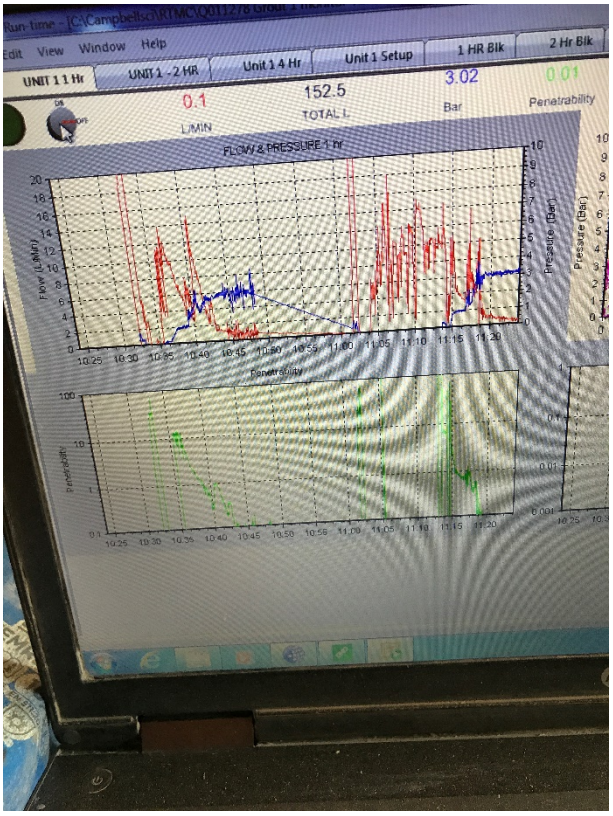
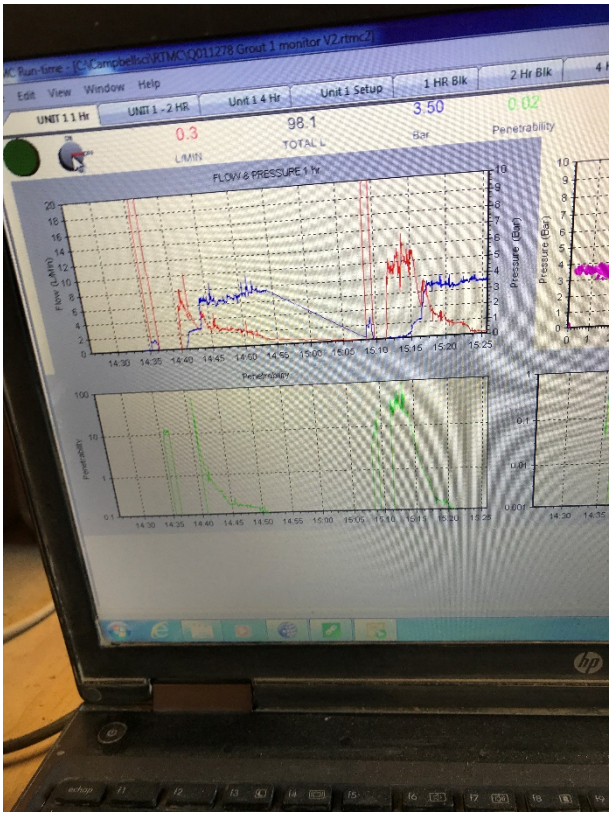
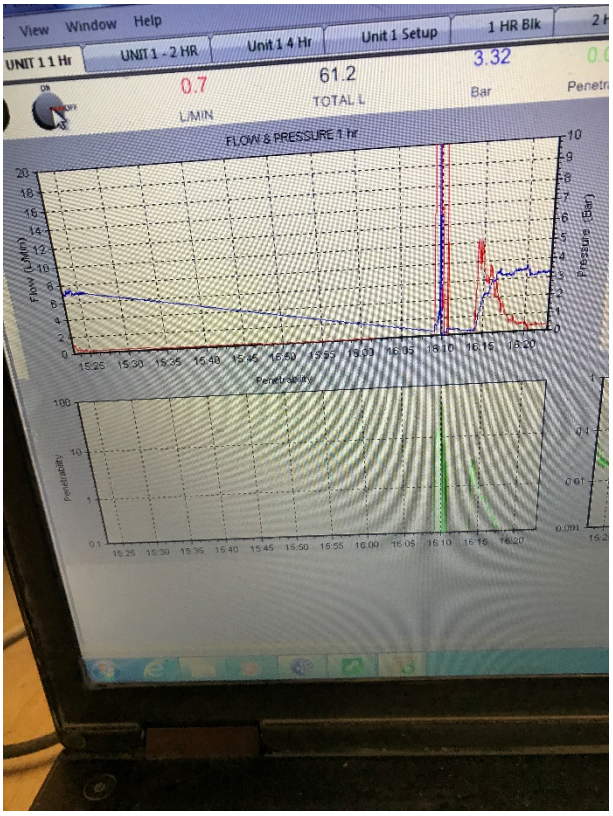


Screen shot of pressure and flow chart at S398.5 and S386.5 from left to right



Screen shot of pressure and flow chart at P368.5 and P354.5 from left to right



Screen shot of pressure and flow chart at P344.5

Packer installed at P368.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200218
Document number

2020-02-18	6:30 am 6:30 pm	669034	Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☐Strong, ☐ gusts Temperature: -31 °C

Comments: Blizzard like conditions from 11am to 2pm

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- During construction meeting AEM and SNC agreed to KCG proposal to backfill hole after pressure refusal if grout take is less than 1000 liters and left the hole open to chek grout level next day if grout take is more than 1000 liters.
- AEM advised KCG if grout discarded due to more than two hours in the agigator tank, grout should not be drained on the ground but should be placed in the tote.

Work Method and Plan

- Continue grouting Primary holes for 5 m stage length and casing plug.
- Continue drilling Secondary holes.

Bedrock Drilling

- Six (6) Secondary holes drilled today.
- The holes were drilled into rock for 5 m grout length.
- No water loss or caving was observed in the holes:

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
S338.5	19.3	-	-	No caving	No
S326.5	16.6	-	-	No caving	No
S314.5	14.5	-	-	No caving	No
S302.5	14.1	-	-	No caving	No
S290.5	14.4	-	-	No caving	No
S278.5	14.3	-	-	No caving	No

Bedrock Grouting.

P260.5 5m stage

- The depth of the hole was checked on Feb 16, 2020 and the hole was open to 14.5 m. Water level was measured at depth 7.1 m
- Packer was placed at the bottom of the casing.
- Prefilled 36 liters of Mix B grout to displace water and then after packer inflated, injected total of 262.7 liters of Mix B.
- After the grouting started, pressure build up slowly and reached Pmax within twenty (20) minutes.
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.44 bar at 0.4 l/min.
- **Hole backfilled after grouting.**

Casing Plug

Six (6) casings plugged today using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and 15 liters grout injected prior to inflate packer.

P-248,5	injected 158 liters grout @ 0.8 bar	(Vmax)
T-245,5	injected 151.2 liters grout @ 1.34 bar	(Vmax)
S-242,5	injected 20.0 liters grout @ 1.98 bar	(Pressure refusal)
T-239,5	injected 25.5 liters grout @ 2.12 bar	(Pressure refusal)
P-236,5	injected 153.7 liters grout @ 0.47 bar	(Vmax)
T-233,5	injected 150.5 liters grout @ 0.34 bar	(Vmax)

P-248.5, T245.5, P236.5 and T233.5 ended at Vmax while rest of all casings injected grout until reach less than 1 liters/ min grout flow at Pmax and wait for 5 minutes.

Grout Test

Mix B	Marsh Value = 40 sec.	S.G = 1.68	Temp. = 19.0 C	Bleeding = 2%
Mix C	Marsh Value = 52 sec.	S.G = 1.75	Temp. = 15.7 C	Bleeding = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

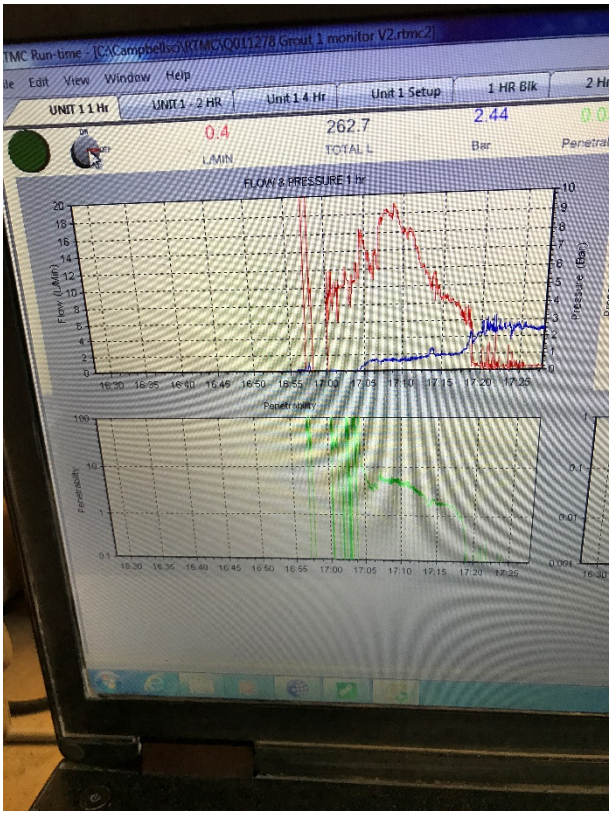
SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **18-02-2020** (Date)

Verified by: *Tom Xue* (Signature) **18-02-2020** (Date)

Moving injection unit



Screen shot of pressure and flow chart at P260.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200219
Document number

2020-02-19	6:30 am 6:30 pm	669034	Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -29 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.

Work Method and Plan

- Continue grouting Primary holes for 5 m stage length and casing plug.
- Continue drilling Secondary holes.

Bedrock Drilling

- No bedrock drilling today

Bedrock Grouting.

- No bedrock grouting today.

Casing Plug

Twelve (12) casings plugged today using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and 15 liters grout injected prior to inflate packer.

S-230,5	injected	179.9 liters grout @ 0.0 bar	(Vmax)
T-227,5	injected	27.0 liters grout @ 1.45 bar	(Pressure refusal)
P-224,5	injected	36.8 liters grout @ 1.44 bar	(Pressure refusal)

T-221,5	injected	19.6 liters grout @ 1.85 bar	(Pressure refusal)
S-218,5	injected	177.2 liters grout @ 1.11 bar	(Vmax)
T-215,5	injected	20.5 liters grout @ 1.51 bar	(Pressure refusal)
P-212,5	injected	20.2 liters grout @ 1.95 bar	(Pressure refusal)
T-209,5	injected	173.3 liters grout @ 0.86 bar	(Vmax)
S-206,5	injected	179.9 liters grout @ 0.0 bar	(Vmax)
T-203,5	injected	27.0 liters grout @ 1.45 bar	(Pressure refusal)
P-200,5	injected	36.8 liters grout @ 1.44 bar	(Pressure refusal)
S-194,5	injected	143.1 liters grout @ 2.28 bar	(Vmax)

- S-218.5, T209.5, S206.5 and T194.5 ended at Vmax while rest of all casings injected grout until reach less than 1 liters/ min grout flow at Pmax and wait for 5 minutes.
- At P200.5, due to slush like muddy material in the hole packer was first placed at the bottom of the hole and then injected 20 liters of grout to displace mud and after that packer raised by 2m and inflated to complete casing plug.
- T197.5 was not plugged due to about 1 m mud in the hole and packer cannot be pushed through the mud. KCG is not interested to clean the hole with drill rig, rather than want to drill the hole and then inject by placing packer half in the casing and half in the rock.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.

Grout Test

Mix C	Marsh Value = 80 sec.	S.G = 1.76	Temp.	= 24.0 C	Bleeding =	1%
Mix C	Marsh Value = 56 sec.	S.G = 1.75	Temp.	= 27.5 C	Bleeding =	
Mix C	Marsh Value = 77 sec.	S.G = 1.78	Temp.	= 18.9 C	Bleeding =	1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **19-02-2020** (Date)

Verified by: *Tom Xue* (Signature) **19-02-2020** (Date)

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200220
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-02-20	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☒ gusts Temperature: -33 °C

Comments: Blizzard started in the late morning

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Attended AEM-SNC coordination meeting.
- SNC will provide the location of super primary holes (deeper holes) for U/S blanket/curtain grouting.
- SNC will provide the location of Quaternary holes for D/S blanket grouting.
- KCG will submit RFI to request relaxation in casing deviation from 0.5% to 2.0%
- Will discuss with AEM and KCG tomorrow to decide the need and location of the four (4) missing casing for the D/S blanket

Work Method and Plan

- Continue grouting casing plug.

Bedrock Drilling

- No bedrock drilling today

Bedrock Grouting.

- No bedrock grouting today.
- Injection unit was moved to T437.5 after competing casing plug and set to start grouting when new crew arrived on Saturday.

Casing Plug
Six (6) casings plugged today using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and 15 liters grout injected prior to inflate packer.

T-191,5	injected 16.9 liters grout @ 1.98 bar	(Pressure refusal)
P-188,5	injected 55.5 liters grout @ 1.48 bar	(Pressure refusal)
T-185,5	injected 25.0 liters grout @ 1.94 bar	(Pressure refusal)
S-182,5	injected 28.3 liters grout @ 1.60 bar	(Pressure refusal)
T-179,5	injected 26.8 liters grout @ 1.42 bar	(Pressure refusal)
P-176,5	injected 38.2 liters grout @ 1.38 bar	(Pressure refusal)

- All casings injected grout until reach less than 1 liters/ min grout flow at Pmax and wait for 5 minutes.
- At T191.5, due to slush like muddy material in the hole packer was first placed at the bottom of the hole and then injected 15 liters of grout to displace mud and after that packer raised by 2m and inflated to complete casing plug.
- All the casings have been plugged on downstream side except T197.5.
- All the casings plugged today, casings were socketed minimum 0.3 m into bedrock.

Grout Test
Mix C Marsh Value = 61 sec. S.G = 1.76 Temp. = 24.0 C Bleeding = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **20-02-2020** (Date)

Verified by: *Tom Xue* (Signature) **20-02-2020** (Date)

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200221
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-02-21	6:30 am 6:30 pm	669034	Sebastien Viau / Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -35 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- No grouting activities due to crew rotation.

Work Method and Plan

- Drilling of eight (8) holes (one secondary and seven primary holes).

Bedrock Drilling

- Eight (8) holes (one secondary and seven primary holes) were drilled today.
- The holes were drilled into rock for 5 m grout length.
- No water loss was observed in the holes:

Hole ID	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Aditionnal casing (m)
S266.5	14.5	-	-	No caving	No
P248.5	14.5	-	-	No caving	No
P236.5	14.5	-	-	No caving	No
P224.5	14.6	-	-	No caving	No
P212.5	15.1	-	-	No caving	No
P200.5	15.3	-	-	No caving	No

P188.5	13.9	-	-	No caving	No
P176.5	13.4	-	-	No caving	No

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by:	*Sebastien Viau / Muhammad Saleem*	**24-02-2020**
	Signature	Date
Verified by:	*Tom Xue*	**24-02-2020**
	Signature	Date

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200222
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-02-22	6:30 am 6:30 pm	669034	Sebastien Viau

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -35 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- QA missed his flight on Friday morning. No QA on site until Monday Feb 24th.

Work Method and Plan

- Continue grouting tertiary holes.
- Casing installation at upstream blanket.
- Considering adjacent secondary and primary holes grout take, it was decided to start grouting of tertiary holes with mix B.

T407.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached within 15 min.
- Total 133 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.4 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T413.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached within 5 min.

- Total 68 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.5 bar at a flow rate of 0.2 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T419.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached within 10 min.
- Total 76 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.1 bar at a flow rate of 0.1 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T425.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pressure started to build up quickly from the beginning of the grouting process and reached Pmax within 5 min.
- Total 40 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 1.2 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T431.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached within 5 min.
- Total 42 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.4 bar at a flow rate of 0.9 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T437.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout without Celbex.
- Pmax was reached within 5 min.
- Total 48 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.4 bar at a flow rate of 1.1 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Upstream blanket casing installation

- One casing installed (T-748).
- Water measured at depth of 5.0 m.

- Drilling rig broke down after the installation of this casing. The casing installation will resume when the contractor will receive the replacement part.

Grout Test

Mix B	Marsh Value = 51 sec.	S.G = 1.72	Temp.	= 27.0 C	Bleeding =	2.0%
Mix B	Marsh Value = 48 sec.	S.G = 1.72	Temp.	= 24.0 C	Bleeding =	-
Mix B	Marsh Value = 49 sec.	S.G = 1.73	Temp.	= 24.5 C	Bleeding =	2.0%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

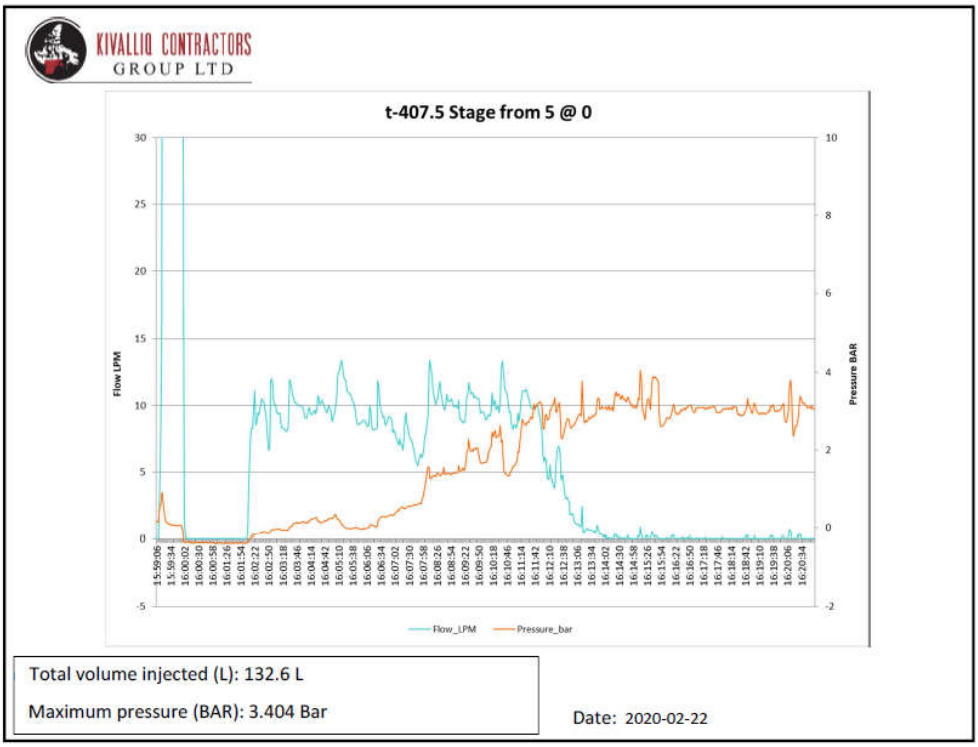
SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

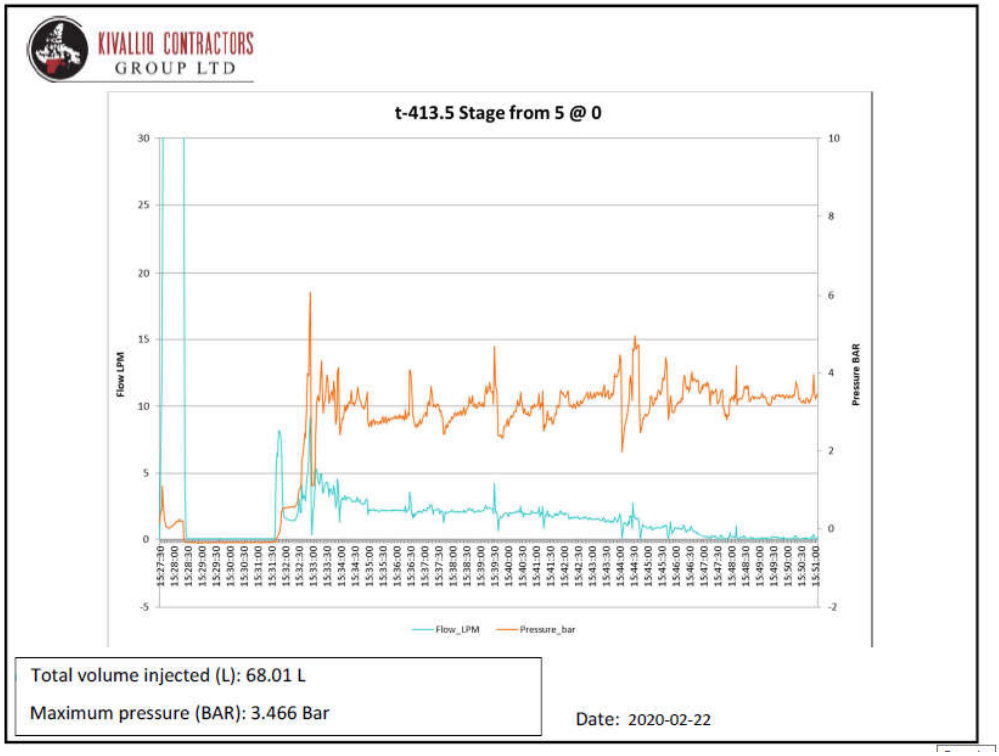
SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

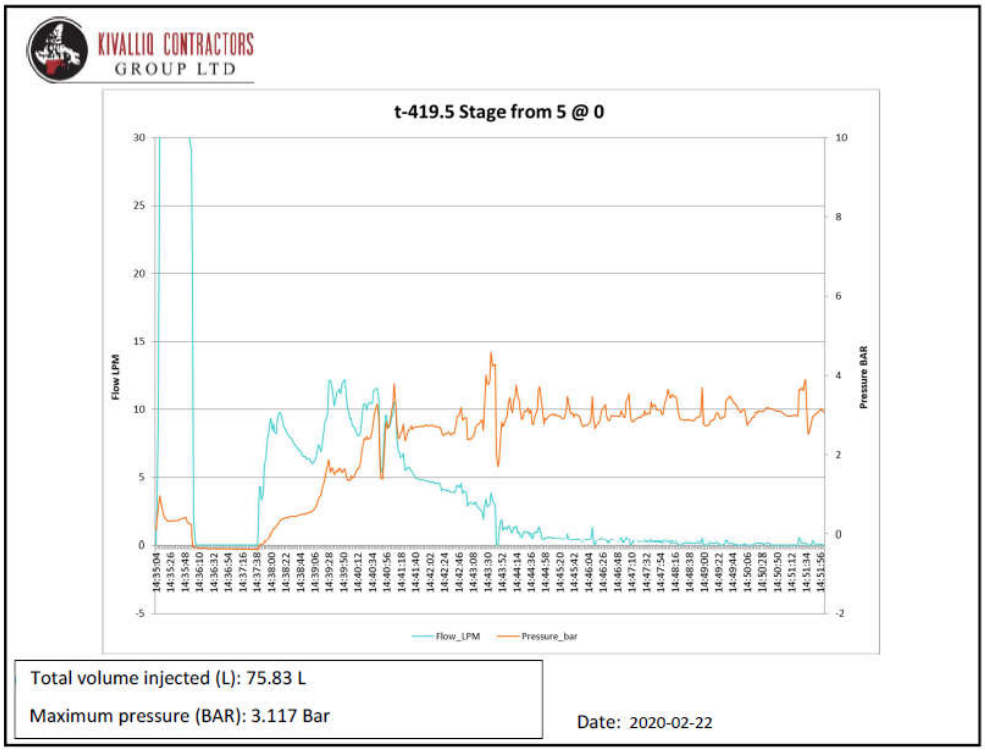
Issued by:	*Sebastien Viau*	**24-02-2020**
	Signature	Date
Verified by:	*Tom Xue*	**24-02-2020**
	Signature	Date



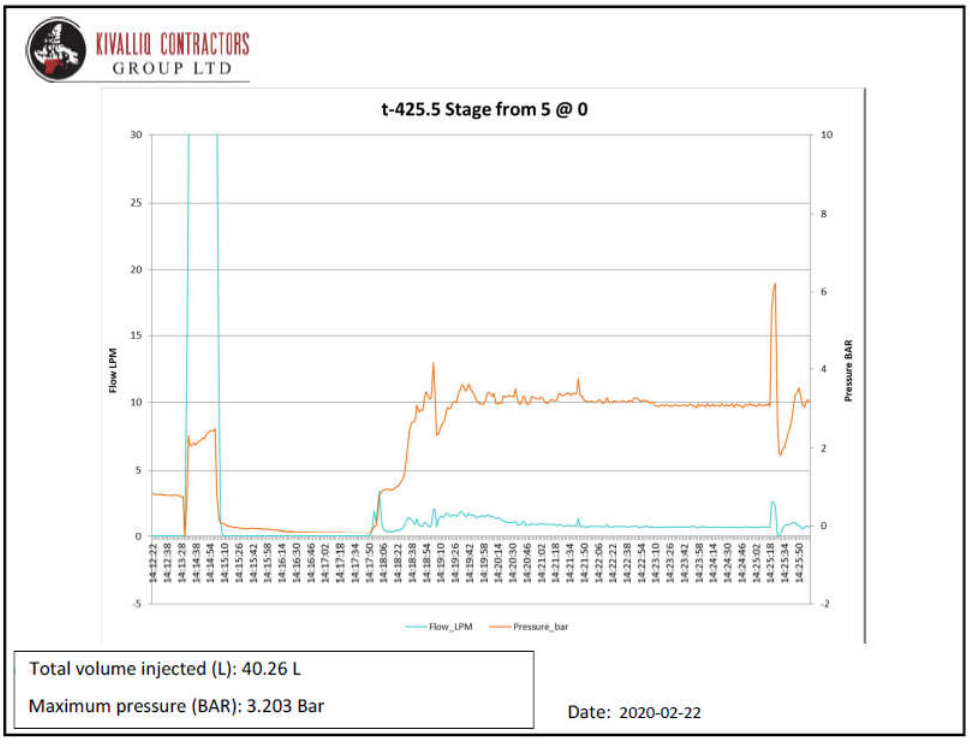
Pressure and flow chart at T407.5



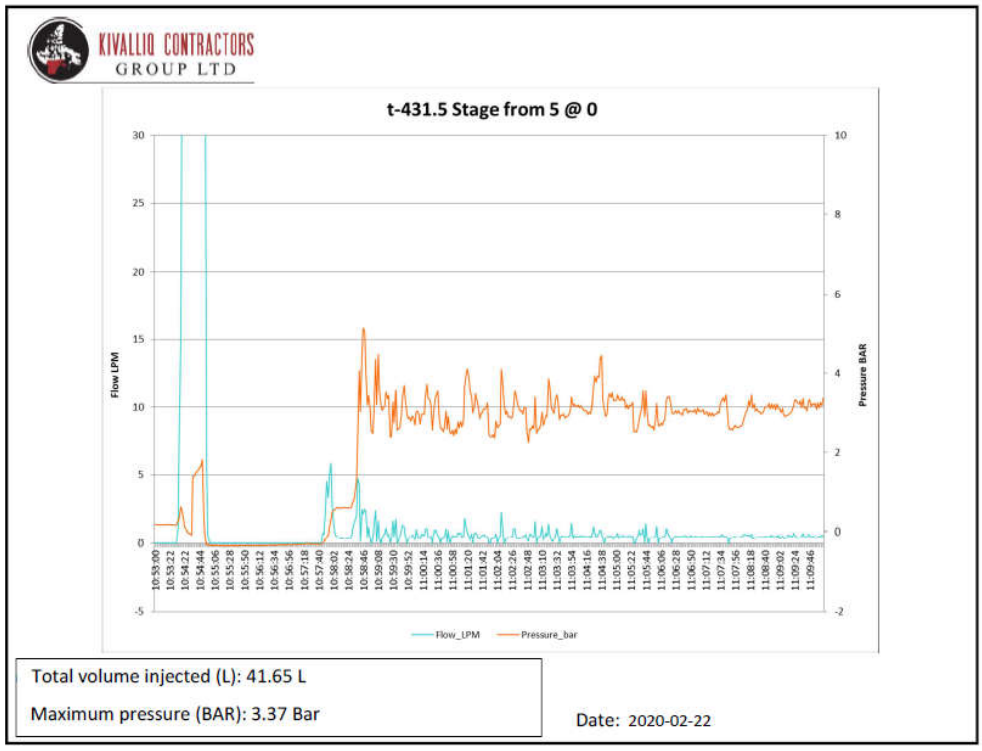
Pressure and flow chart at T413.5



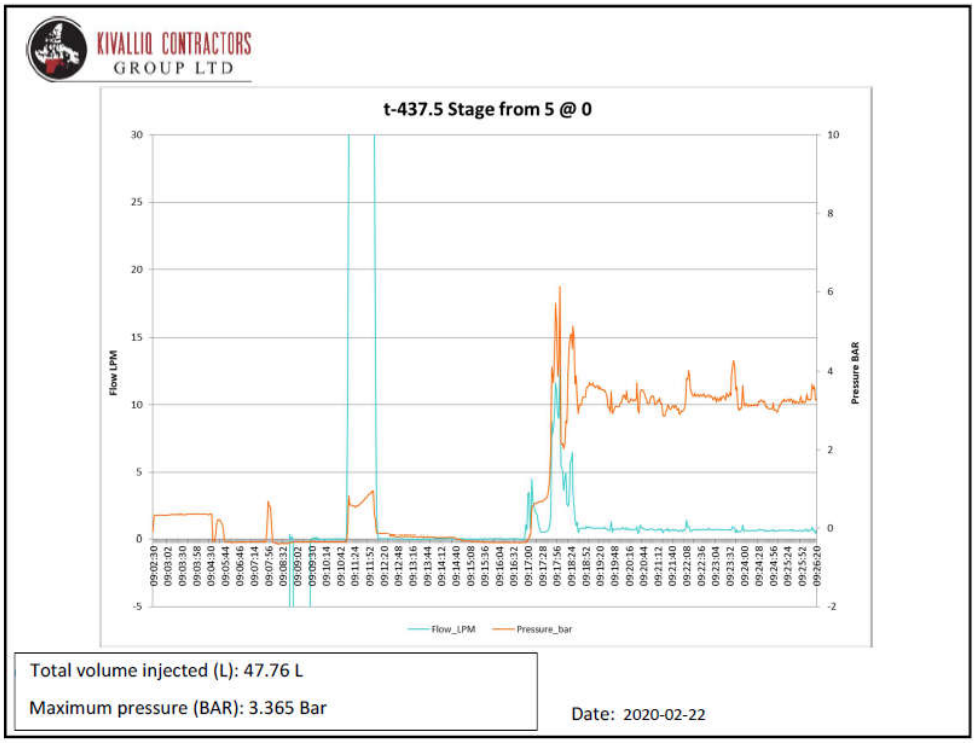
Pressure and flow chart at T419.5



Pressure and flow chart at T425.5



Pressure and flow chart at T431.5



Pressure and flow chart at T437.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200223
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-02-23	6:30 am 6:30 pm	669034	Sebastien Viau

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -34 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- No QA on site until Monday Feb 24th.

Work Method and Plan

- Grouting tertiary and secondary holes.
- Considering the secondary and primary holes grout take in the West portion of the dike, grouting of tertiary and secondary holes will now starts with mix B.

T401.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- After +- 400 L of mix B, grout was changed to Mix C without Celbex (for +-230 L).
- Pmax was reached after +-30 min.
- Total 631 liters of grout injected (+-400 L of Mix B and +-231 L of Mix C without Celbex).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.4 bar at a flow rate of 0.2 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T395.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached after +-10 min.

- Total 97 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.3 bar at a flow rate of 0.0 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T389.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached after +-10 min.
- Total 100 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.3 bar at a flow rate of 0.1 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T383.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached within 5 min.
- Total 74 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.1 bar at a flow rate of 0.0 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S374.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached within 5 min.
- Total 76 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.9 bar at a flow rate of 0.1 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S362.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with mix B grout.
- Pmax was reached within 5 min.
- Total 76 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.3 bar at a flow rate of 0.4 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix B	Marsh Value = 54 sec.	S.G = 1.70	Temp.	= 26.0 C	Bleeding =	2.0%
Mix C	Marsh Value = 64 sec.	S.G = 1.76	Temp.	= 25.0 C	Bleeding =	-
Mix B	Marsh Value = 48 sec.	S.G = 1.71	Temp.	= 21.0 C	Bleeding =	2.0%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

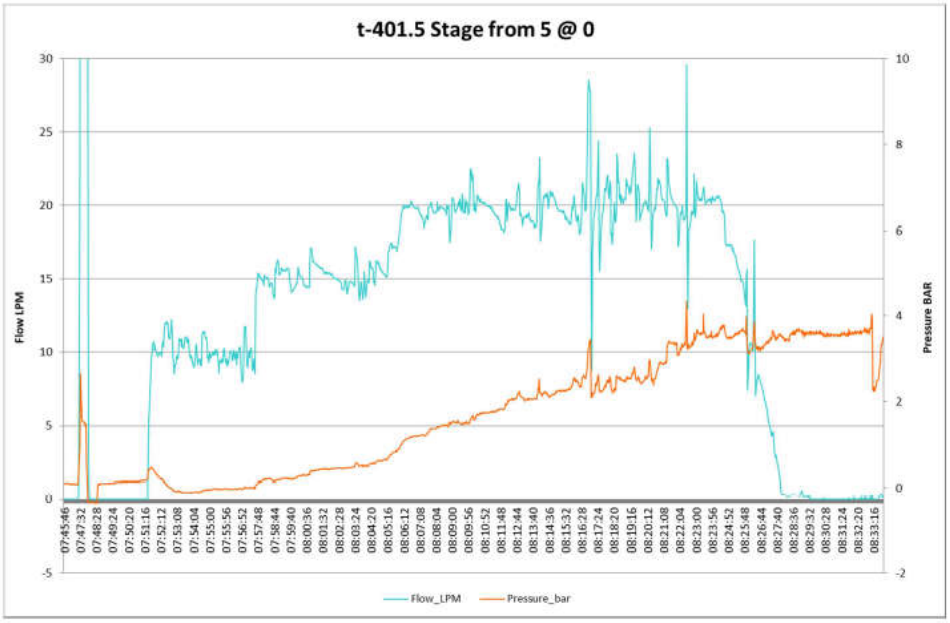
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by:	*Sebastien Viau*	**24-02-2020**
	Signature	Date
Verified by:	*Tom Xue*	**24-02-2020**
	Signature	Date

KIVALLIQ CONTRACTORS GROUP LTD



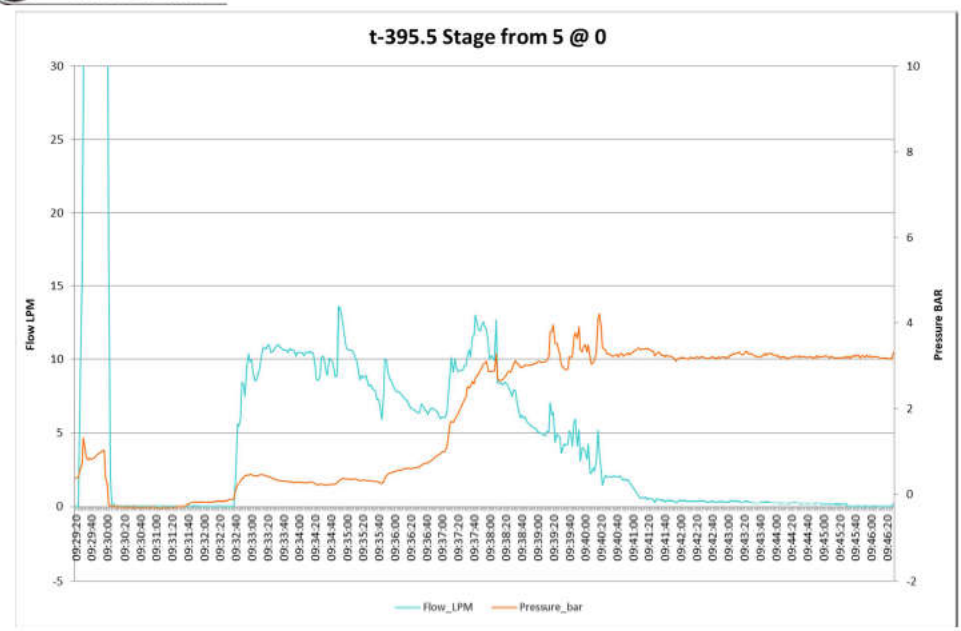
Total volume injected (L): 630.6 L

Maximum pressure (BAR): 3.41 Bar

Date: 2020-02-23

Pressure and flow chart at T401.5

KIVALLIQ CONTRACTORS GROUP LTD



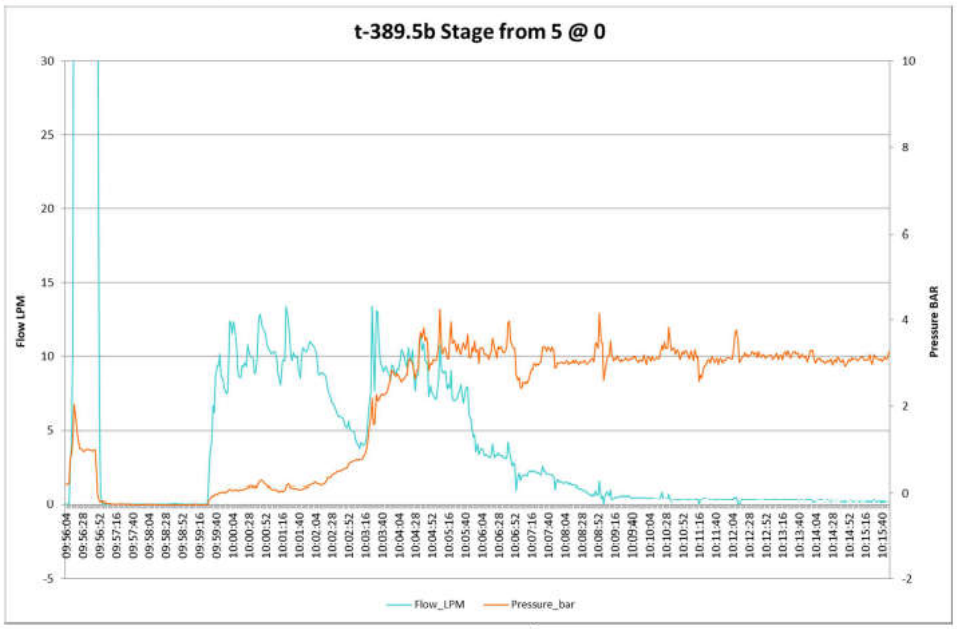
Total volume injected (L): 96.5 L

Maximum pressure (BAR): 3.324 Bar

Date: 2020-02-23

Pressure and flow chart at T395.5

KIVALLIQ CONTRACTORS GROUP LTD



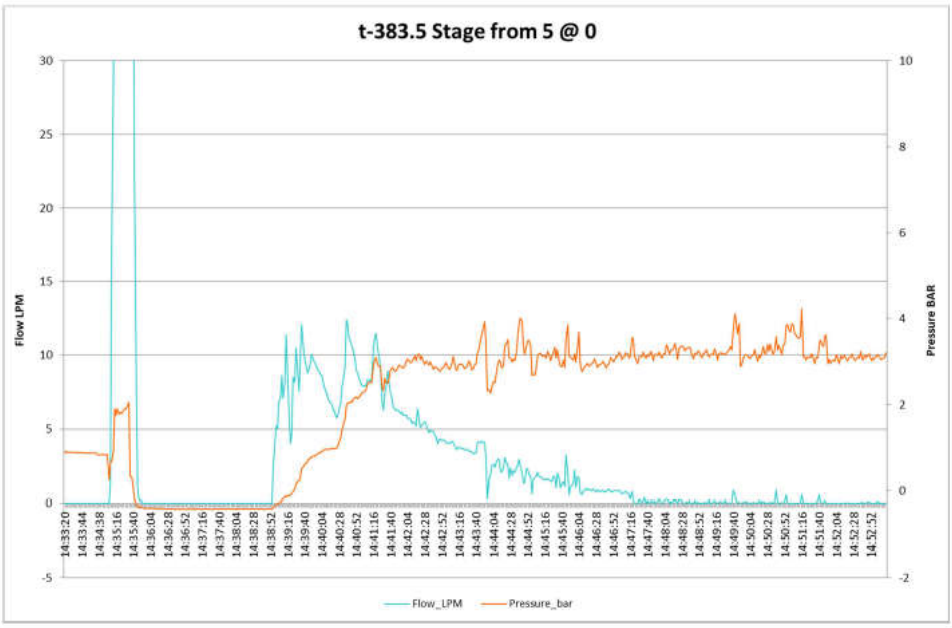
Total volume injected (L): 100.1 L

Maximum pressure (BAR): 3.295 Bar

Date: 2020-02-23

Pressure and flow chart at T389.5

KIVALLIQ CONTRACTORS GROUP LTD

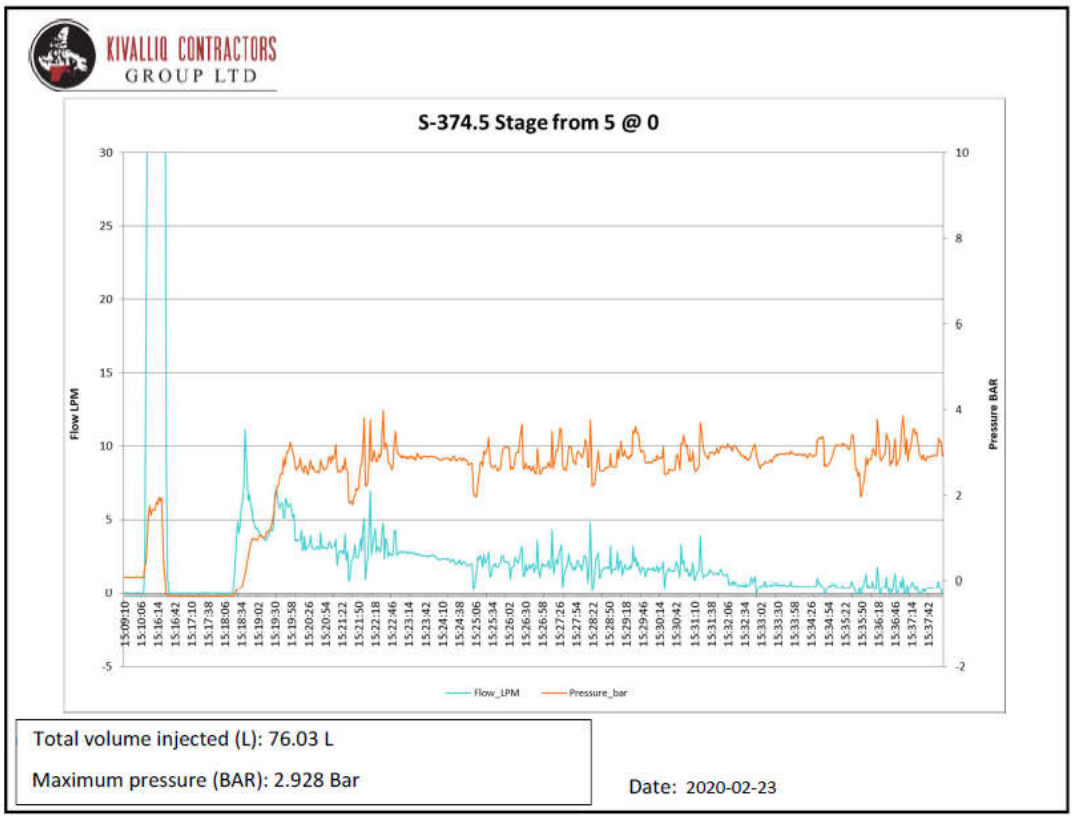


Total volume injected (L): 74.0 L

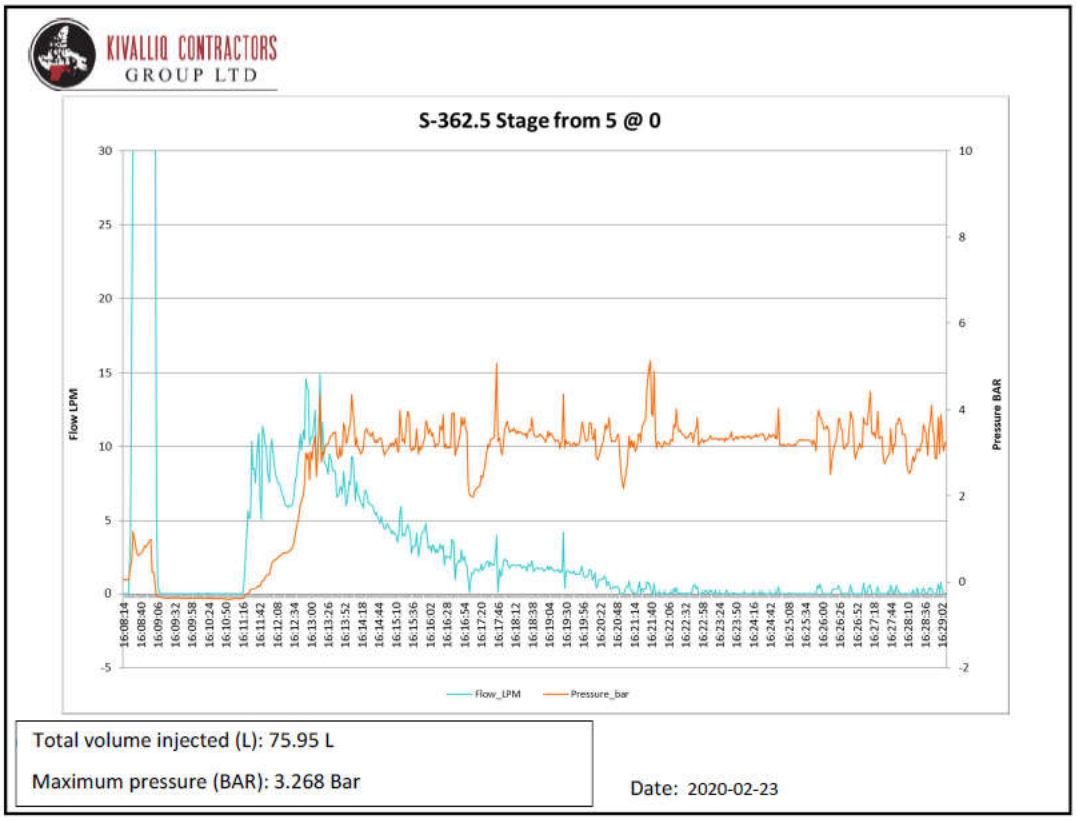
Maximum pressure (BAR): 3.085 Bar

Date: 2020-02-23

Pressure and flow chart at T383.5



Pressure and flow chart at S374.5



Pressure and flow chart at S362.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200224
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-02-24	6:30 am 6:30 pm	669034	Sebastien Viau

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☒Moderate ☐Strong, ☐ gusts Temperature: -35 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- QA got back on site at the end of the day.

Work Method and Plan

- Grouting secondary holes.
- Considering the anticipated low grout take in the West portion of the dike, grouting will now start with Mix B.

S350.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +-5 min.
- Total 64 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.1 bar at a flow rate of 0.1 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S338.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 64 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.

- The closing pressure was 4.0 bar at a flow rate of 0.3 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S326.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 56 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.1 bar at a flow rate of 0.5 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S314.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 58 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.9 bar at a flow rate of 1.0 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S302.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 46 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.8 bar at a flow rate of 0.0 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S290.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 69 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.1 bar at an average flow rate of 0.7 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix B	Marsh Value = 51 sec.	S.G = 1.72 Temp. = 19.5 C	Bleeding = 2.0%
Mix B	Marsh Value = 54 sec.	S.G = 1.72 Temp. = 18.0 C	Bleeding = -
Mix B	Marsh Value = 55 sec.	S.G = 1.73 Temp. = 18.5 C	Bleeding = 2.0%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

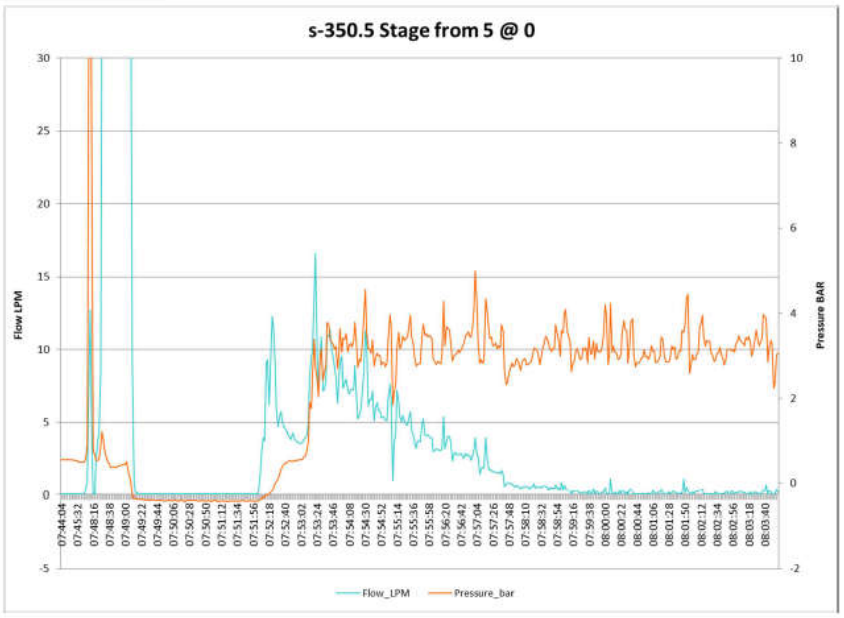
SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Sebastien Viau* — Signature — **25-02-2020** — Date

Verified by: *Tom Xue* — Signature — **25-02-2020** — Date

KIVALLIQ CONTRACTORS GROUP LTD



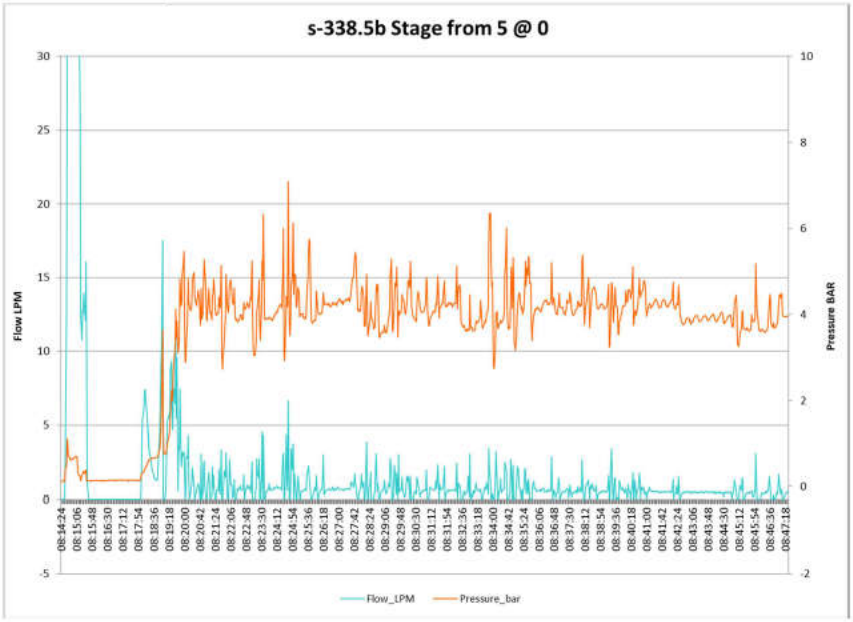
Total volume injected (L): 63.55 L

Maximum pressure (BAR): 3.055 Bar

Date: 2020-02-24

Pressure and flow chart at S350.5

KIVALLIQ CONTRACTORS GROUP LTD

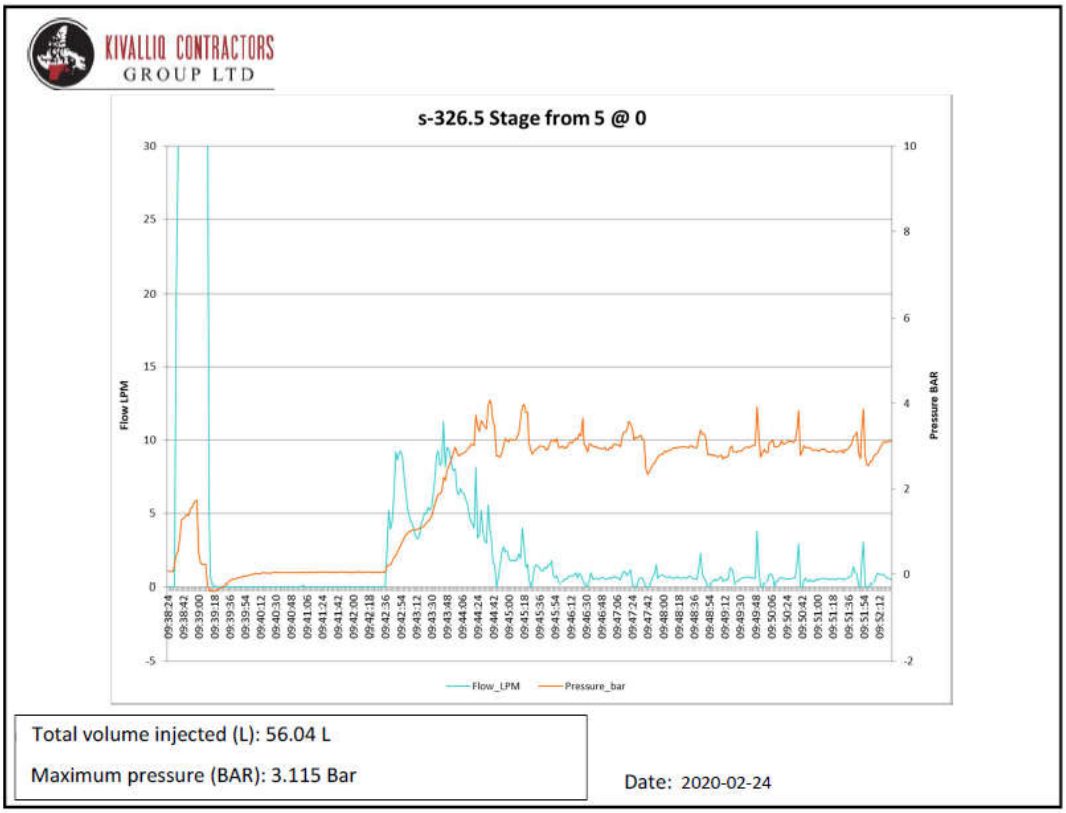


Total volume injected (L): 63.94 L

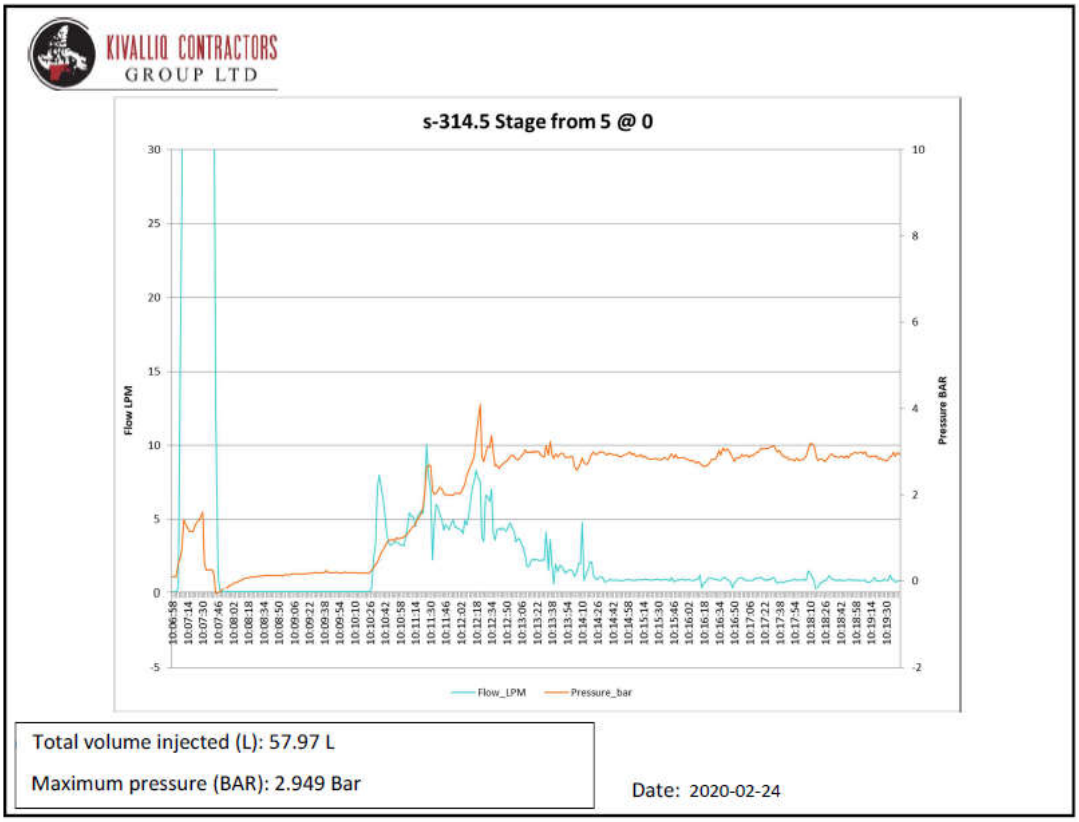
Maximum pressure (BAR): 3.958 Bar

Date: 2020-02-24

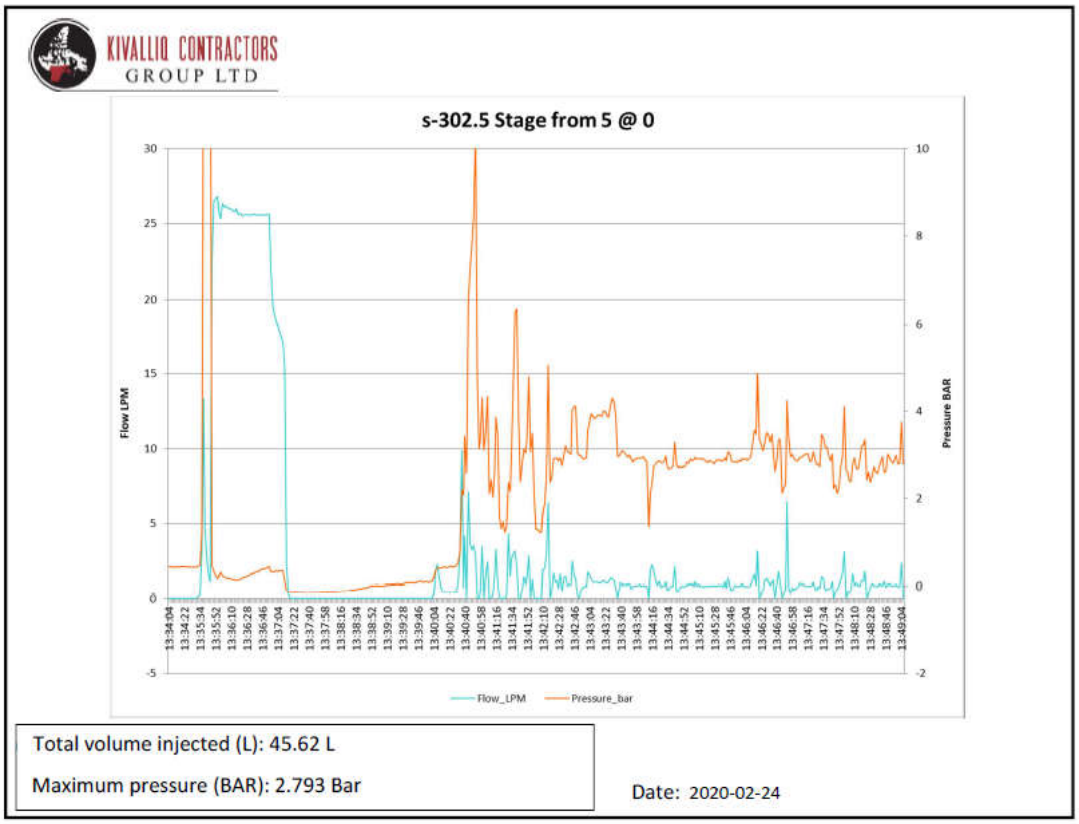
Pressure and flow chart at S338.5



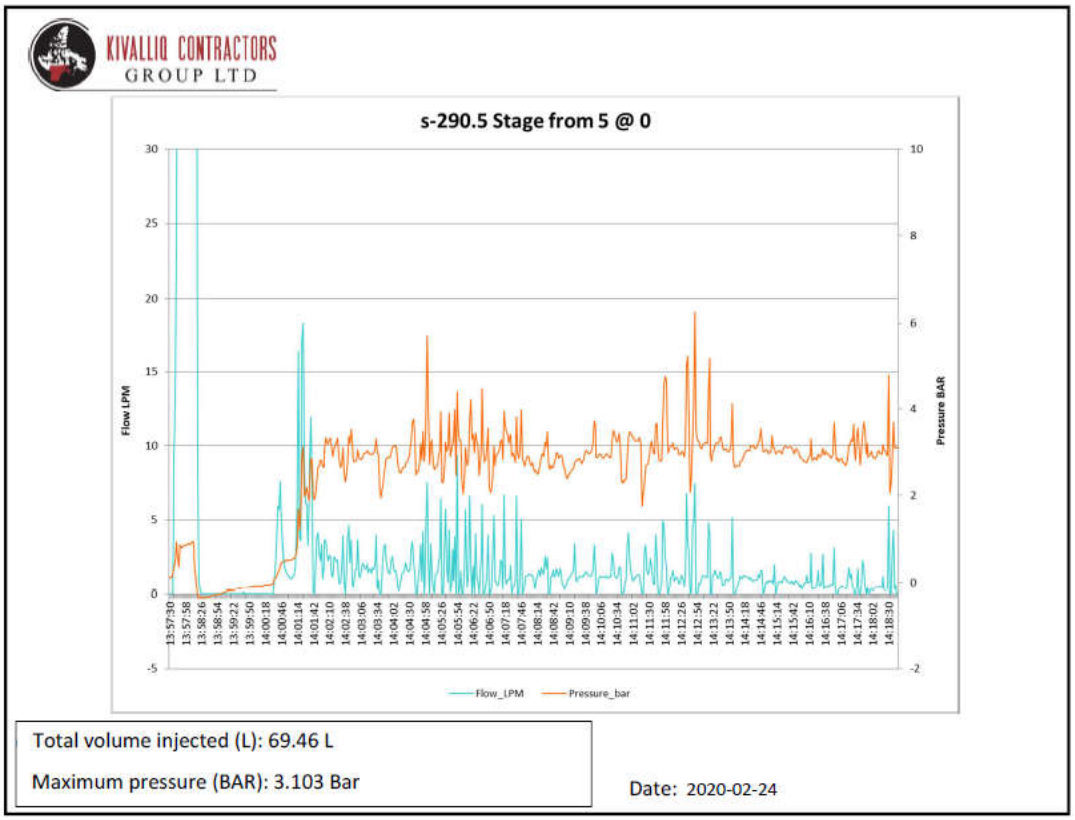
Pressure and flow chart at S326.5



Pressure and flow chart at S314.5



Pressure and flow chart at S302.5



Pressure and flow chart at S290.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200225
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-02-25	6:30 am 6:30 pm	669034	Sebastien Viau

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -32 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.

Work Method and Plan

- Grouting secondary and primary holes.
- Considering the anticipated low grout take in the West portion of the dike, grouting will now start with Mix B.
- Drilling Tertiary holes.

S278.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 52 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.3 bar at a flow rate of 0.3 l/min. The Pmax was supposed to be higher at 3.1 bar but it was written 2.1 bar on the sheet provided to the grout shack. It was found later that the pressure should have been higher but the hole was already backfilled.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S266.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 38 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 46 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.3 bar at a flow rate of 0.9 l/min. The Pmax was supposed to be higher at 3.3 bar but it was written 2.3 bar on the sheet provided to the grout shack. It was found later that the pressure should have been higher but the hole was already backfilled.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

P248.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 10 min.
- Total 67 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 0.8 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

P236.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 35 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 54 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.0 bar at a flow rate of 0.4 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

P224.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 63 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.0 bar at a flow rate of 0.2 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

P212.5 5 m stage

- Packer was placed at the bottom of the casing.

- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 62 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 1.0 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

P200.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 1 min.
- Total 41 liters of grout injected (Mix B)
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.9 bar at a flow rate of 0.5 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix B	Marsh Value = 51 sec.	S.G = 1.72 Temp. = 19.5 C	Bleeding = 2.0%
Mix B	Marsh Value = 54 sec.	S.G = 1.72 Temp. = 18.0 C	Bleeding = -
Mix B	Marsh Value = 55 sec.	S.G = 1.73 Temp. = 18.5 C	Bleeding = 2.0%

Bedrock Drilling

- Thirteen (13) tertiary holes drilled today.
- The holes were drilled into rock for 5 m grout length.
- No water loss was observed in the holes:

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
T-293,5	14.1	-	-	No caving	No
T-299,5	13.2	-	-	No caving	No
T-305,5	13.6	-	-	No caving	No
T-311,5	13.9	-	-	No caving	No
T-317,5	15.0	-	-	No caving	No
T-323,5	15.7	-	-	No caving	No
T-329,5	16.4	-	-	No caving	No
T-341,5	17.9	-	-	No caving	No
T-347,5	18.4	-	-	No caving	No
T-353,5	19.9	-	-	No caving	No
T-365,5	22.3	-	-	No caving	No
T-371,5	18.2	-	-	No caving	No
T-377,5	16.9	-	-	No caving	No

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

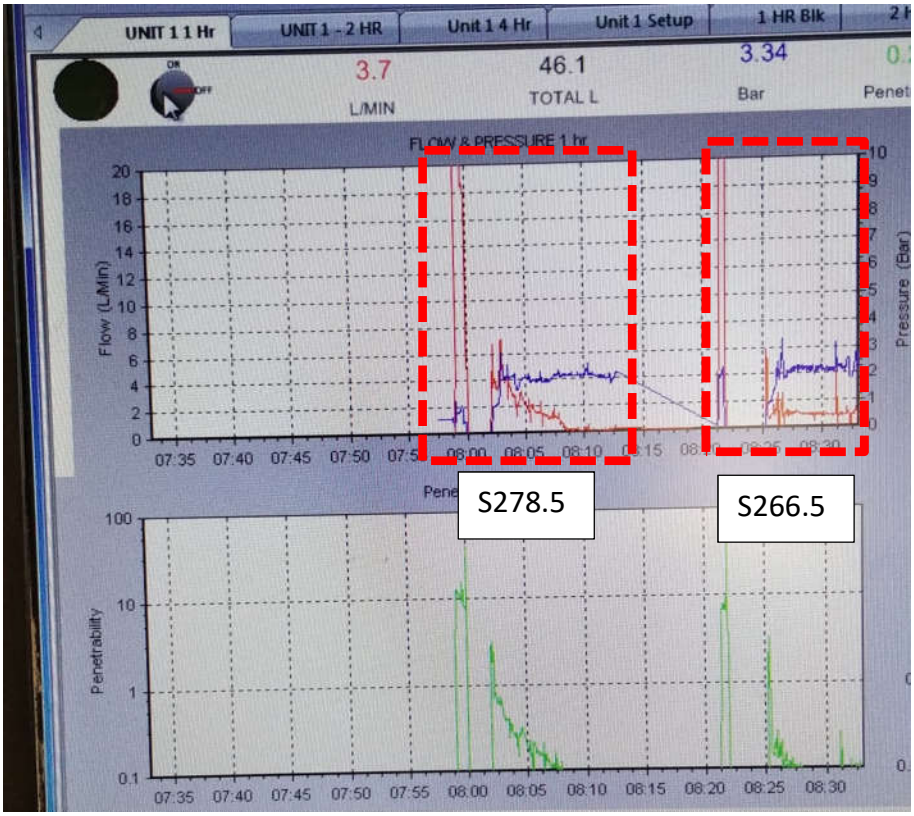
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

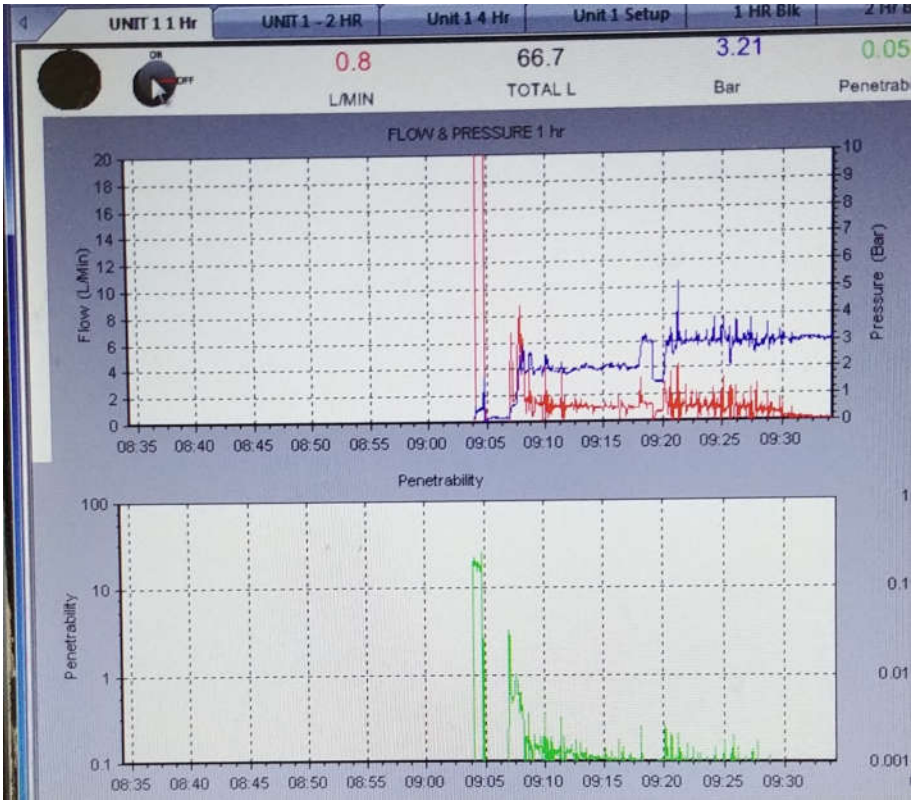
- Dress up properly for extreme cold conditions

Issued by: *Sebastien Viau* (Signature) **25-02-2020** (Date)

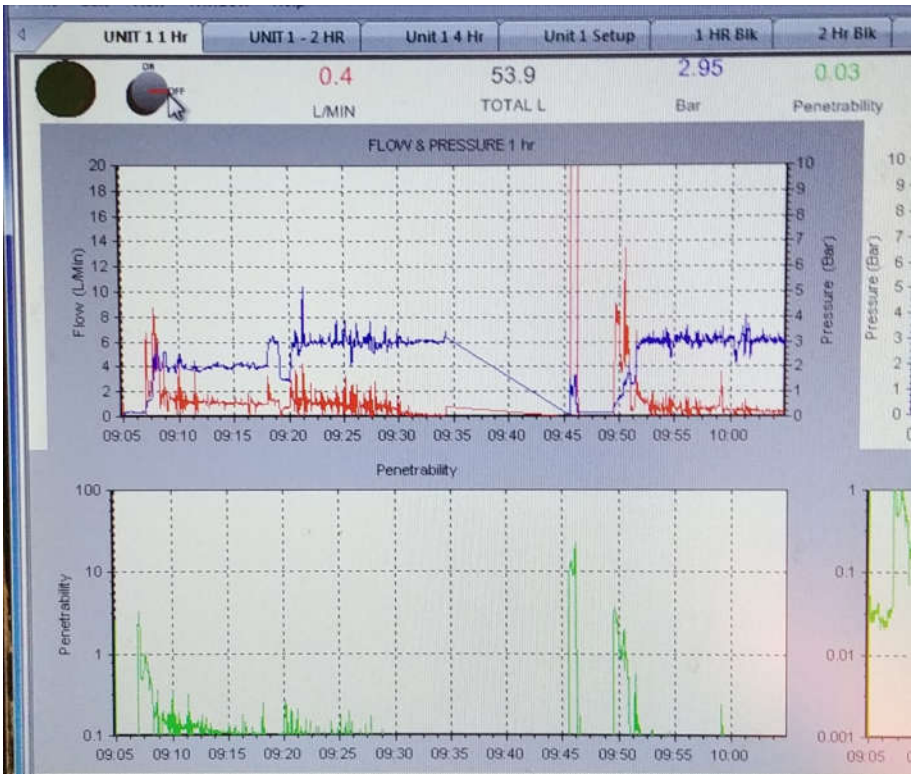
Verified by: *Tom Xue* (Signature) **25-02-2020** (Date)



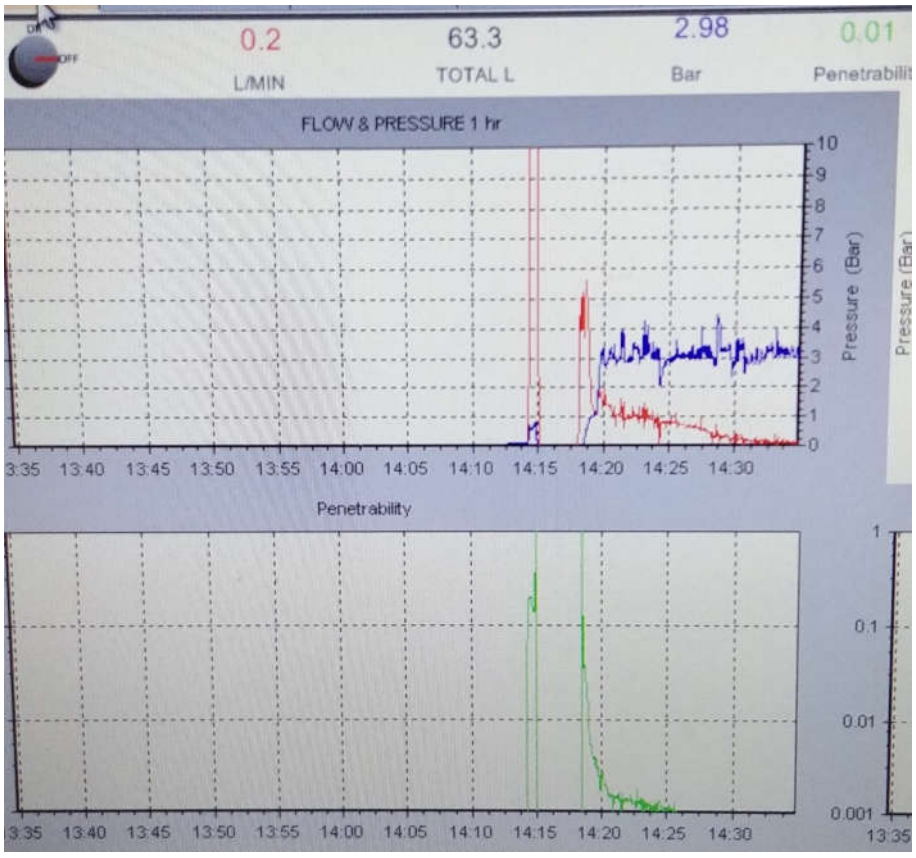
Pressure and flow chart at S278.5 ans S266.5



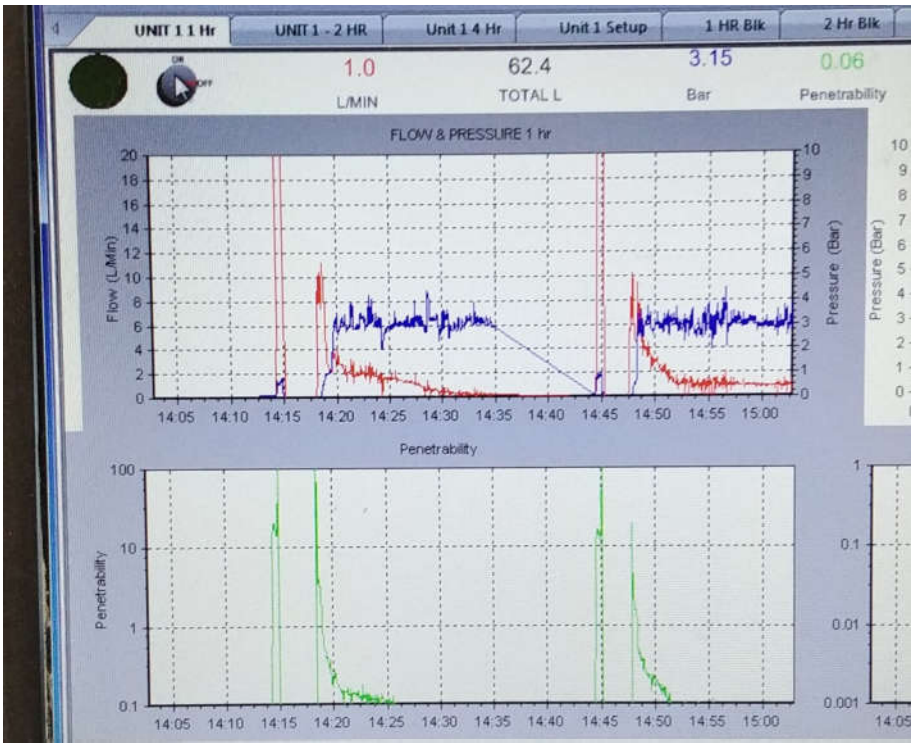
Pressure and flow chart at P248.5



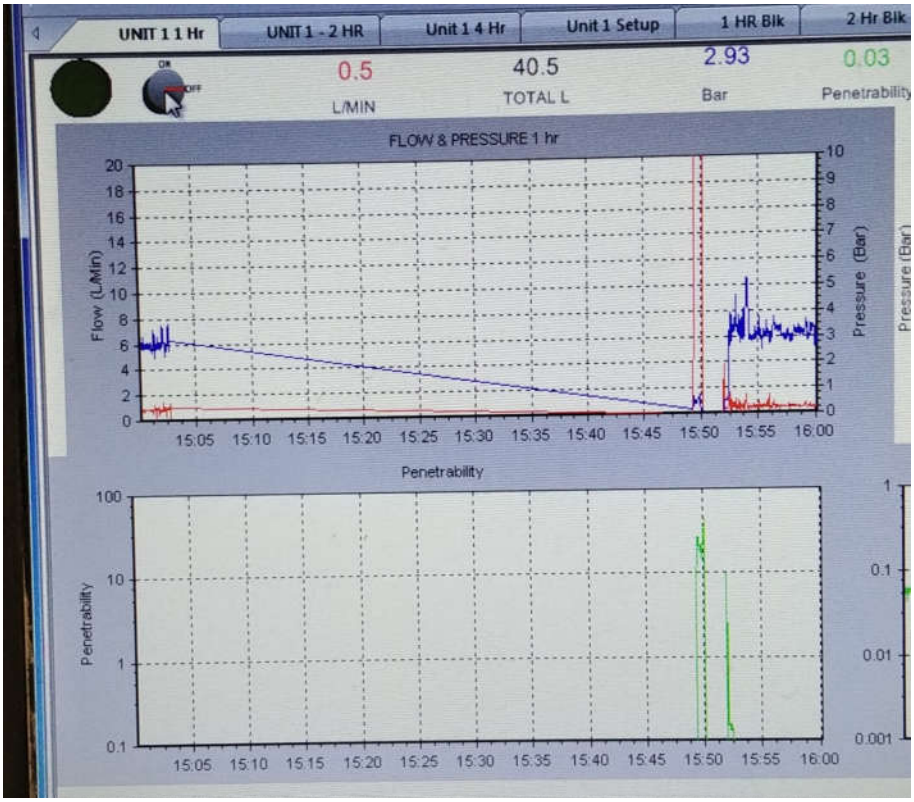
Pressure and flow chart at P236.5



Pressure and flow chart at P224.5



Pressure and flow chart at P212.5



Pressure and flow chart at P200.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200226
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-02-26	6:30 am 6:30 pm	669034	Sebastien Viau

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -30 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Provided to the contractor the grout mixes table to incorporate as legend on the As-Built Drilling and Grouting.

Work Method and Plan

- Completing Primary holes grouting of the downstream blanket.
- After the completion of the primary holes, maintenance will be required on the grout unit structure.
- Drilling Secondary and Tertiary holes of the downstream blanket.
- Casing installation at downstream (quaternary) and upstream blanket.

P188.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 38 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pressure started to build up slowly after +- 200 L and Pmax was reached after +- 25 min.
- Total 404 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.9 bar at a flow rate of 0.0 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

P176.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- After +- 420 L of mix B, grout was changed to Mix C without Celbex (for +-110 L).
- Pressure started to build up after +- 25 min.
- Total 509 liters of grout injected (+- 420 L of Mix B and +- 90 L of Mix C).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.0 bar at a flow rate of 0.0 l/min
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

After the two primary holes grouting completion (10 am), grouting operation were adjourned in order to repair the steel structure of the grout unit. Grouting operation has not resumed yet.

Grout Test

Mix B Marsh Value = 52 sec. S.G = 1.71 Temp. = 27.5 C Bleeding = 2.4%
Mix B Marsh Value = 55 sec. S.G = 1.72 Temp. = 24.0 C Bleeding = -

Bedrock Drilling

- Nine (9) secondary and tertiary holes drilled today.
- The holes were drilled into rock for 5 m grout length.
- No water loss was observed in the holes:

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
S-206,5	15.7	-	-	No caving	No
S-218,5	15.8	-	-	No caving	No
S-230,5	14.2	-	-	No caving	No
S-242,5	14.3	-	-	No caving	No
S-254,5	14.8	-	-	No caving	No
T-269,5	14.4	-	-	No caving	No
T-275,5	14.5	-	-	No caving	No
T-281,5	14.4	-	-	No caving	No
T-287,5	13.9	-	-	No caving	No

Casing installation

- Five casing installed (night shift and day shift); four (4) at the downstream blanket and one (1) at the upstream blanket.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m)
Q-697,0	DS	9.45	9.96	10.26	9.1
Q-733,0	DS	8.89	9.81	10.11	9.07
Q-736,0	DS	8.9	9.73	10.03	8.87
Q-739,0	DS	8.9	10.2	10.5	5.0
S-745,0	US	8.4	8.8	9.1	5.0

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

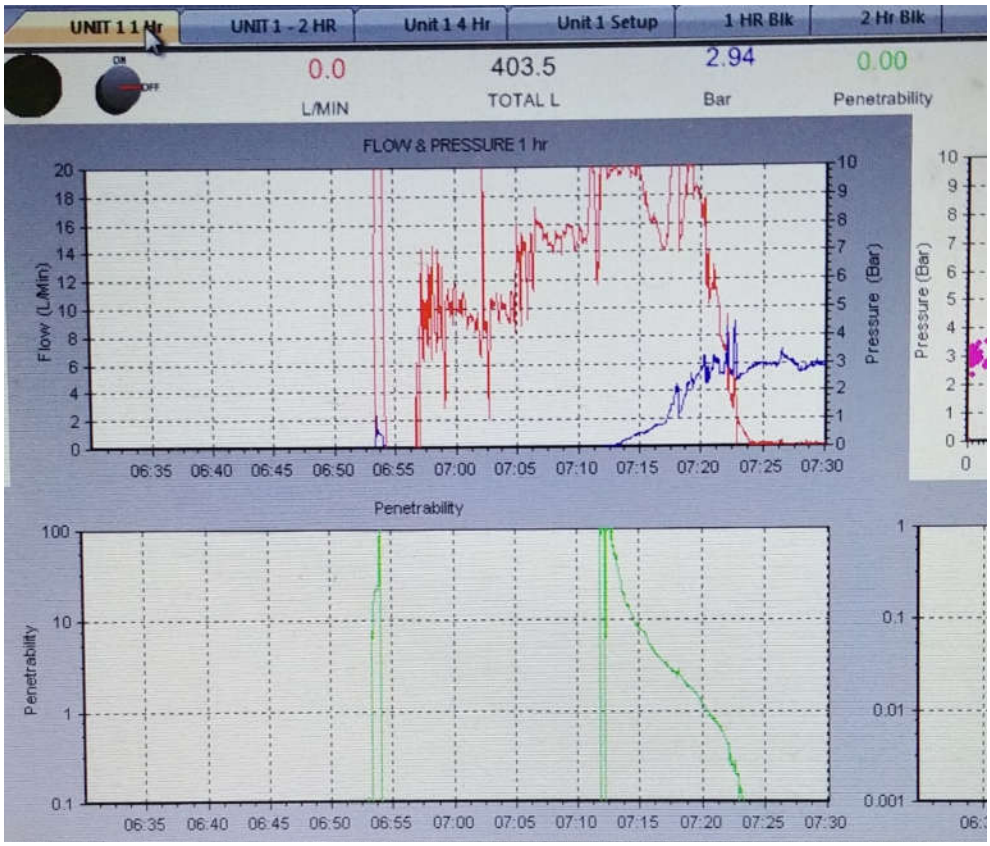
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

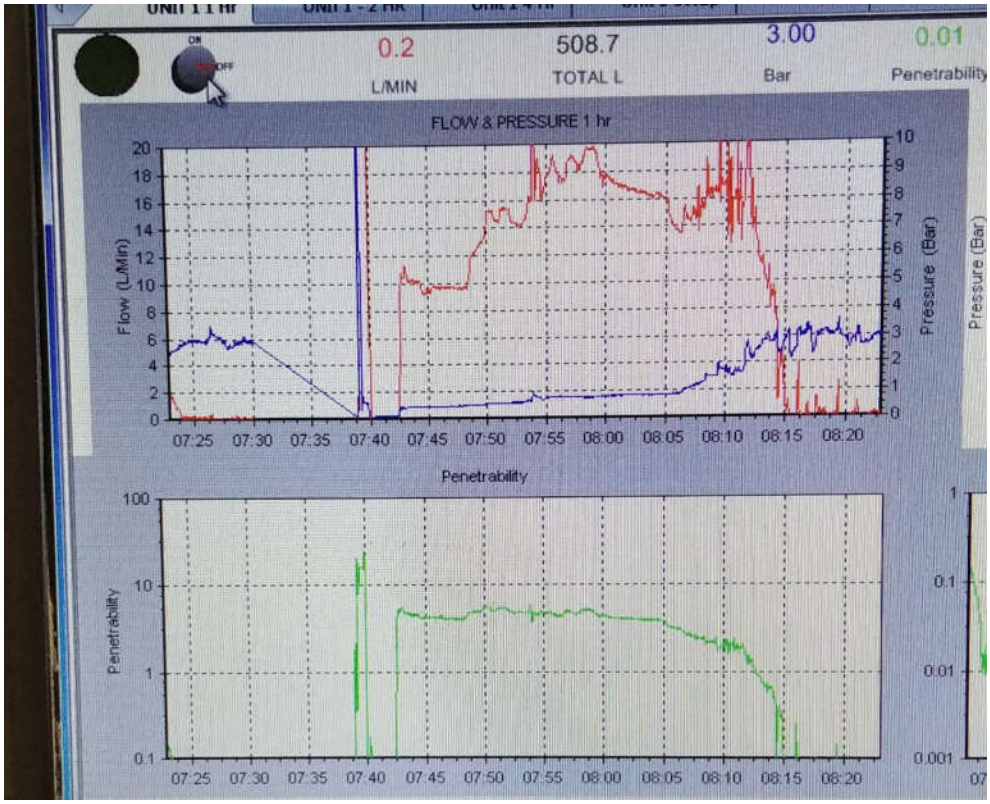
- Dress up properly for extreme cold conditions

Issued by: *Sebastien Viau* — Signature — **26-02-2020** — Date

Verified by: *Tom Xue* — Signature — **26-02-2020** — Date



Pressure and flow chart at P188.5



Pressure and flow chart at P176.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200227
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-02-27	6:30 am 6:30 pm	669034	Sebastien Viau

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -29 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Attended AEM-SNC coordination meeting.
- Weekly report preparation.

Work Method and Plan

- Maintenance of the grout unit structure in the morning.
- Secondary holes grouting of the downstream blanket.
- Casing installation of quaternary holes at the downstream blanket.

S254.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 35 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 51 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.0 bar at a flow rate of 0.5 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S242.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- After +- 450 L of mix B, grout was changed to Mix C (without Celbex). After a total volume of 930 L (450 L of Mix B and 480 L of Mix C), grout was changed to Mix D for 58 L.
- Pressure started to build up after +- 30 min and reached Pmax after 60 min.
- Total 988 liters of grout injected (+- 450 L of Mix B, +- 480 L of Mix C and 58 L of Mix D).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.5 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- Grout level was measured at depth of 9.00 m, 15 min after grouting.
- **Hole backfilled after grouting.**

Grout Test

Mix B	Marsh Value = 46 sec.	S.G = 1.72 Temp. = 23.5 C	Bleeding = 2.0%
Mix C	Marsh Value = 65 sec.	S.G = 1.75 Temp. = 22.0 C	Bleeding = 1.0%
Mix D	Marsh Value = -	S.G = 1.81 Temp. = 21.0 C	Bleeding = -

C**asing installation**

- Two casing installed (day shift) at the downstream blanket. No casing installed during night shift because generator break down.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m)
Q-694,0	DS	9.73	9.54	9.84	7.92
Q-691,0	DS	9.89	10.32	10.52	9.05

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

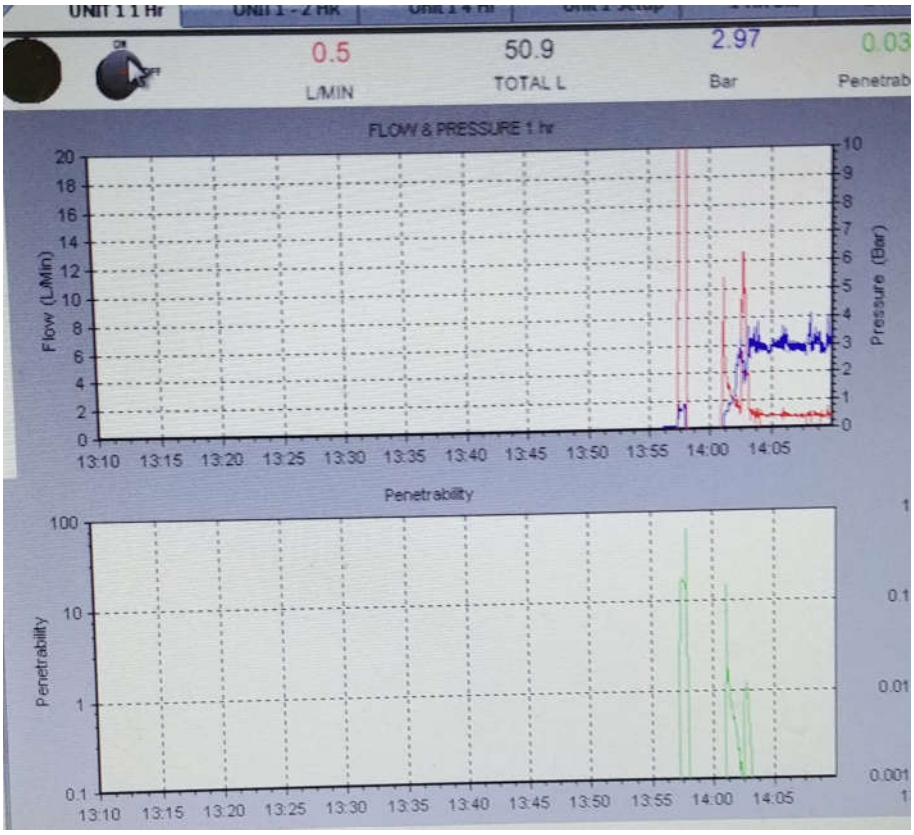
SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

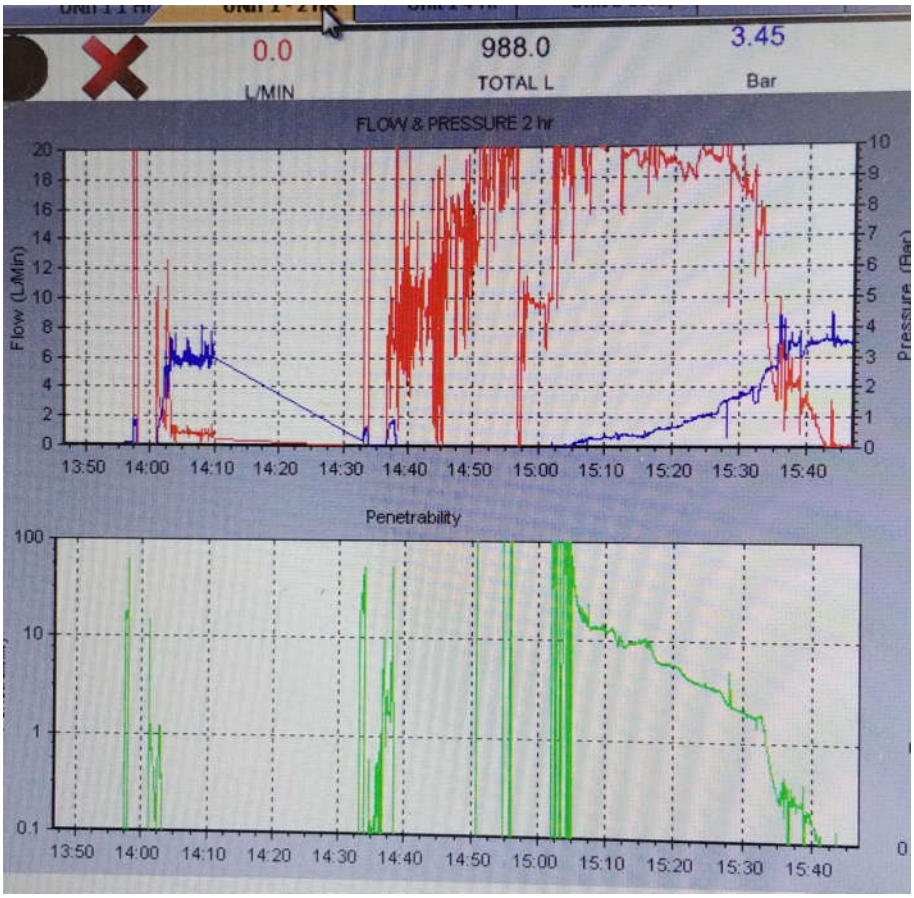
SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by:	*Sebastien Viau*	**27-02-2020**
	Signature	Date
Verified by:	*Tom Xue*	**27-02-2020**
	Signature	Date



Pressure and flow chart at S254.5



Pressure and flow chart at S242.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200228 rev 01
Document number

2020-02-28	6:30 am 6:30 pm	669034	Sebastien Viau
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -29 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Weekly report preparation.

Work Method and Plan

- Secondary holes grouting of the downstream blanket.
- Casing installation of quaternary holes at the downstream blanket.

S230.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +-15 min.
- Total 257 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.1 bar at a flow rate of 0.1 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S218.5 5 m stage

- Packer was placed at the bottom of the casing.

- Prefilled with 38 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 56 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 1.1 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S206.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 76 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 0.8 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

S194.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- After +- 460 L of mix B, grout was changed to Mix C (without Celbex).
- After a total volume of +- 1000 L (460 L of Mix B and 540 L of Mix C), grout was changed to Mix D.
- Grouting operation were adjourned for cleaning and lunch time after 1350 L. Works resumed +- 150 min later.
- After a total volume of +- 1800 L (460 L of Mix B, 540 L of Mix C and 800 L of Mix D), the quantity of Rheomac was double in Mix D until refusal at 1863 L.
- Total 1863 liters of grout injected (+- 460 L of Mix B, +- 540 L of Mix C, +- 800 L of Mix D and +- 65 L of Mix D with 2x Rheomac).
- Hole grouting started at 10h10 and Pmax was reached 15h15.
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 4.3 bar at a flow rate of 1.6 l/min.
- No grout communication or leakage observed.
- Grout level was measured at depth of 8.50 m, 15 min after grouting but **final grout depth will be measured tomorrow morning.**

Grout Test

Mix B	Marsh Value = 53 sec.	S.G = 1.71 Temp. = 20.0 C	Bleeding = 3.0%
Mix B	Marsh Value = 46 sec.	S.G = 1.70 Temp. = 19.0 C	Bleeding = -
Mix C	Marsh Value = 62 sec.	S.G = 1.76 Temp. = 16.0 C	Bleeding = -
Mix D	Marsh Value = -	S.G = 1.80 Temp. = 17.0 C	Bleeding = 0.0%
Mix D	Marsh Value = -	S.G = 1.79 Temp. = 18.5 C	Bleeding = -
Mix D (2x Rheomac)	Marsh Value = -	S.G = 1.83 Temp. = 15.5 C	Bleeding = -

Casing installation

- Seven (7) casings installed at the downstream blanket (quaternary holes).

- When casing drilling Q-664, water was coming out from hole Q-667. It was observed while the Q-664 casing was not in bedrock yet (about 1 m above bedrock). The water was coming out when the rig was not drilling, and the water went away when drilling resumed.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m)	Observations
Q-628	DS	11.6	12.07	12.37	9.13	
Q-664	DS	10.4	10.35	10.65	10.35	Water coming from Q-667 while drilling Q-664
Q-667	DS	10.5	10.56	10.86	9.02	
Q-682	DS	9.9	10.26	10.47	9.0	Concrete chips observed in water return
Q-685	DS	10.0	10.90	11.20	9.0	Concrete chips observed in water return
Q-688	DS	10.0	10.26	10.56	9.0	Concrete chips observed in water return
Q-718	DS	9.4	11.61	11.91	10.6	

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

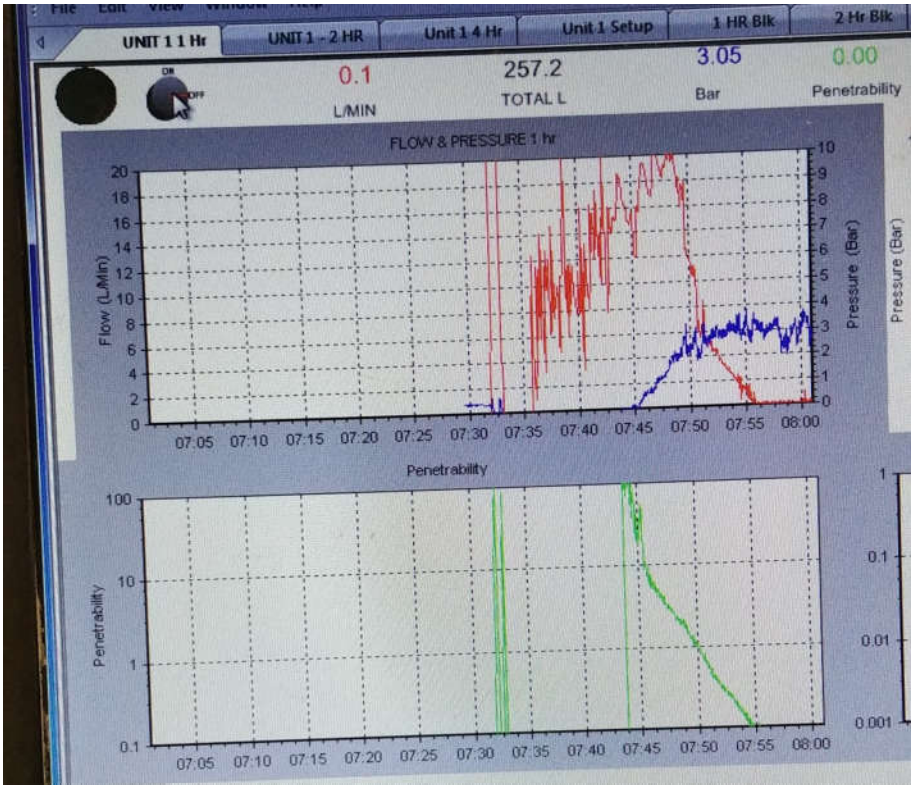
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

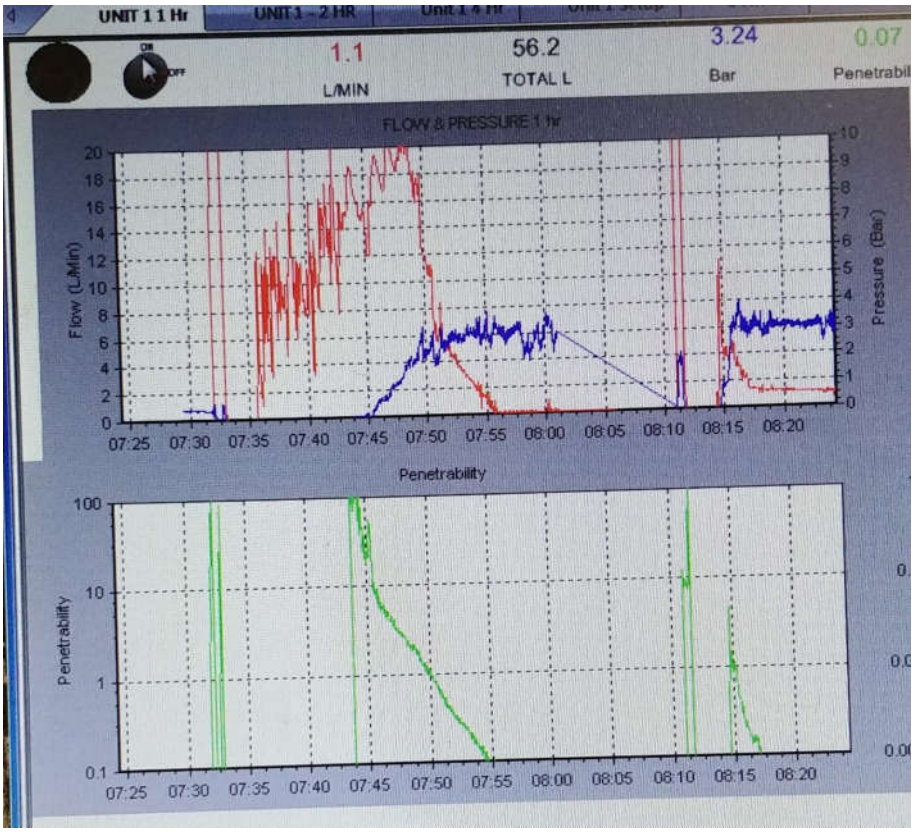
- Dress up properly for extreme cold conditions

Issued by: *Sebastien Viau* — Signature — **28-02-2020** — Date

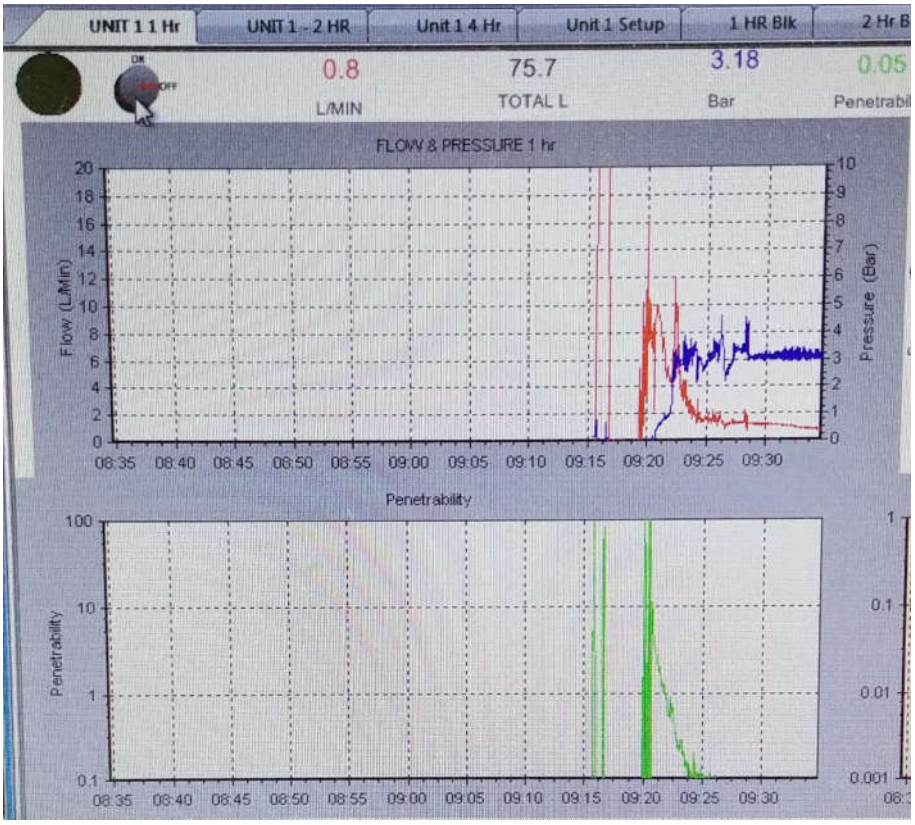
Verified by: *Tom Xue* — Signature — **28-02-2020** — Date



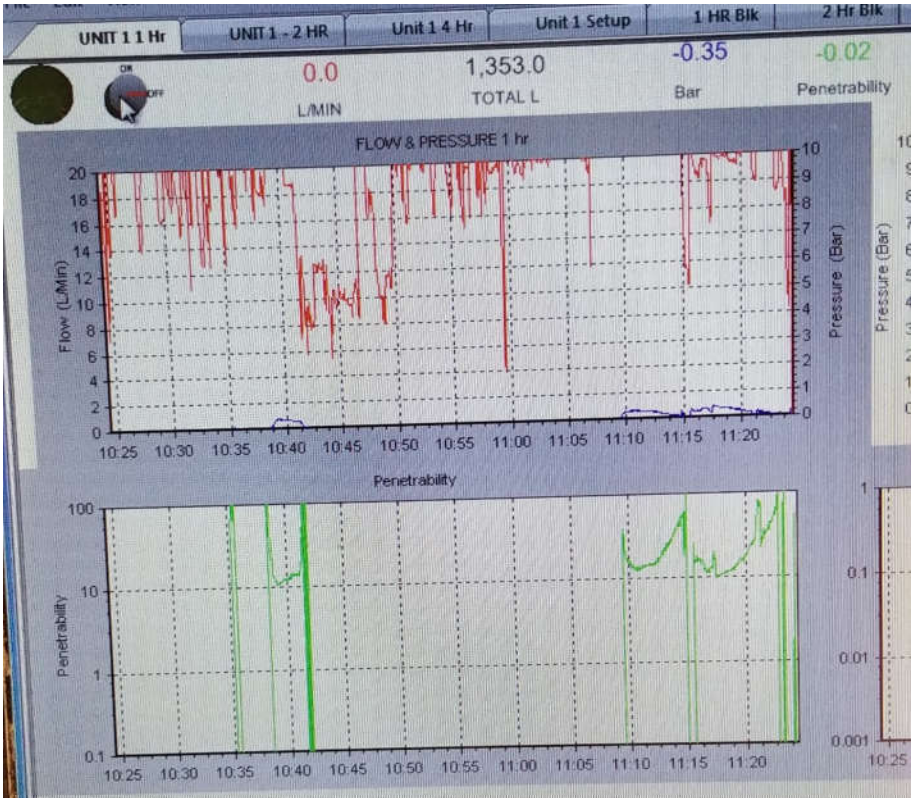
Pressure and flow chart at S230.5



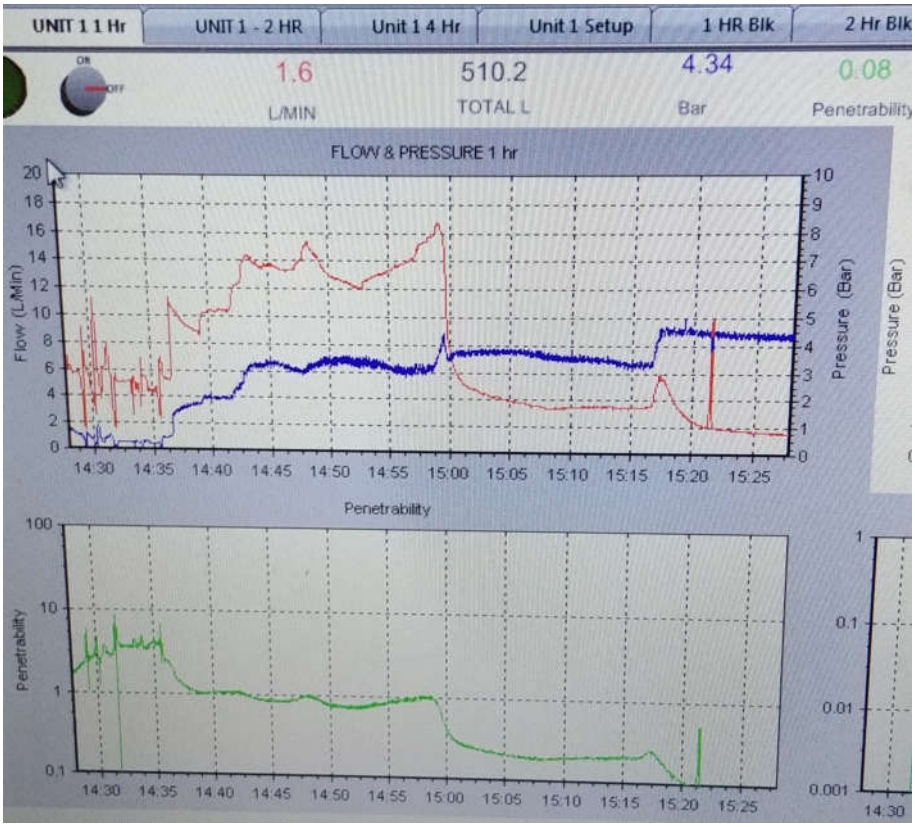
Pressure and flow chart at S218.5



Pressure and flow chart at S206.5



Pressure and flow chart at S194.5 (part I)



Pressure and flow chart at S194.5 (part II)

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200229
Document number

2020-02-29	6:30 am 6:30 pm	669034	Sebastien Viau
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☒Moderate ☐Strong, ☐ gusts Temperature: -24 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.

Work Method and Plan

- Tertiary holes grouting of the downstream blanket.
- Drilling Tertiary hole of the downstream blanket.
- Casing installation at upstream and downstream blanket.

S182.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +-5 min.
- Total 112 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.0 bar at a flow rate of 0.1 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T377.5 5 m stage

- Packer was placed at the bottom of the casing.

- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- After +- 480 L of mix B, grout was changed to Mix C (without Celbex).
- Pressure started to build up after +- 30 min and reached Pmax after 45 min.
- Total 705 liters of grout injected (+- 480 L of Mix B and +- 225 L of Mix C without Celbex).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
  Hole backfilled after grouting

T371.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 37 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +-15 min.
- Total 170 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.3 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T365.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 35 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 95 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.8 bar at a flow rate of 0.4 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T353.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 37 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 10 min.
- Total 124 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 4.0 bar at a flow rate of 0.2 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T347.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 41 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 87 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.

- The closing pressure was 3.4 bar at a flow rate of 0.2 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix B Marsh Value = 57 sec. S.G = 1.73 Temp. = 20.5 C Bleeding = 3.0%
Mix B Marsh Value = 49 sec. S.G = 1.70 Temp. = 17.0 C Bleeding = -
Mix C Marsh Value = [(1)] S.G = 1.78 Temp. = 24.0 C Bleeding = -
Mix B Marsh Value = 58 sec. S.G = 1.69 Temp. = 20.0 C Bleeding = 3.0%

[(1)] Grout showed agglomeration of cement in Mix C. It was mentioned to the contractor. Cement temperature was ok (21°C) and batching procedure seemed ok. No cement agglomeration was found in the subsequent mixes.

Bedrock Drilling

- One (1) tertiary hole drilled today.
- The hole was drilled into rock for 5 m grout length.
- No water loss was observed in the hole:

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Observations
T-263,5	14,5	-	-	No caving	-

Casing installation

- Nine (9) casing installed; one (1) at the downstream blanket and eight (8) at the upstream blanket.
- Grout in water was observed in the water drilling return in some holes.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m)	Observations
S-721	US	9.9	11.75	12.05	8.42	
T-724	US	9.5	11.8	12.1	9.09	
P-727	US	9.6	11.33	11.63	9.61	
T-730	US	9.7	10.23	10.53	8.37	
S-733	US	9.5	9.67	9.97	9.1	
T-736	US	8.9	9.12	9.42	9.0	Concrete chips observed in water return
P-739	US	8.9	9.44	9.74	9.0	Concrete chips observed in water return
T-742	US	8.4	9.11	9.41	8.5	Concrete chips observed in water return
P-609,1	DS	11.83	12.72	13.02	9.0	Concrete chips observed in water return

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

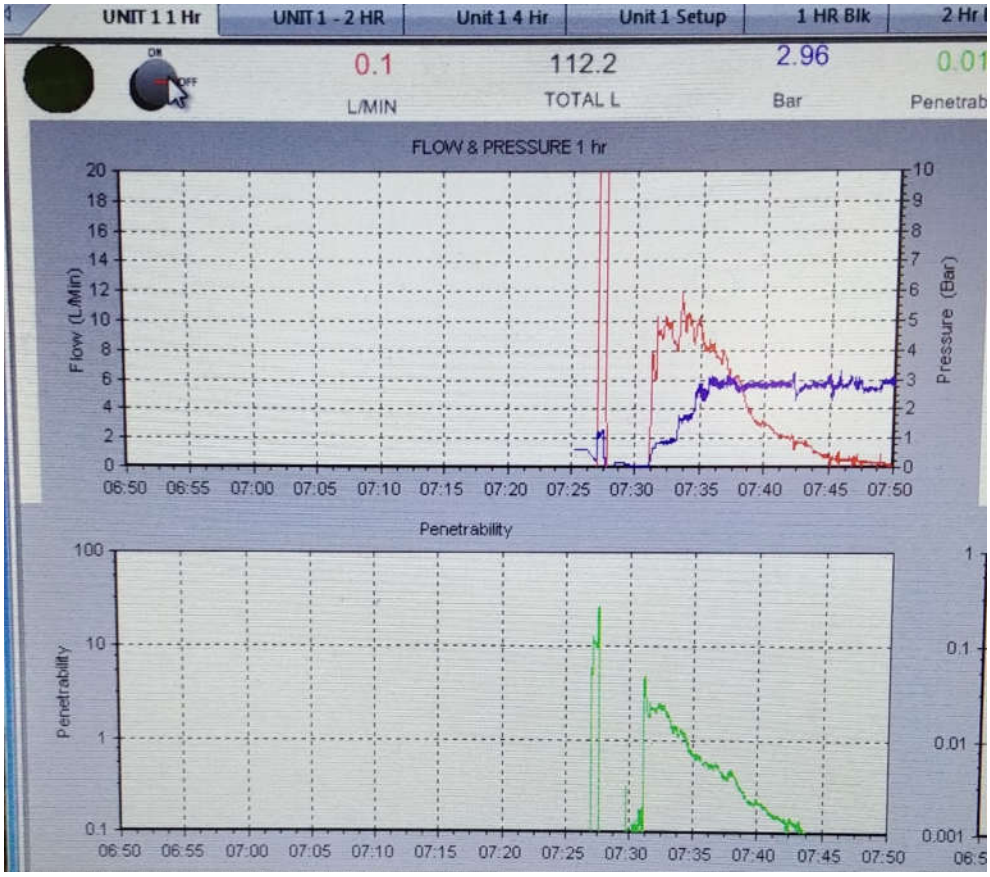
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

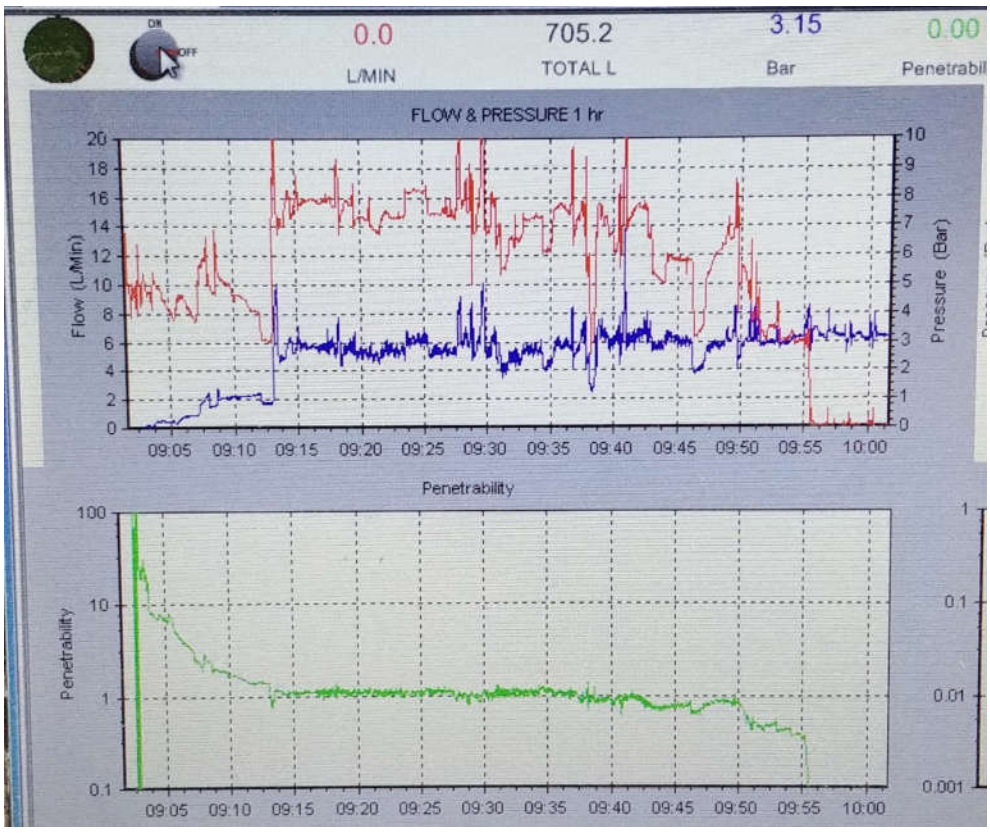
- Dress up properly for extreme cold conditions

Issued by: *Sebastien Viau* — Signature — **29-02-2020** — Date

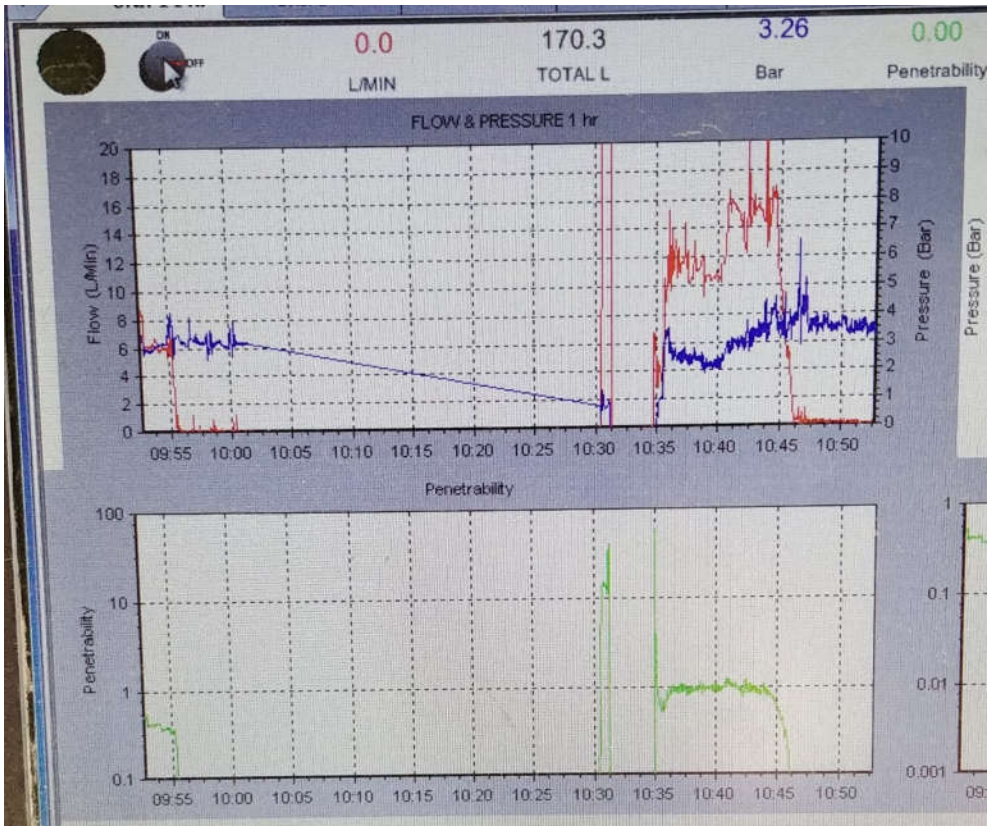
Verified by: *Tom Xue* — Signature — **29-02-2020** — Date



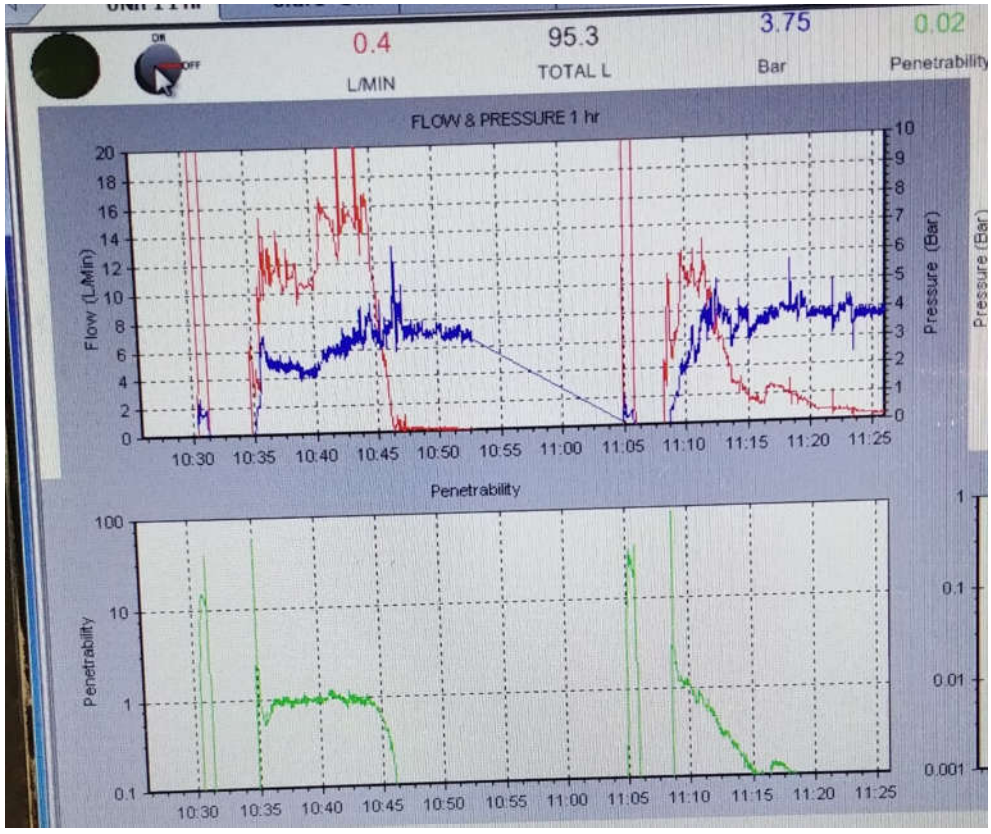
Pressure and flow chart at S182.5



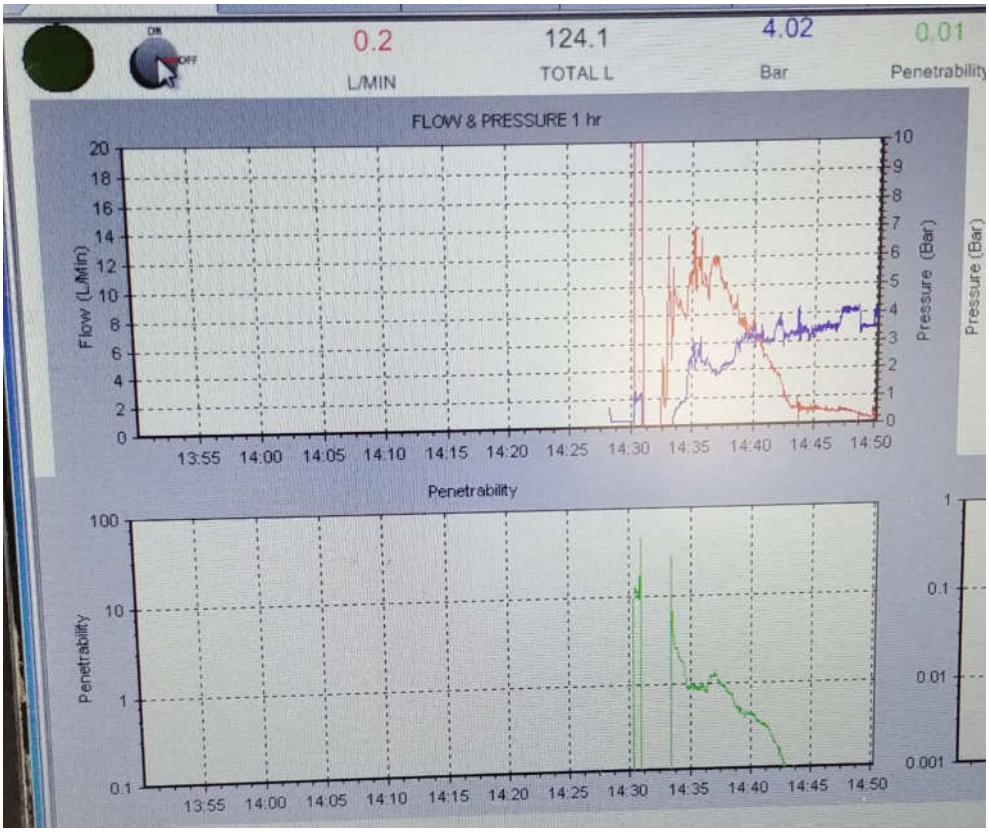
Pressure and flow chart at T377.5



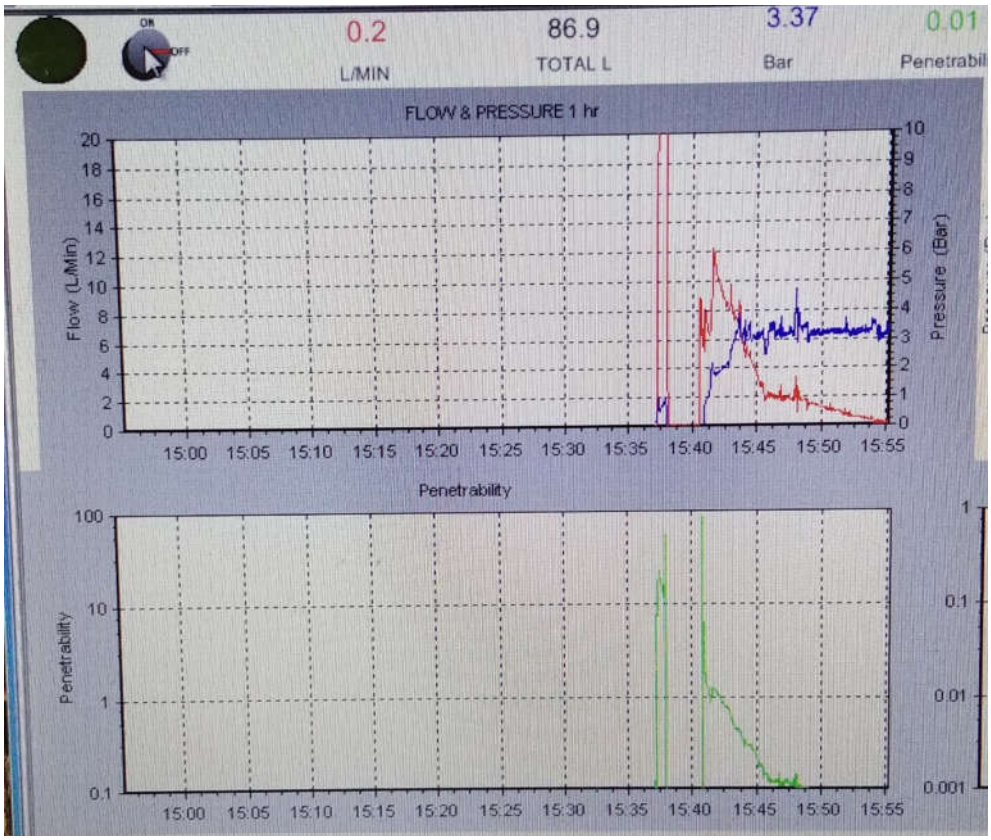
Pressure and flow chart at T371.5



Pressure and flow chart at T365.5



Pressure and flow chart at T353.5



Pressure and flow chart at T347.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200301
Document number

2020-03-01	6:30 am 6:30 pm	669034	Sebastien Viau
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☒Moderate ☐Strong, ☐ gusts Temperature: -27 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.

Work Method and Plan

- Tertiary holes grouting of the downstream blanket.
- Drilling Tertiary hole of the downstream blanket.
- Casing installation at upstream blanket.

T341.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 64 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.6 bar at a flow rate of 1.2 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T329.5 5 m stage

- Packer was placed at the bottom of the casing.

- Prefilled with 42 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 42 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.8 bar at a flow rate of 0.7 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T323.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 39 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 10 min.
- Total 94 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.9 bar at a flow rate of 0.6 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T317.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 48 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.0 bar at a flow rate of 0.8 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T311.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 37 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 87 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 0.3 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T305.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 35 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 87 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.8 bar at a flow rate of 0.8 l/min.

- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T299.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 87 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.3 bar at a flow rate of 1.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix B	Marsh Value = 53 sec.	S.G = 1.72 Temp. = 20.5 C	Bleeding = 2.0%
Mix B	Marsh Value = 60 sec.	S.G = 1.72 Temp. = 20.5 C	Bleeding = -
Mix B	Marsh Value = 55 sec.	S.G = 1.72 Temp. = 19.0 C	Bleeding = -

Bedrock Drilling

- Six (6) tertiary holes drilled today.
- The hole was drilled into rock for 5 m grout length.
- No water loss was observed in the hole:

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Observations
T-227,5	14.4	-	-	No caving	-
T-233,5	14.1	-	-	No caving	-
T-239,5	14.3	-	-	No caving	-
T-245,5	14.6	-	-	No caving	-
T-251,5	14.6	-	-	No caving	-
T-257,5	14.6	-	-	No caving	-

Casing installation

- Eight (8) casing installed; all at the upstream blanket.
- Grout in water was observed in the water drilling return in some holes.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m) [(1)]	Observations
T-718	US	9.93	13.28	13.58	8.5	Concrete chips observed in water return
P-715	US	9.94	13.32	13.62	8.5	Concrete chips observed in water return
T-712	US	9.64	13.31	13.61	7.5	Concrete chips observed in water return
S-709	US	9.71	12.51	12.81	9	Concrete chips observed in water return
T-706	US	9.73	10.7	11	8.52	

P-703	US	9.6	10.8	11.1	4.83	Drilling water communicate with T-700
T-700	US	9.91	10.56	10.86	4.83	Water coming from T-703 while drilling T-700
S-697	US	10.1	10.59	10.89	9.15	Water coming from T-700 while drilling T-697

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

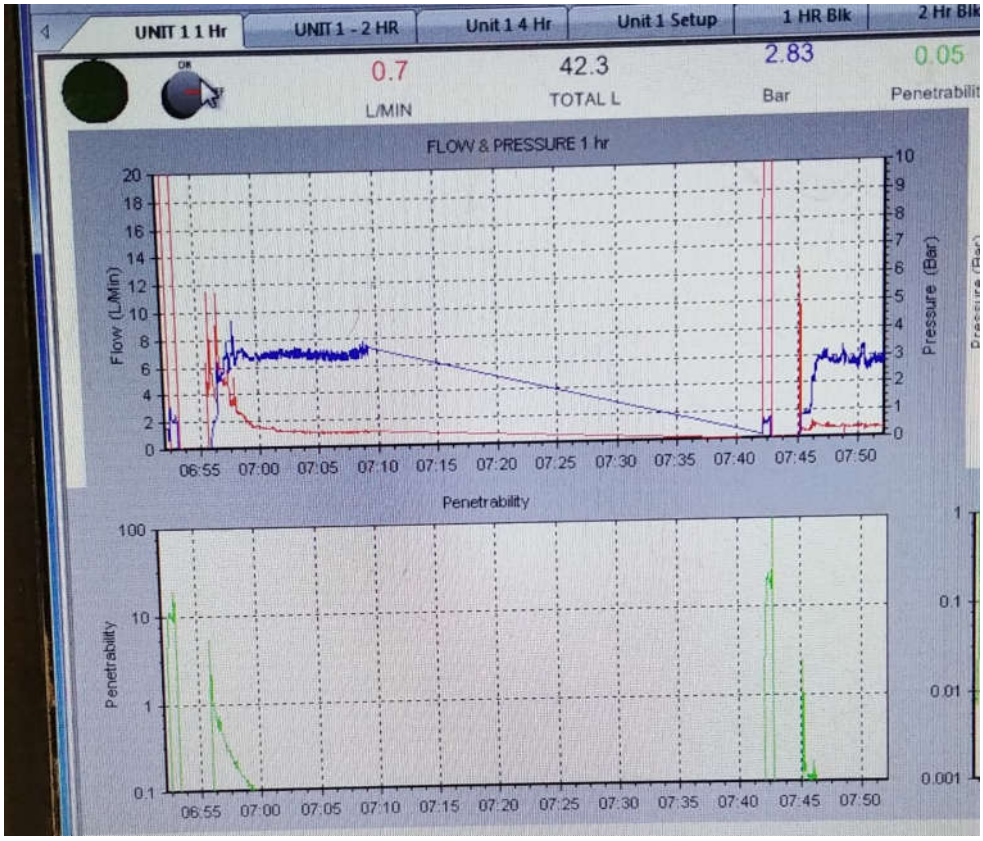
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

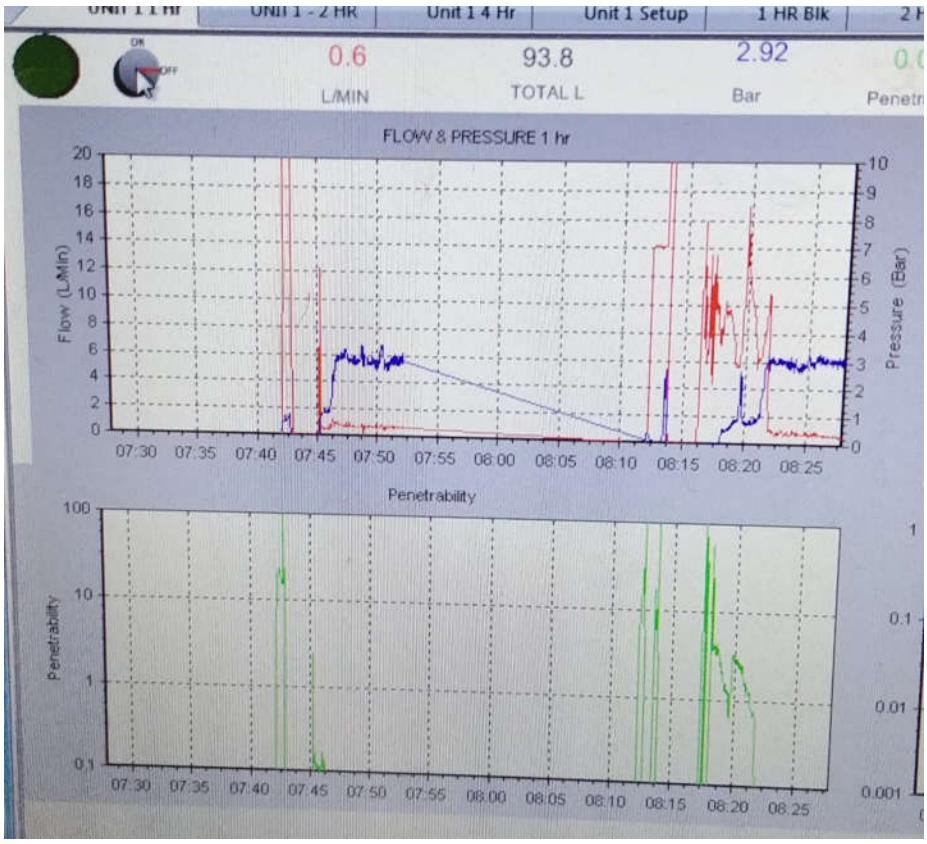
- Dress up properly for extreme cold conditions

Issued by: *Sebastien Viau* (Signature) **01-03-2020** (Date)

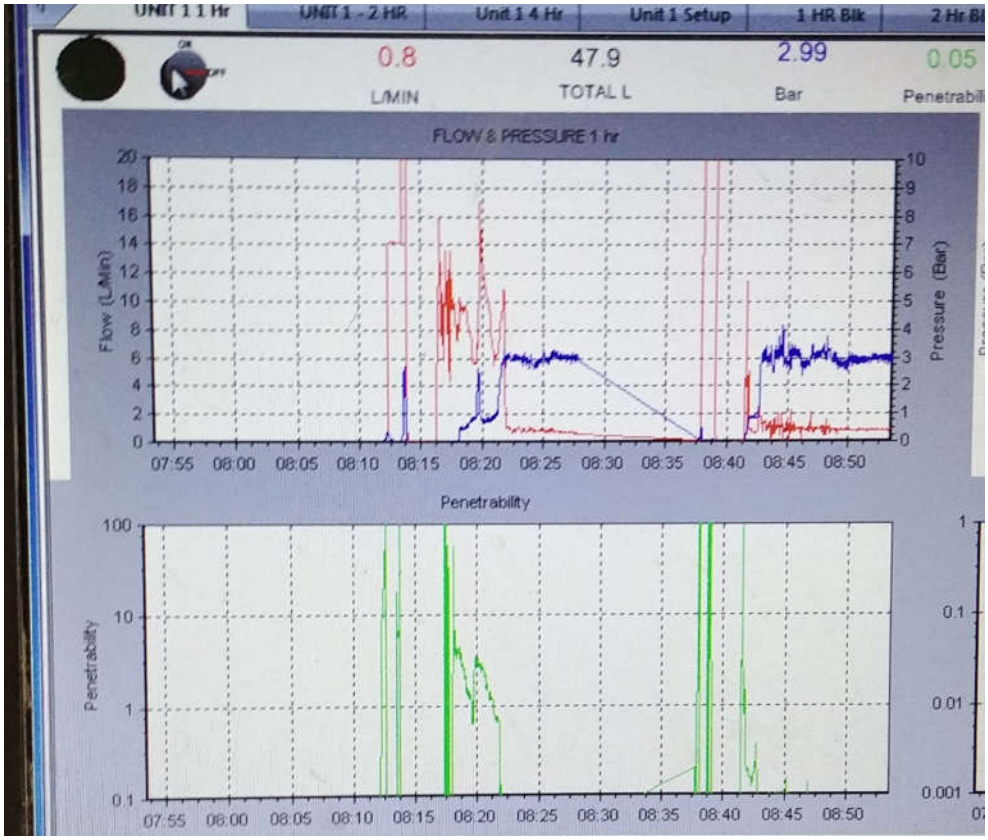
Verified by: *Tom Xue* (Signature) **01-03-2020** (Date)



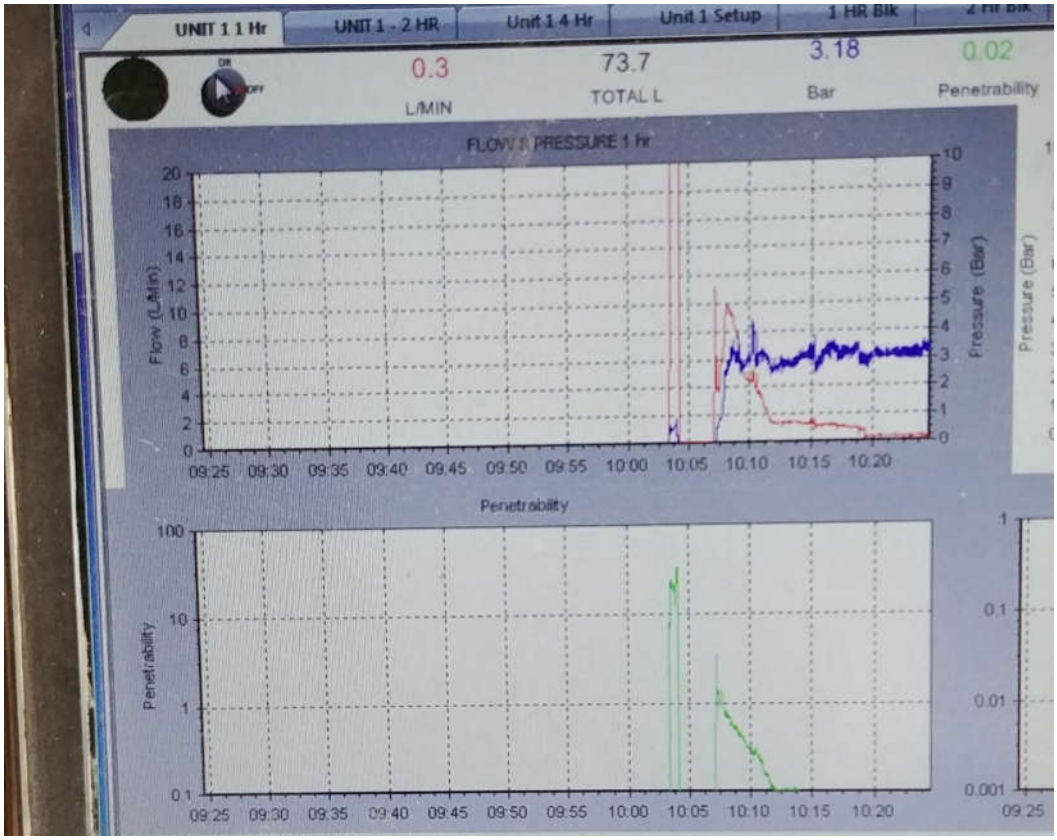
Pressure and flow chart at T329.5



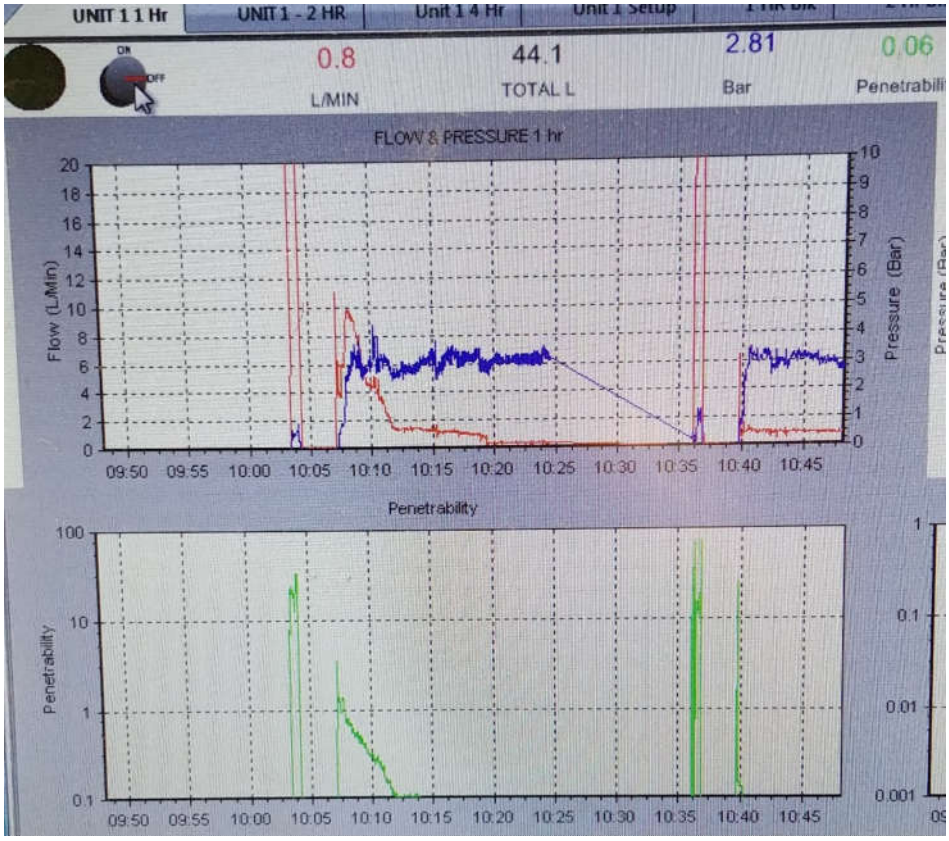
Pressure and flow chart at T323.5



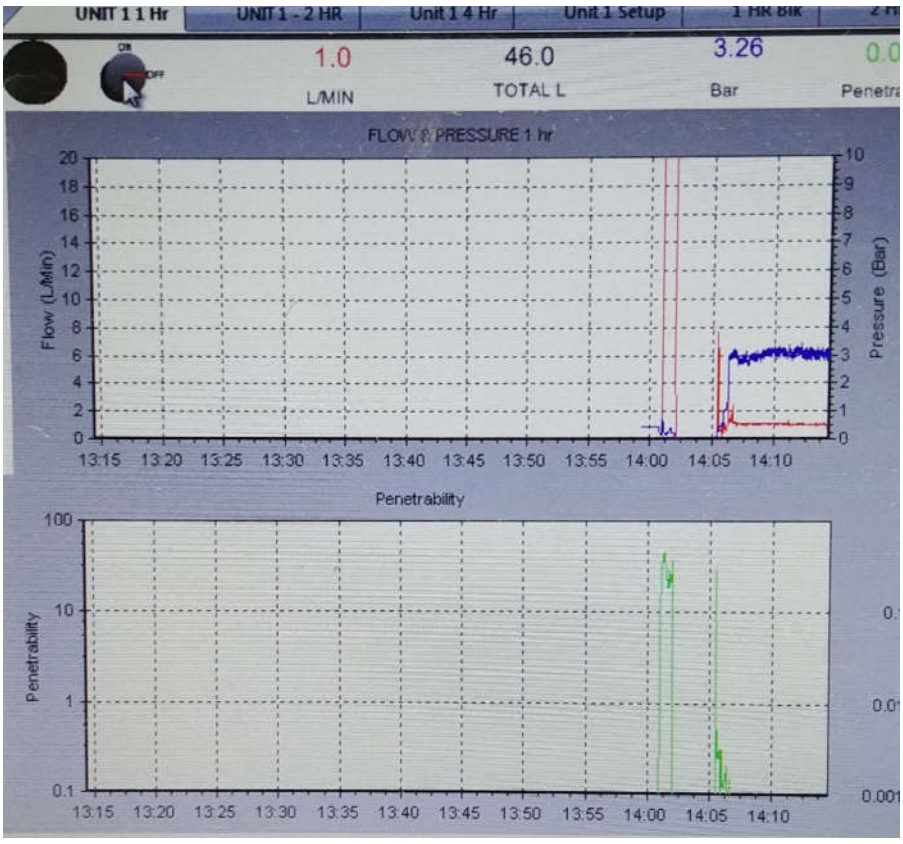
Pressure and flow chart at T317.5



Pressure and flow chart at T311.5



Pressure and flow chart at T305.5



Pressure and flow chart at T299.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200302
Document number

2020-03-02	6:30 am 6:30 pm	669034	Sebastien Viau
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☒Moderate ☐Strong, ☐ gusts Temperature: -35 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.

Work Method and Plan

- Tertiary holes grouting of the downstream blanket.
- Drilling Tertiary hole of the downstream blanket.
- Casing installation at upstream blanket.

T293.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- After +- 500 L of mix B, grout was changed to Mix C (without Celbex).
- After a total volume of +- 900 L (500 L of Mix B and 400 L of Mix C), grout was changed to Mix D.
- Pmax was reached after a total 1270 liters of grout injected (+- 500 L of Mix B, +- 400 L of Mix C and +- 370 L of Mix D).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3,5 bar at a flow rate of 1.5 l/min.
- No grout communication or leakage observed.
- **Grout level was measured at depth of 6.50 m 4 hours after grouting so hole was backfilled.**

T287.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 31 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.
- Total 89 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.0 bar at a flow rate of 0.2 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T281.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 37 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 10 min.
- Total 82 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.0 bar at a flow rate of 0.6 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T275.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 130 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.4 bar at a flow rate of 0.4 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix B	Marsh Value = 45 sec.	S.G = 1.68 Temp. = 16.5 C	Bleeding = 3.0%
Mix C	Marsh Value = 65 sec.	S.G = 1.78 Temp. = 17.5 C	Bleeding = 1.5%
Mix D	Marsh Value = -	S.G = 1.83 Temp. = 16.0 C	Bleeding = -
Mix B	Marsh Value = 49 sec.	S.G = 1.73 Temp. = 14.0 C	Bleeding = 2.0%

Bedrock Drilling

- Eight (8) tertiary holes drilled today.
- The holes were drilled into rock for 5 m grout length.
- No water loss was observed in the holes:

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Observations
T-179,5	13.4	-	-	No caving	-
T-185,5	13.7	-	-	No caving	-
T-191,5	14.1	-	-	No caving	-
T-197,5	14.3	-	-	No caving	-

T-203,5	15.5	-	-	No caving	-
T-209,5	15.8	-	-	No caving	-
T-215,5	15.9	-	-	No caving	-
T-221,5	15.7	-	-	No caving	-

Casing installation

- Six (6) casing installed; all at the upstream blanket.
- Grout chips were observed in the water drilling return in hole T-694.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m) [1]	Observations
T-694	US	10.47	10.52	10.82	6.0	Concrete chips observed in water return
P-691	US	10.60	10.55	10.85	4.82	Water coming from T-700 and T694 while drilling T-691
T-688	US	10.70	10.26	10.56	9.0	-
S-685	US	10.80	10.92	11.22	9.1	-
T-682	US	10.70	10.29	10.59	9.2	-
P-679	US	11.00	11.00	11.30	4.76	-

[1] Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

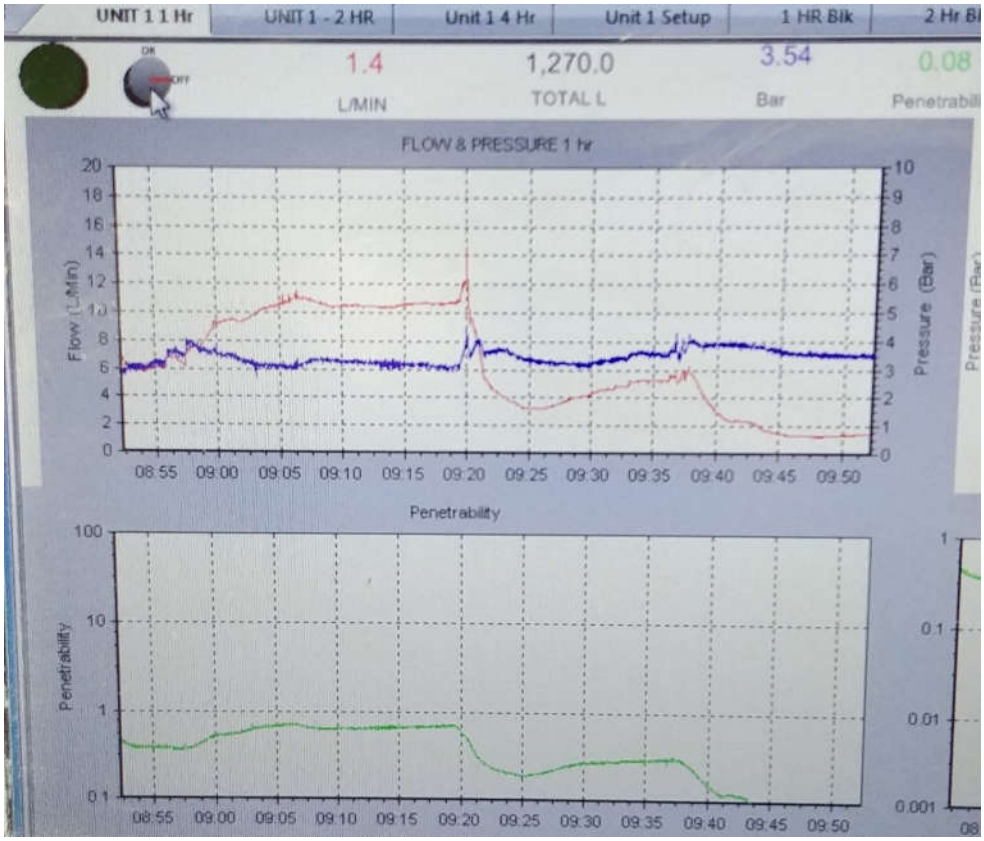
SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

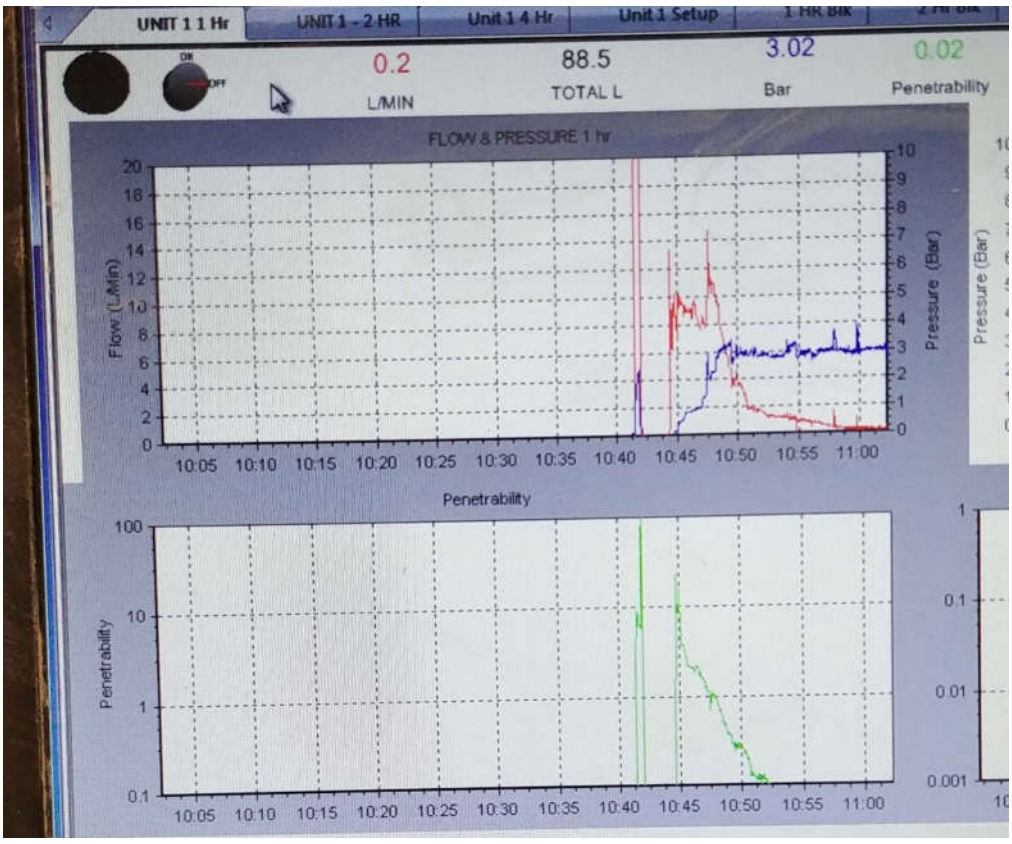
SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

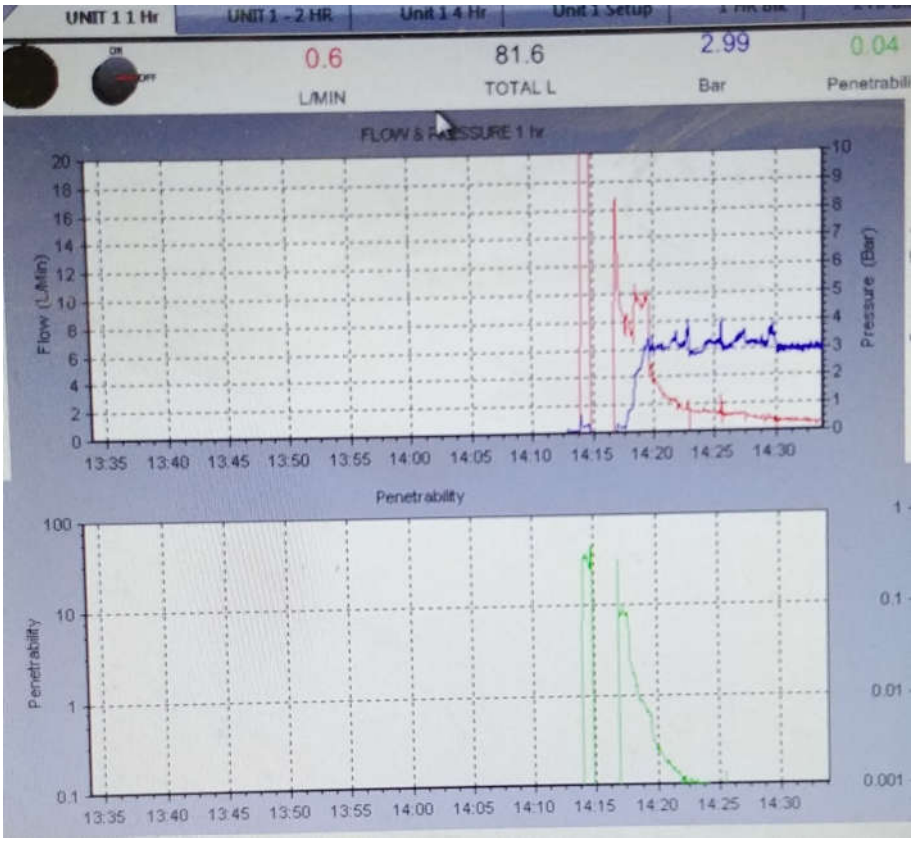
Issued by:	*Sebastien Viau*	**02-03-2020**
	Signature	Date
Verified by:	*Tom Xue*	**02-03-2020**
	Signature	Date



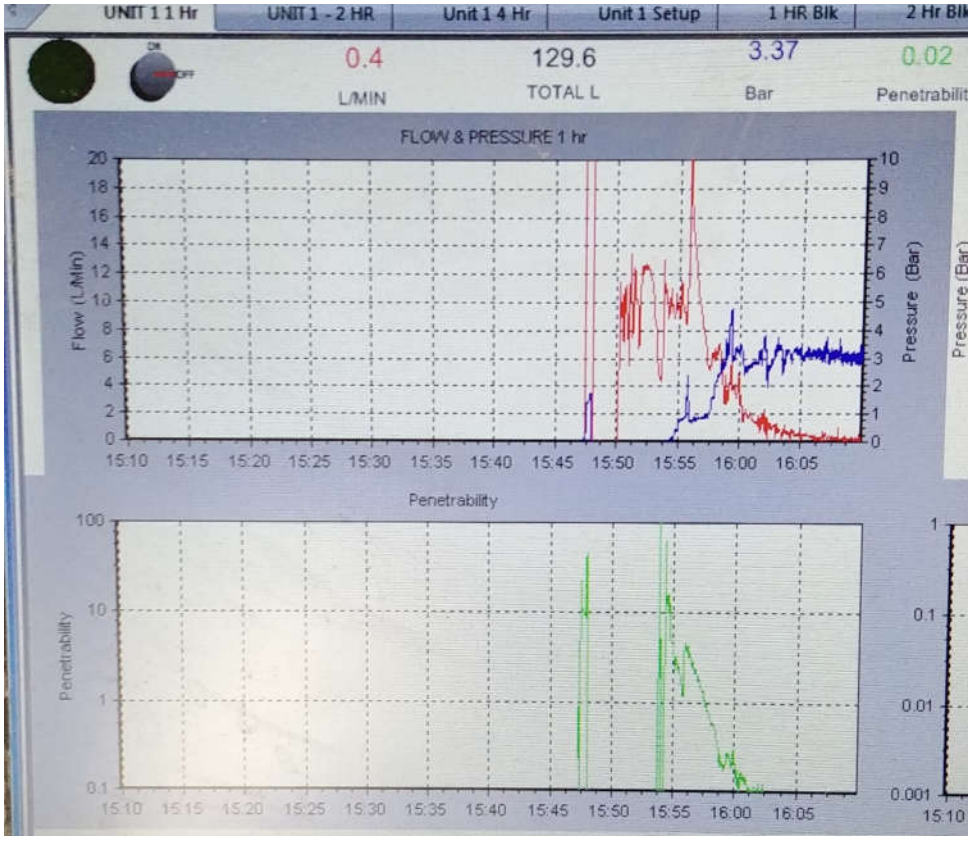
Pressure and flow chart at T293.5



Pressure and flow chart at T287.5



Pressure and flow chart at T281.5



Pressure and flow chart at T275.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200303
Document number

2020-03-03	6:30 am 6:30 pm	669034	Sebastien Viau
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☒Moderate ☐Strong, ☐ gusts Temperature: -33 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.

Work Method and Plan

- Tertiary holes grouting of the downstream blanket.
- Casing installation at upstream blanket.
- The first cement batch send to the grout unit this morning was at -10°C. This batch was return to the batch plant and warmer cement (15°C) was brought to the grout unit. Discussion with batch plant operators was held in order to make sure this problem will not be repeated.

T269.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 36 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 55 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.1 bar at a flow rate of 1.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T263.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 35 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 54 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.4 bar at a flow rate of 1.1 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T257.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 37 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 51 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 0.8 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T251.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 34 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 81 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 0.5 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T245.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 66 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 66 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.1 bar at a flow rate of 0.9 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T239.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 37 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 5 min.

- Total 55 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 0.3 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix B	Marsh Value = 47 sec.	S.G = 1.70	Temp.	= 14.5 °C	Bleeding =	2.0%
Mix B	Marsh Value = 49 sec.	S.G = 1.71	Temp.	= 16.0 °C	Bleeding =	3.5%

Casing installation

- Six (6) casing installed; all at the upstream blanket.
- First casing was installed in holes T-652 and S-649. These holes will be completed later.
- First casing was installed in hole T-646 but it was found that it was not vertical. This casing will be corrected and completed later.
- Grout chips were observed in the water drilling return in holes T-676 and S-673.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m) [(1)]	Observations
T-676	US	10.96	10.46	10.76	7.5	Grout chips observed in water
S-673	US	10.79	10.68	10.98	8.0	Grout chips observed in water
T-664	US	11.2	11.21	11.51	9.6	-
S-661	US	11.6	11.22	11.52	9.16	-
T-658	US	11.6	11.22	11.52	9.01	-
P-655	US	12.3	12.39	12.69	9.11	-

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

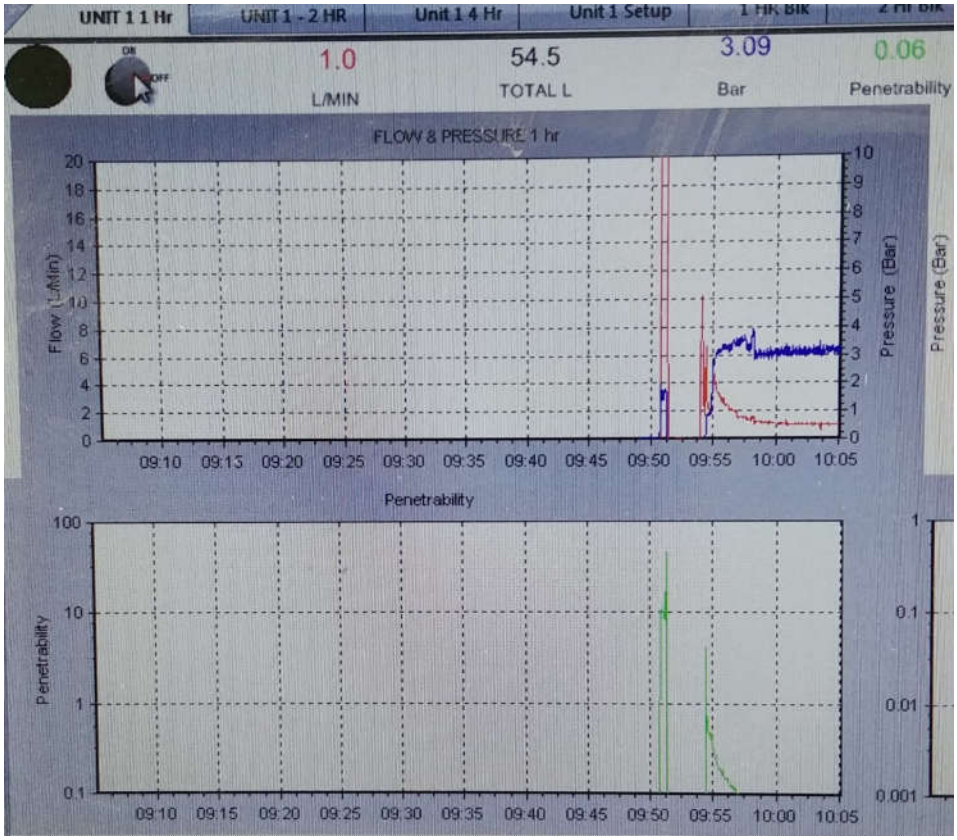
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

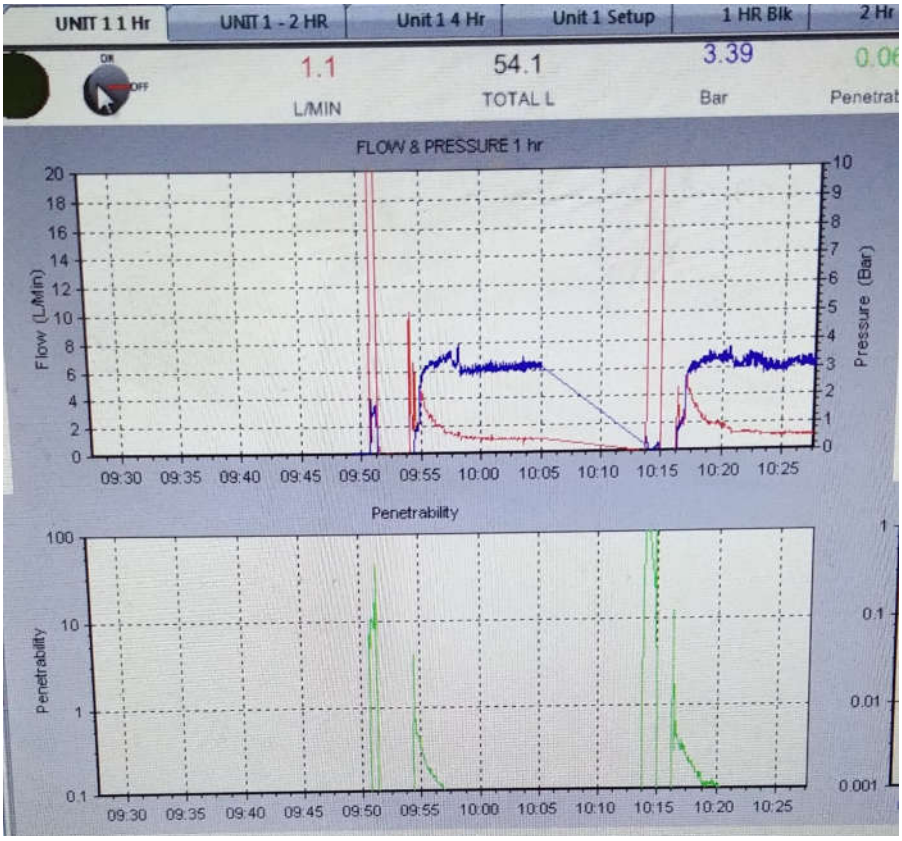
- Dress up properly for extreme cold conditions

Issued by: *Sebastien Viau* — Signature — **03-03-2020** — Date

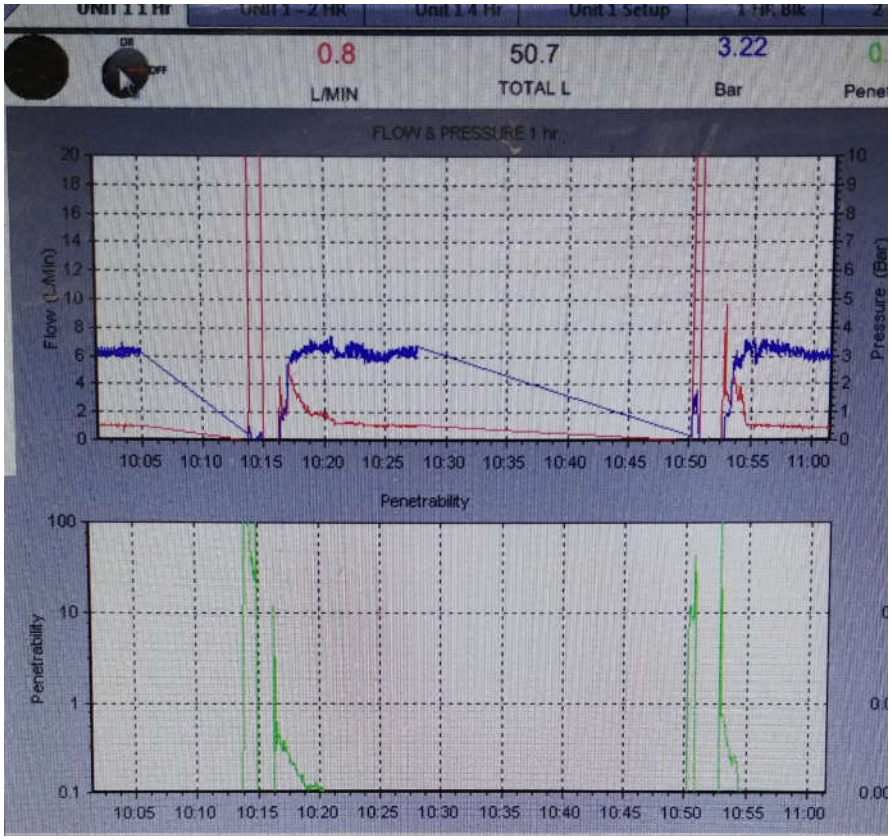
Verified by: *Tom Xue* — Signature — **03-03-2020** — Date



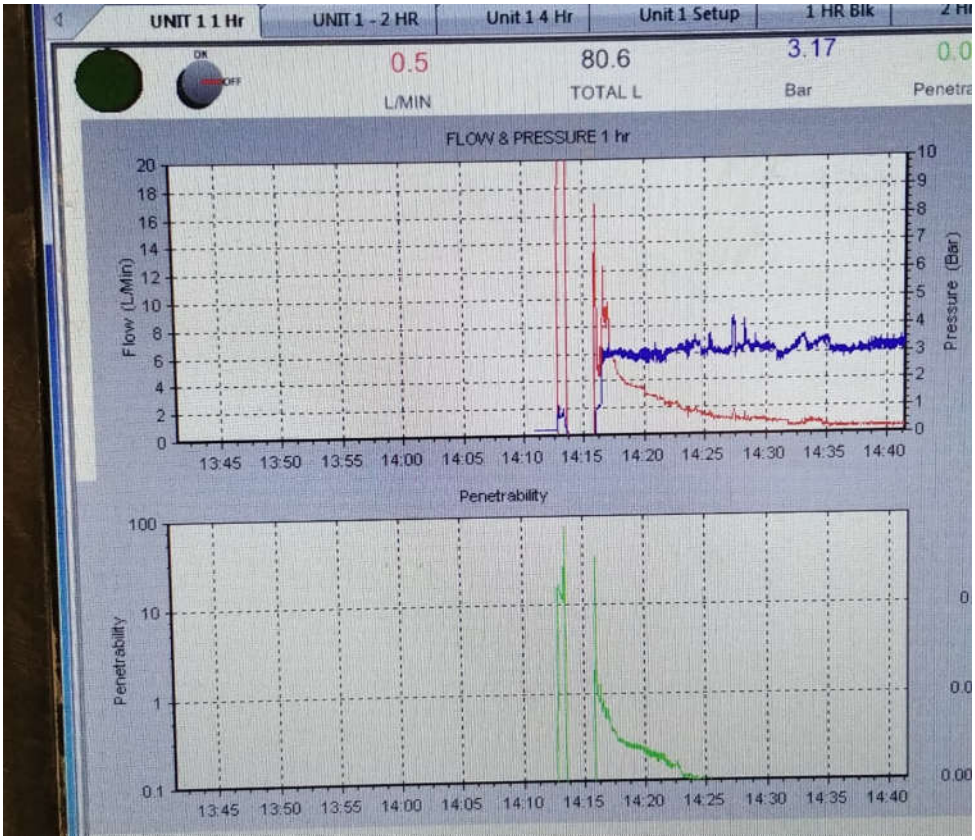
Pressure and flow chart at T269.5



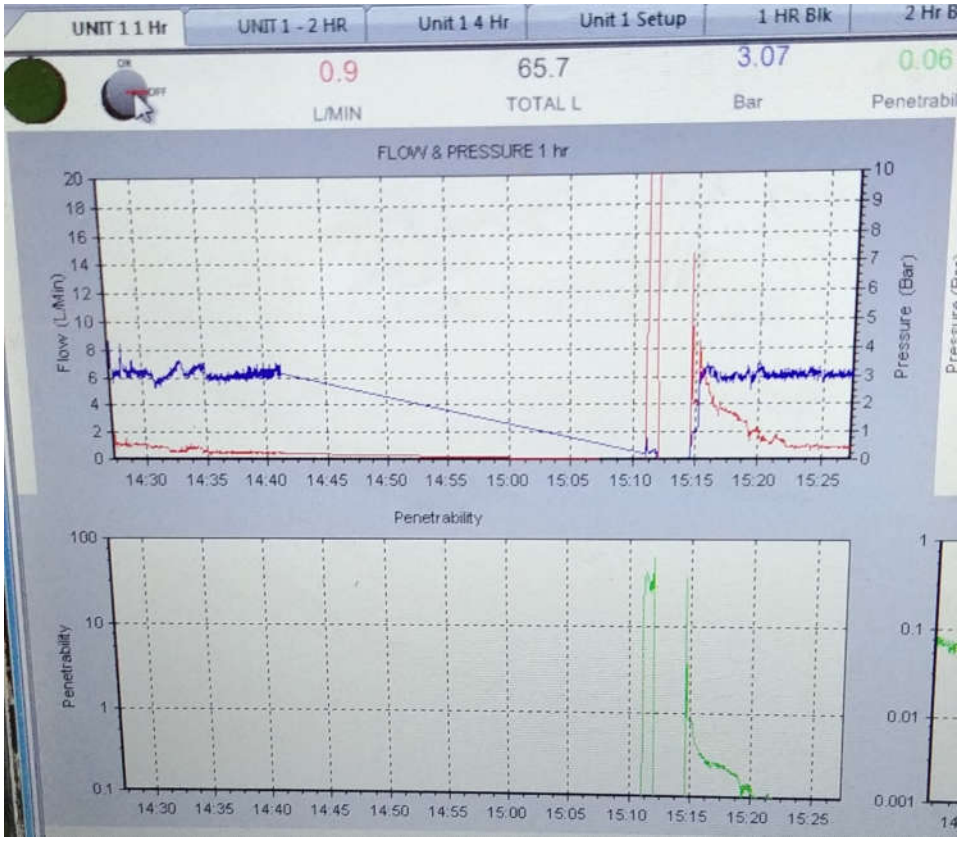
Pressure and flow chart at T263.5



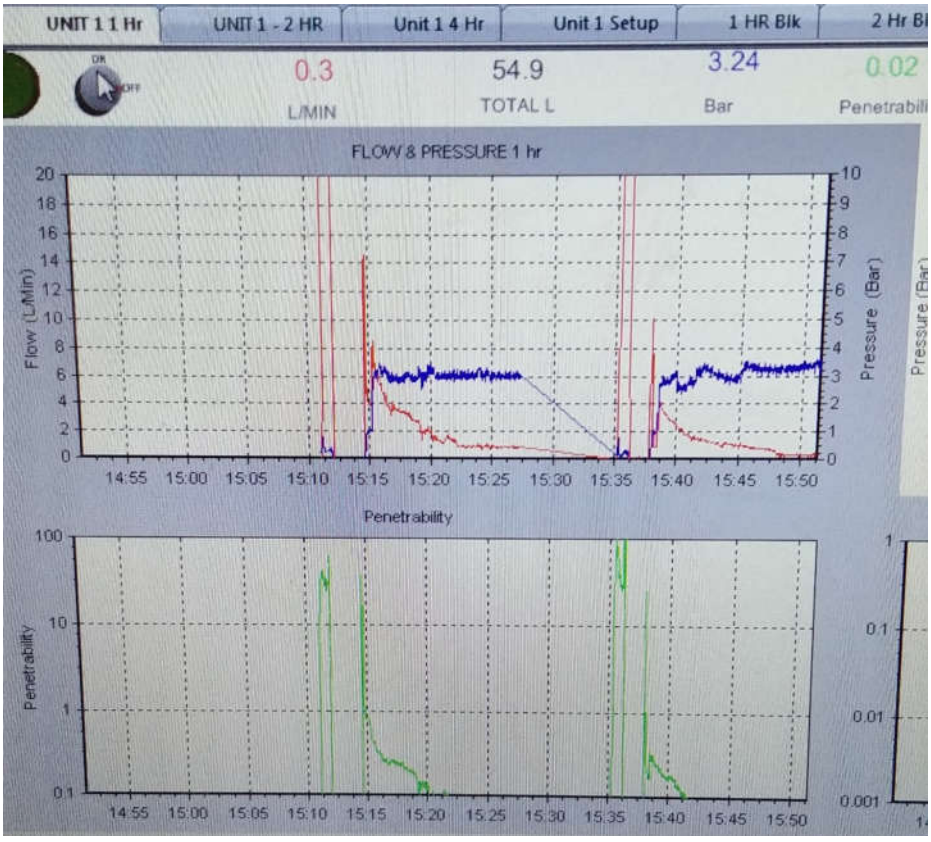
Pressure and flow chart at T257.5



Pressure and flow chart at T251.5



Pressure and flow chart at T245.5



Pressure and flow chart at T239.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200304
Document number

2020-03-04	6:30 am 6:30 pm	669034	Sebastien Viau
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☒Moderate ☐Strong, ☐ gusts Temperature: -30 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.

Work Method and Plan

- Tertiary holes grouting of the downstream blanket.
- Casing installation at upstream blanket.

T233.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- After +- 450 L of mix B, grout was changed to Mix C (without Celbex).
- Pmax was reached after a total 688 liters of grout injected (+- 450 L of Mix B and +- 240 L of Mix C).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3,1 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T227.5 5 m stage

- Packer was placed at the bottom of the casing.

- Prefilled with 35 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached within 2 min.
- Total 64 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.9 bar at a flow rate of 0.7 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T221.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 38 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- After +- 500 L of mix B, grout was changed to Mix C (without Celbex).
- After a total volume of +- 900 L (500 L of Mix B and 400 L of Mix C), grout was changed to Mix D.
- Pmax was reached after a total 1584 liters of grout injected (+- 500 L of Mix B, +- 400 L of Mix C and +- 680 L of Mix D).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 4.0 bar at a flow rate of 1.4 l/min.
- No grout communication or leakage observed.
- **Grout level was measured at depth of 8.20 m 4 hours after grouting so hole was backfilled.**

T215.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 37 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 25 min.
- Total 325 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.4 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix	Marsh Value (sec.)	Specific Gravity	Grout temperature (°C)	Bleeding (%)
B	50	1.72	19.5	2.0
C	100	1.77	16.0	-
C	72	1.79	17.5	1.0
D	-	1.82	16.0	-
D	-	1.83	17.0	-
B	48	1.68	17.5 (1)	-

(1) Water temperature measured at 9.0 °C. Additional water heating was added.

- <u>It was found that grout recipes were not followed by the batcher in the grout unit. For grout mix B and C, the quantity of Calcium chloride vary between 1 and 1.2% instead of 2% required in the spec. Also, the quantity of Rheomac in mix D was 1000 ml instead of 500 ml required in the spec. The batcher said that he has learned by the other batcher to do that way. Further investigations will be done to clarify the situation and correct it.</u>

Casing installation

- Eight (8) casing installed; all at the upstream blanket.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m) [1]	Observations
T-652	US	12.09	11.74	12.04	7	Dirty drilling water return
S-649	US	11.91	11.39	11.69	7.5	Dirty drilling water return
T-646	US	11.87	11.21	11.51	8	Dirty drilling water return
P-643	US	11.6	11.23	11.53	9	
T-640	US	11.4	11.07	11.37	9	
S-637	US	11.9	11.04	11.34	9.1	
T-634	US	12.4	12.23	12.53	8.8	
P-631	US	12.2	12.19	12.49	8.9	

[1] Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

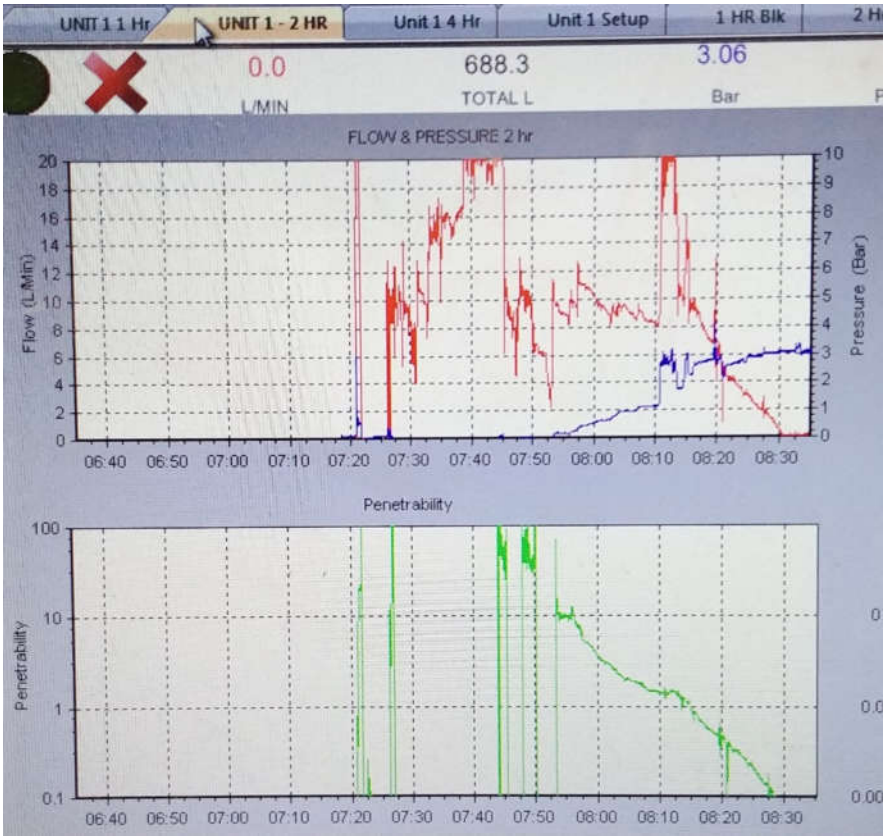
SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

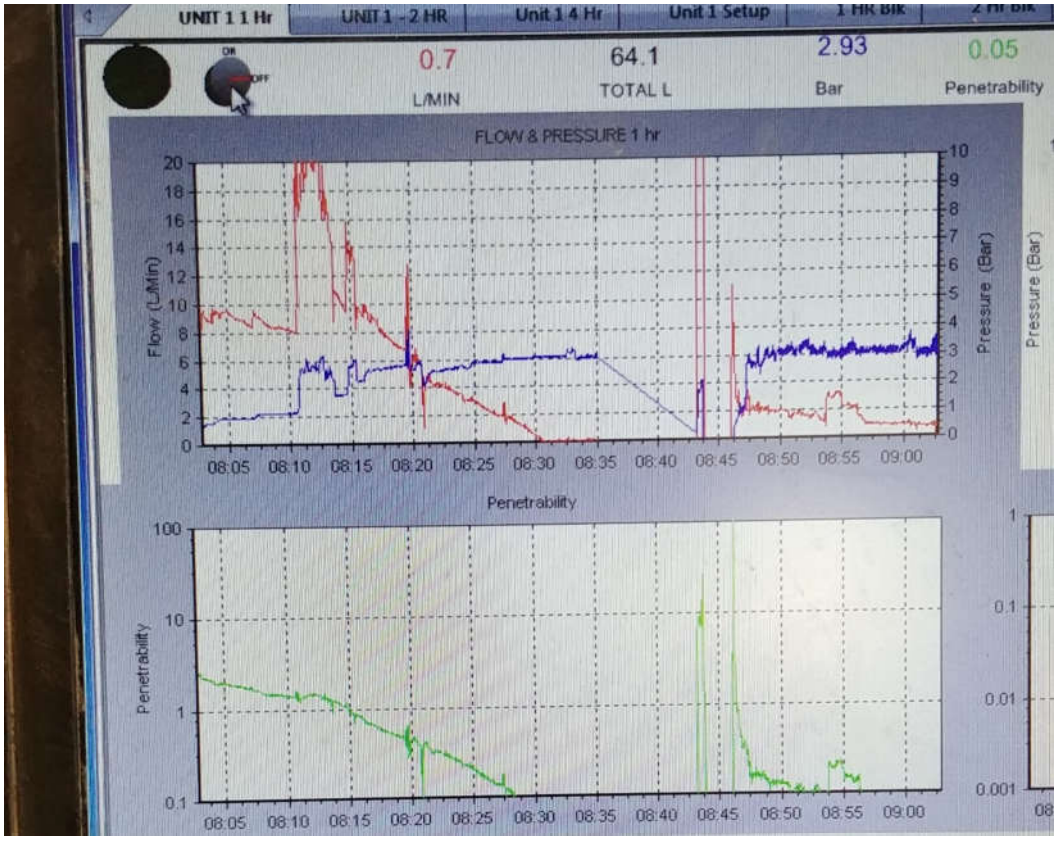
SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

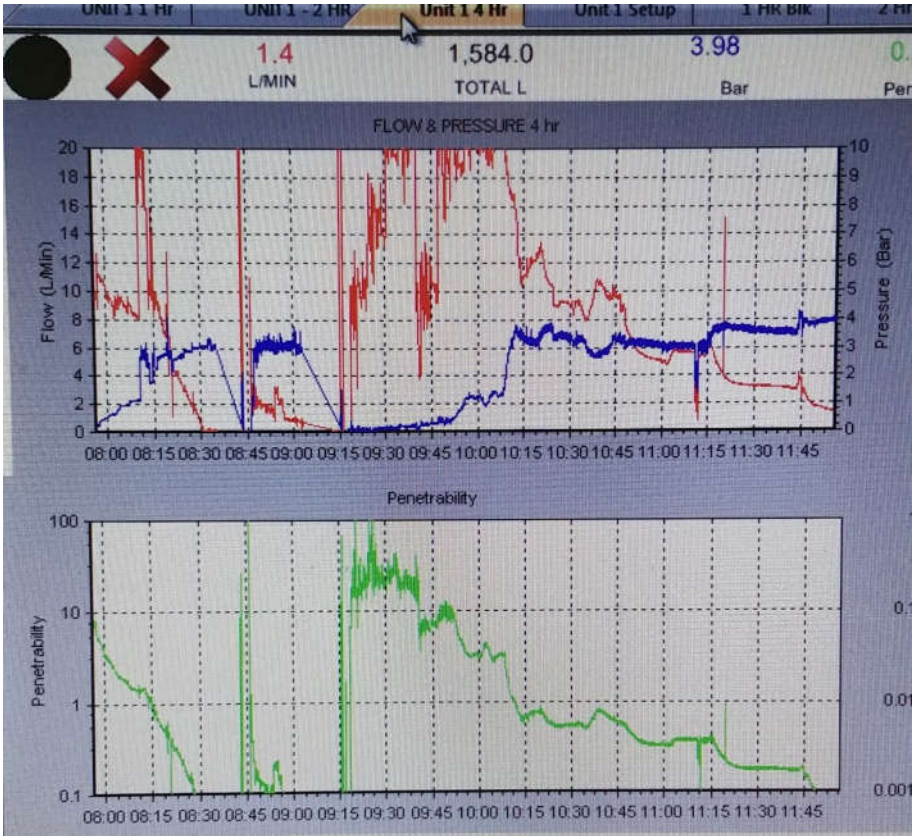
Issued by:	*Sebastien Viau*	**04-03-2020**
	Signature	Date
Verified by:	*Tom Xue*	**04-03-2020**
	Signature	Date



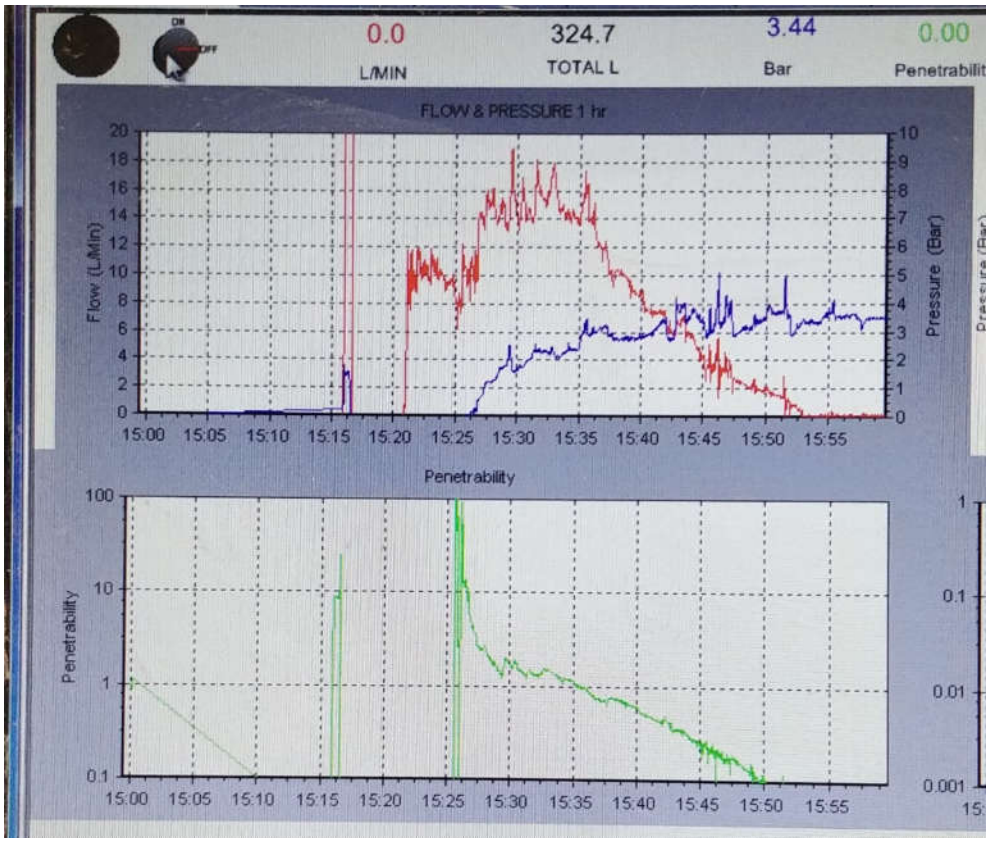
Pressure and flow chart at T233.5



Pressure and flow chart at T227.5



Pressure and flow chart at T221.5



Pressure and flow chart at T215.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200305
Document number

2020-03-05	6:30 am 6:30 pm	669034	Sebastien Viau
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☒Moderate ☐Strong, ☐ gusts Temperature: -25 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Weekly report preparation.

Work Method and Plan

- Tertiary holes grouting of the downstream blanket.
- Casin plug at T-197.5.
- Casing installation at upstream blanket.
- No grouting operation in the afternoon due to maintenance of the injection unit.

T-209.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 15 min.
- Total 272 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.5 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T-203.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 5 min.
- Total 108 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.8 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T-197.5 5 m stage

- Casing has not been previously plugged because some mud was found in the hole during the initial casing plug attempt.
- It was then decided that the packer would be place half in bedrock and half in casing for bedrock injection after bedrock drilling.
- Prefilled with 40 L of Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- After +- 400 L of mix B, grout was changed to Mix C (without Celbex).
- After a total volume of +- 860 L (400 L of Mix B and 460 L of Mix C), grout was changed to Mix D.
- After a total volume of +- 1500 L (400 L of Mix B, 460 L of Mix C and 640 L of Mix D), Rheomac quantity was doubled in Mix D.
- Pmax was reached after a total 1742 liters of grout injected (+- 400 L of Mix B, +- 460 L of Mix C, +- 640 L of Mix D and +-240 L of Mix D with 2x Rheomac).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 4.0 bar at a flow rate of 2.4 l/min.
- No grout communication or leakage observed.
- **Grout level will be measured tomorrow or the day after. Hole will be backfilled after if grout level in ok.**

T-197.5 Casing Plug

- As mentioned above, casing of hole T-197.5 has not been previously plugged.
- After the completion of the bedrock grouting, rods and packer were lift and packer was inflated in casing.
- The purpose was to plug the casing and to grout the upper portion of bedrock where the packer was inflated.
- For this reason, high pressure was used. Casing uplift was attentively monitored.
- A total of 67 L was injected using mix D with 2x Rheomac at a closing pressure of 4.1 bar.
- Waited for 5 minutes after flow rate reached below 1 l/min at Pmax

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)
B	1.73	53	23.5	2
B	1.70	48	20.0	-
C	1.79	NC	16.5	-
C	1.79	72	16.5	0
D	1.80	-	17.0	-
D	1.83	-	19.0	-

- On March 4th, it was found that grout recipes were not precisely followed by the batcher in the grout unit. Tests were done on March 5th to compare results (Specific gravity, Marsh value, and grout temperature) from the original recipes with results from the recipes they were using. No significant deviation was observed. It is

important to note that results usually vary from one batch to another one even with the same recipe, so it is very hard to conclude the impact of the modified recipes. It was asked to follow the recipe more precisely.

Casing installation

- Two (2) casing installed; all at the upstream blanket.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m) (1)	Observations
T-628	US	12.13	11.78	12.08	8.5	Dirty drilling water return
S-625	US	12.4	12.71	13.01	8.9	

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

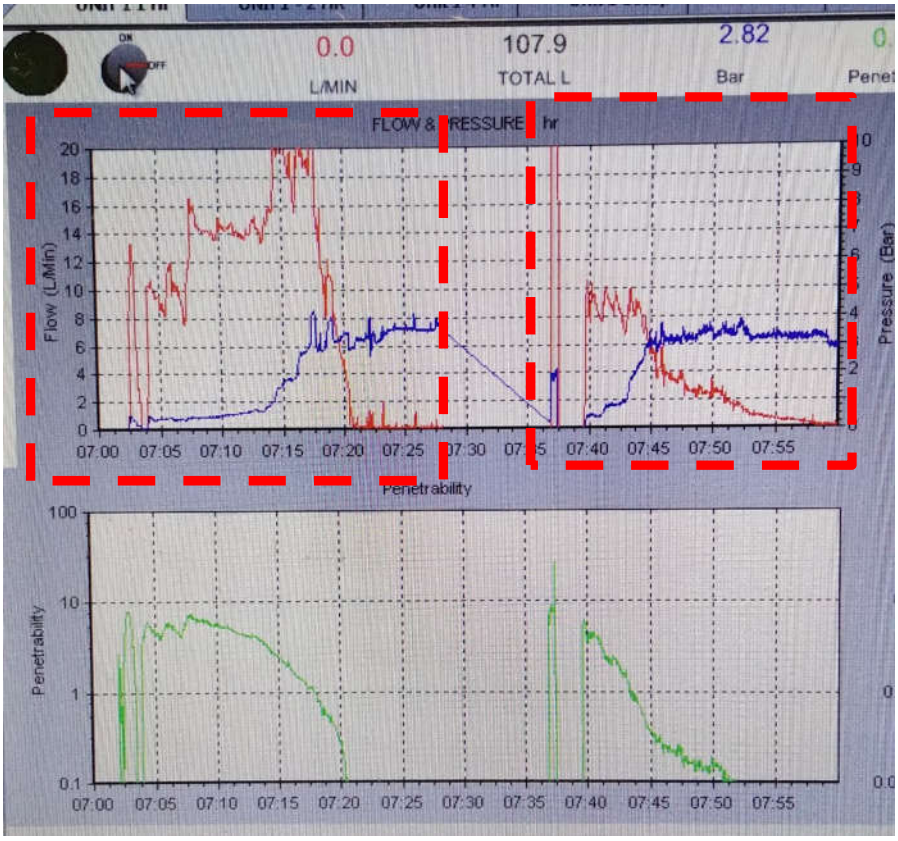
SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

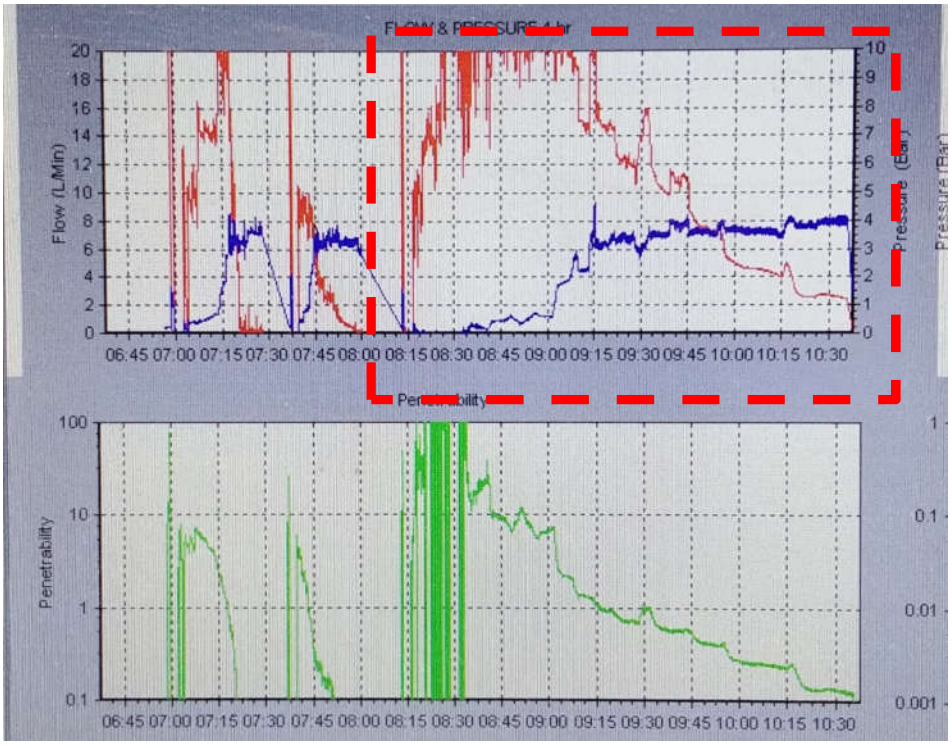
SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by:	*Sebastien Viau*	**05-03-2020**
	Signature	Date
Verified by:	*Tom Xue*	**05-03-2020**
	Signature	Date



Pressure and flow chart at T209.5 and T203.5



Pressure and flow chart at T197.5

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200306
Document number

2020-03-06	6:30 am 6:30 pm	669034	Sebastien Viau / Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☐Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☒Moderate ☐Strong, ☐ gusts Temperature: -29 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- QA and Injection crew has shift change.

Work Method and Plan

- Casing installation at upstream blanket.
- No grouting operation due to shift change.

Casing installation

- Four (4) casing installed during the last 24 hours (2020-03-05); all at the upstream blanket.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m) (1)	Observations
S625	US	12.4	12.71	13.01	8.9	communicate with T628
T622	US	12.19	11.39	11.69	8.5	
P619	US	11.71	11.18	11.48	8.5	
T616	US	11.6	10.91	11.21	8.5	

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments

SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Sebastien Viau / Muhammad Saleem* — Signature — **06-03-2020** — Date

Verified by: *Tom Xue* — Signature — **06-03-2020** — Date

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200307
Document number

2020-03-07	6:30 am 6:30 pm	669034	Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☐ gusts Temperature: -41 °C

Comments: Blizzard from Midnight to Afternoon

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture iDon the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Injection was started with Mix C while QA was in the construction meeting. Advised the crew to start injection with Mix B for the remaining hole unless advised.
- All Primary, Secondary and Tertiary Downstream blanket holes except holes in the exclusion zone have been completed.

Work Method and Plan

- Tertiary holes grouting of the downstream blanket.
- Casing installation at upstream blanket .
- Injecttion will be moved to the East end of the WTD after completing the remaining Tertiary holes for the D/S blanket.
- Tomorrow will start casing plug for Quaternary holes for the D/S blanket.

Bedrock Grouting.

T-191.5 5 m stage

- This hole was grouted prior to QA arrived after attending the daily construction meeting.
- Packer was placed at the bottom of the casing.
- Prefilled with Mix C grout to displace water and then after packer inflated, started injection with Mix C grout.
- Pmax was reached after +- 10 min.
- Total 116.6 liters of grout injected (Mix C).

- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.94 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T-185.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 5 min.
- Total 53.4 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.82 bar at a flow rate of 1.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T-179.5 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 5 min.
- Total 52.8 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.05 bar at a flow rate of 1.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

T-197.5 5 m stage

- This hole was grouted on Mar 5, 2020 but left open due to high grout take.
- Grout depth was checked and measured at 7.65 m below ground and 1.49 m above the bottom of the casing.
- Hole backfilled with Mix B after confirming the grout elevation inside the casing.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)
C	1.75	>100	18.0	1
B	1.63	42	14.5	2
B	1.67	55	28.0	2

Casing installation

- Six (6) casings installed on Mar 06, 2020, four (4) during day shift and two (2) during the night shift; all at the upstream blanket.
- Due to Blizzard and extremely cold weather conditions (-41 C), casing installation operation stopped after midnight.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Water depth (m) (1)	Observations
S-613	US	11.9	11.81	12.11	9	
T-610	US	12.9	12.55	12.85		
P-607	US	12.9	12.73	13.03	9.1	

T-604	US	12.7	12.6	12.9	8.8	
S-601	US	11.68	12.09	12.39	8.5	
T-598	US	11	12.25	12.55	8.5	

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

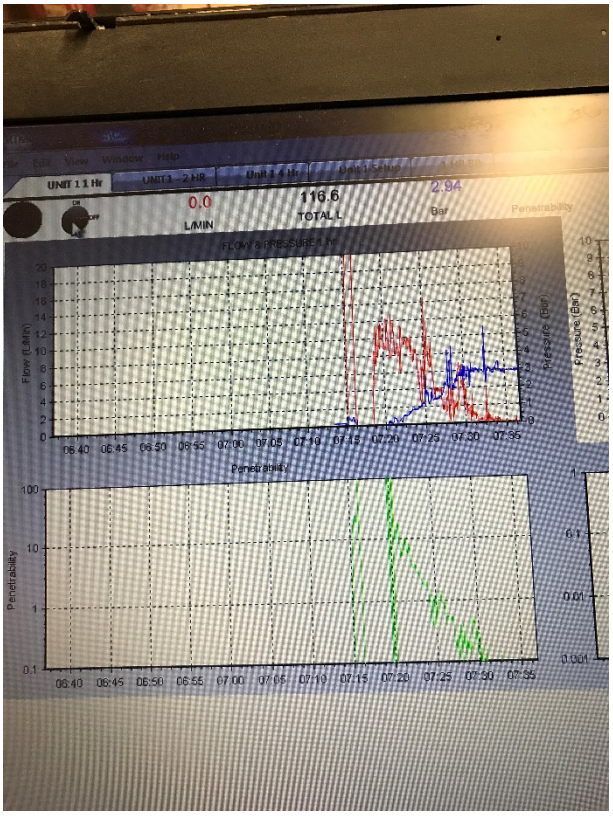
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

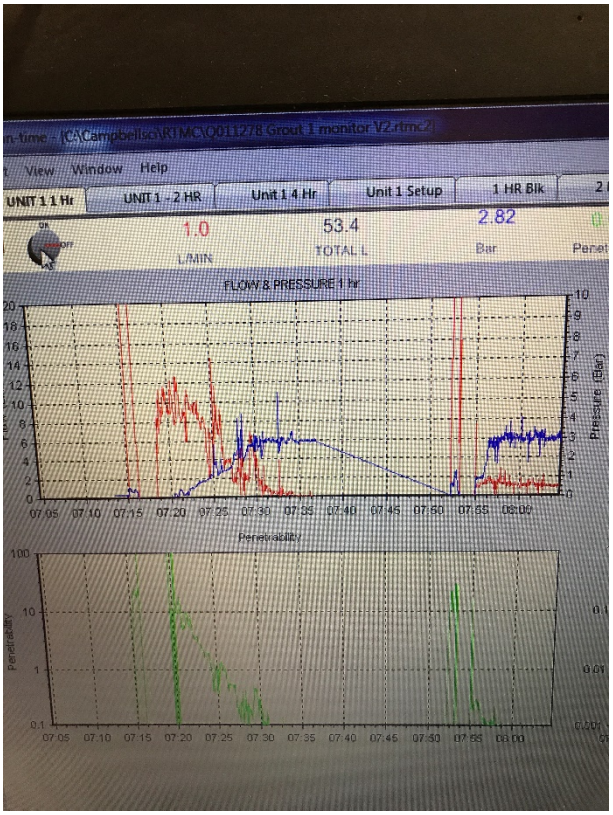
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **07-03-2020** (Date)

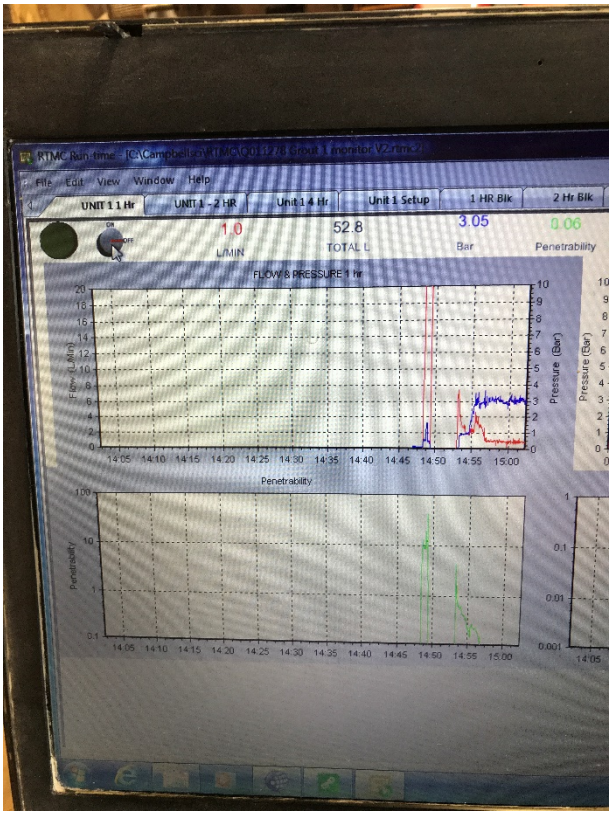
Verified by: *Tom Xue* (Signature) **07-03-2020** (Date)



Pressure and flow chart at T191.5



Pressure and flow chart at T185.5



Pressure and flow chart at T179.5

T197.5 backfilled after confirming grout elevation inside the casing

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200308
Document number

2020-03-08	6:30 am 6:30 pm	669034	Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -39 °C

Comments: Blizzard from Midnight to Afternoon

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Discussed the grout quantity for casing plug shown on As-Buit drawing in l/m. KCG agreed that it should be in liters not in liters/meter. Will be corrected in next weekly update.
- Ask KCG to put more information's on the casing installation logs about drilling difficulties and cutting.
- Observed ice in the first three (3) casings for upstream blanket at the east end. KCG will drill inside these casings to see if it frozen to the bottom of the casing or just near the water surface.
- About two hours of time lost before lunch due to cleaning of the dewatering pipes.

Work Method and Plan

- Casing plug for Quaternary holes of the downstream blanket.
- Casing installation at upstream blanket.
- Mix C will be used for the casing plug while the blanket grouting will be continued starting with Mix B.
- For Quaternary holes if very low grout take observed with Mix B will start using Mix A as starting grout.

Casing Plug

Ten (10) casings plugged today for Quaternary holes for downstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.

Q-739 injected 24.3 liters grout @ 1.88 bar (Pressure refusal)
Q-736 injected 25.5 liters grout @ 1.86 bar (Pressure refusal)

Q-733 injected 19.6 liters grout @ 1.98 bar (Pressure refusal)
Q-718 injected 18.9 liters grout @ 1.98 bar (Pressure refusal)
Q-697 injected 23.5 liters grout @ 1.92 bar (Pressure refusal)
Q-694 injected 16.4 liters grout @ 2.03 bar (Pressure refusal)
Q-691 injected 17.9 liters grout @ 1.90 bar (Pressure refusal)
Q-688 injected 20.4 liters grout @ 1.95 bar (Pressure refusal)
Q-685 injected 26.5 liters grout @ 1.99 bar (Pressure refusal)
Q-682 injected 16.4 liters grout @ 2.03 bar (Pressure refusal)

- All the casings injected grout until reach less than 1 liters/ min grout flow at Pmax and wait for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.
- At Q682, about 0.45 m mud encountered at the bottom of the casing, due to logistic reasons KCG attempted to plug without cleaning and if needed during blanket grouting packer will be placed half in the casing and half in the hole.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)
C	1.69	48	24.0	1
C	1.74	65	24.5	1

Casing installation

- Four (4) casings installed on Mar 07, 2020, one (1) during day shift and three (3) during the night shift; all at the upstream blanket.
- Due to Blizzard and extremely cold weather conditions yesterday, casing installation operation was stopped in the morning and resumed in the afternoon.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Hole Bottom depth (m)	Water depth (m) (1)	Observations
P-595	US	11.5	11.89	12.19		9	
T-592	US	10.9	11.56	11.86	11.95	8.7	
S589	US	10.5	12.16	12.46	12.57	9.01	communication with T592
T-586	US	10.4	11.8	12.1	12.18	9.06	

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

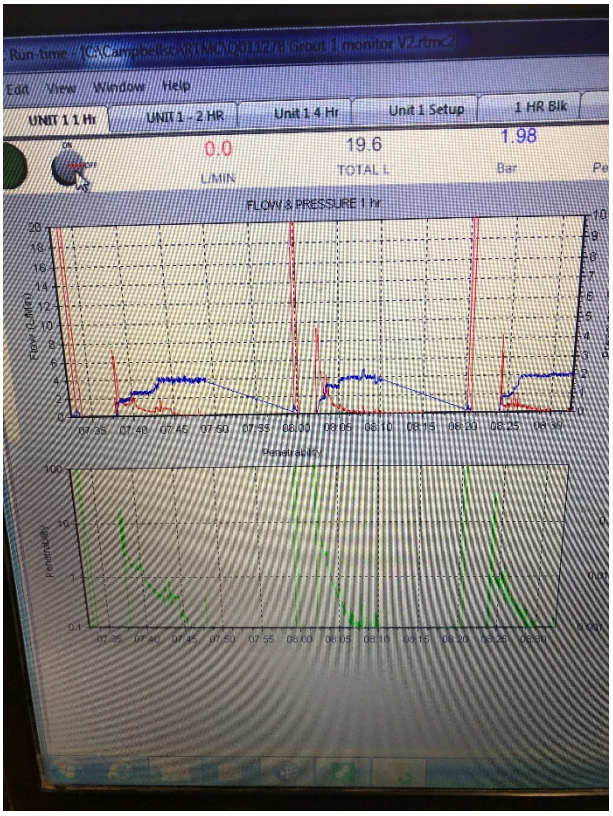
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

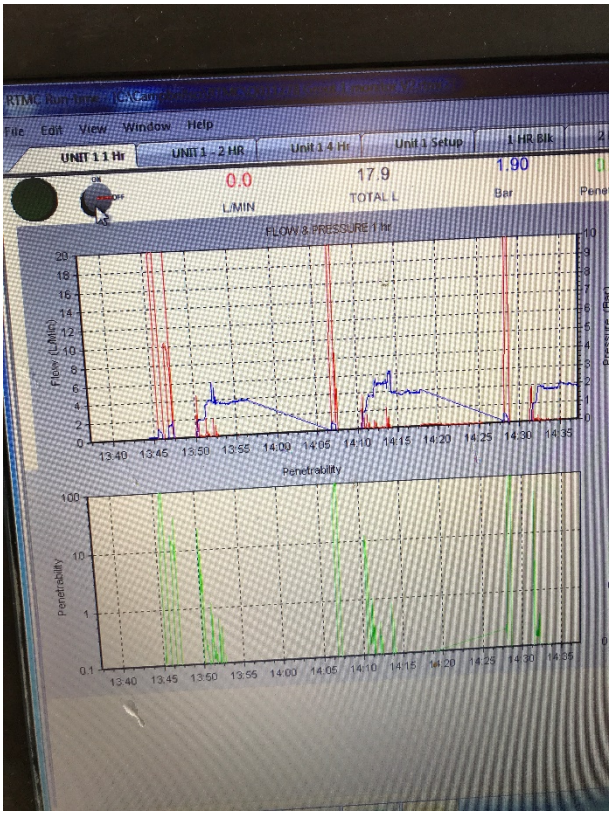
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **08-03-2020** (Date)

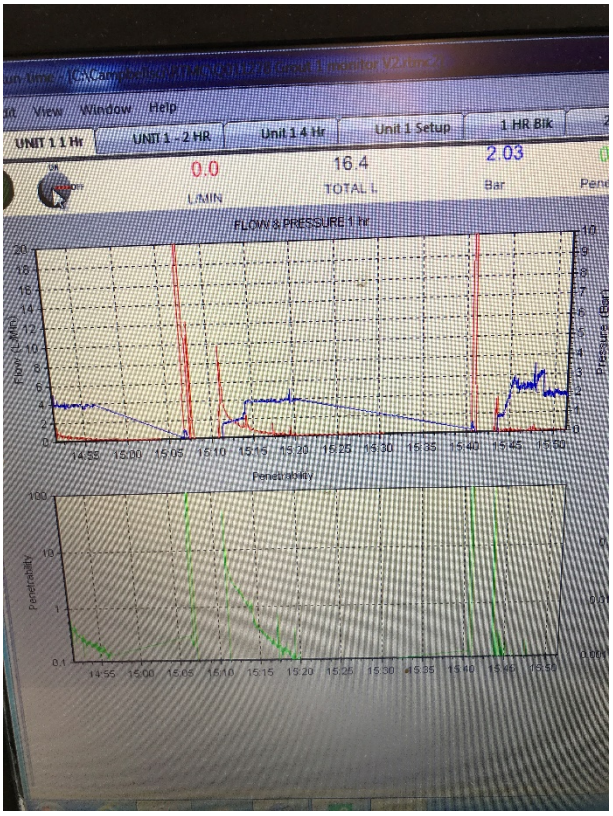
Verified by: *Tom Xue* (Signature) **08-03-2020** (Date)



Pressure and flow chart at Q739, Q736 and Q733 from left to right



Pressure and flow chart at Q697, Q694 and Q691 from left to right



Pressure and flow chart at Q688, Q685 and Q682 from left to right

Measuring Marsh Value for Mix C.

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200309
Document number

2020-03-09	6:30 am 6:30 pm	669034	Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☐Moderate ☒Strong, ☐ gusts Temperature: -36 °C

Comments: Blizzard from Midnight to Afternoon

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Advised KCG, at Q682 during rock drilling if the casing is in the bedrock and also check if hole start caving should be grouted in two short stages.
- Few casings for the upstream blanket observed frozen ice inside the casings.

Work Method and Plan

- Casing plug for Quaternary holes of the downstream blanket and upstream blanket.
- Casing installation at upstream blanket.

Bedrock Drilling

- Six (6) Quaternary holes drilled today.
- The holes were drilled into rock for 5 m grout length.
- No water loss reported on the drilling report. Talk to KCG there might be some water loss but due to amount of water return they can not confirm the depth of water loss. Advised KCG if there is water loss should be reported even if the depth of water loss can not be confirmed.

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
Q685	16.3	-	-	14	No
Q691	15.4	-	-	No caving	No

Q697	15.3	-	-	No caving	No
Q718	16.6	-	-	No caving	No
Q733	15.3	-	-	No caving	No
Q739	15.2	-	-	No caving	No

Casing Plug
Eight (8) casings plugged today, three (3) for Quaternary holes and one (1) for Primary hole in the exclusion zone for downstream blanket and four (4) for upstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.

Downstream blanket
Q-667 injected 204.2 liters grout @ 0.4 bar (Vmax)
Q-664 injected 18.5 liters grout @ 1.87 bar (Pressure refusal)
Q-628 injected 19.8 liters grout @ 2.23 bar (Pressure refusal)
P-609.1 injected 50.7 liters grout @ 2.19 bar (Pressure refusal)
Upstrean blanket
P-661 injected 20.1 liters grout @ 2.03 bar (Pressure refusal)
T-652 injected 18.3 liters grout @ 2.16 bar (Pressure refusal)
P-643 injected 75.5 liters grout @ 1.96 bar (Pressure refusal)
T-640 injected 59.9 liters grout @ 1.79 bar (Pressure refusal)

- Q667 ended at Vmax while rest of casings injected grout until reach less than 1 liters/ min grout flow at Pmax and wait for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	comment
C	1.75	>100	27.0	1	Follow regular mixing procedure
C	1.71	>100	17.5		Mix calcium chloride before adding cement
C		>100	18		Without calcium chloride
C	1.76	75	25	1	With 1% calcium chloride
C	1.7	50	22.8		Sample taken at the collar of the hole

- There was some issues with the Marsh value grout becomes very thick shortly after mixing. Talk to ken (KCG) possibly due to different batches of cement bags
- Tried different options to figure out the issue and to get proper mix.
- Tomorrow will be rock grouting for Quaternary holes and will use Mix B, will continue monitoring grout tests.

Casing installation
- Four (4) casings installed on Mar 08, 2020, one (1) during day shift and three (3) during the night shift; all at the upstream blanket.
- Only one casing installed during the day shift due to mechanical problem with the rig.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Hole Bottom depth (m)	Water depth (m) [1]	Observations
P-595	US	11.5	11.89	12.19		9	
T-592	US	10.9	11.56	11.86	11.95	8.7	
S589	US	10.5	12.16	12.46	12.57	9.01	communication with T592
T-586	US	10.4	11.8	12.1	12.18	9.06	

[1] Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

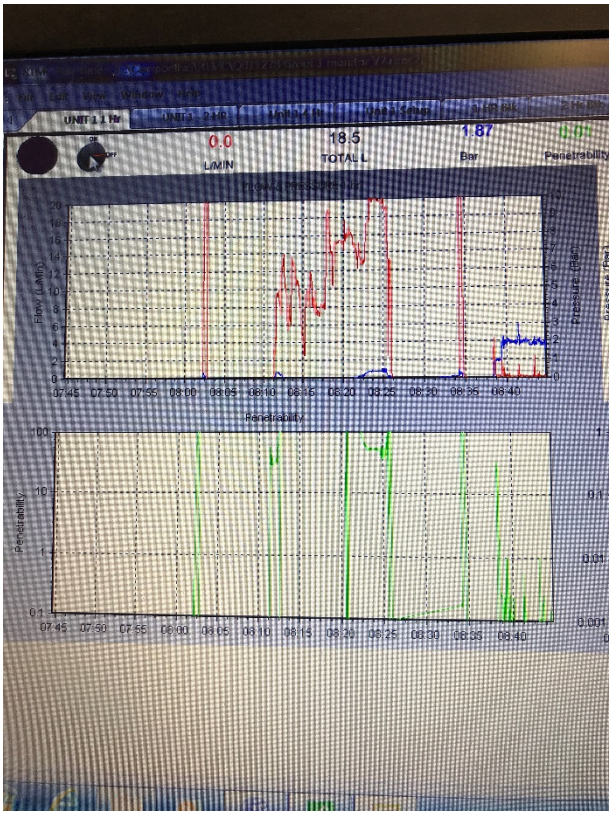
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

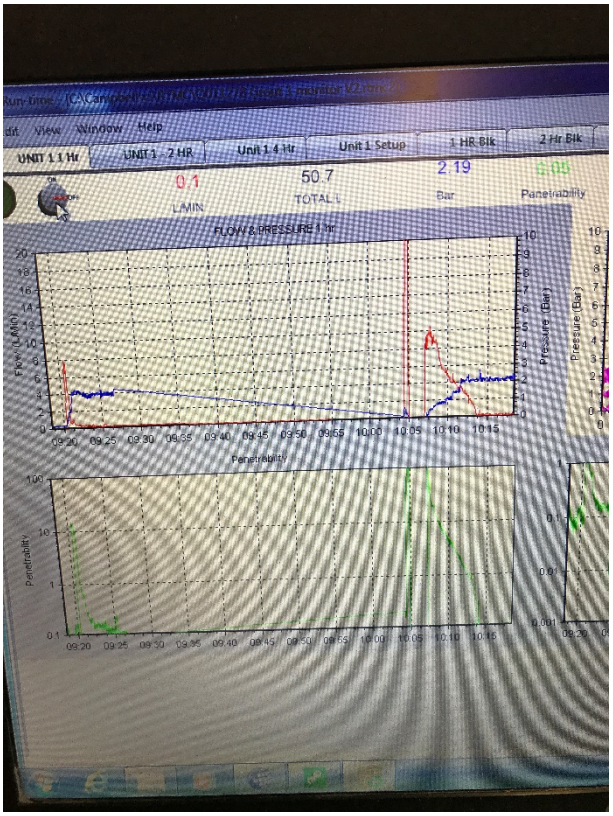
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **09-03-2020** (Date)

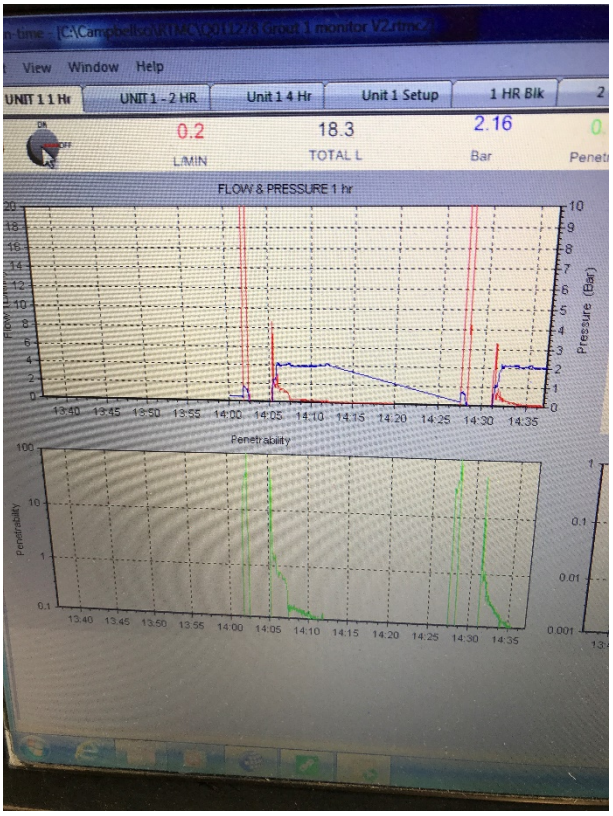
Verified by: *Tom Xue* (Signature) **09-03-2020** (Date)



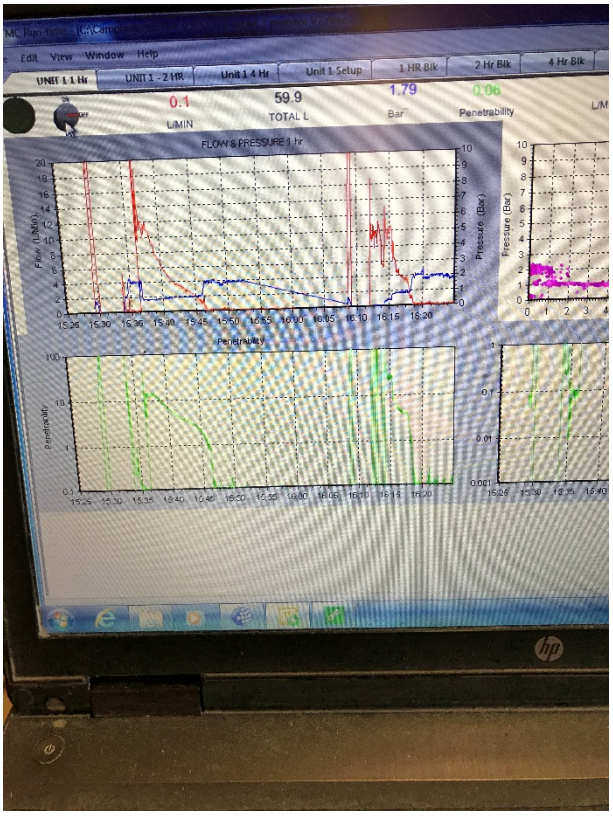
Pressure and flow chart at Q667 and Q664 from left to right



Pressure and flow chart at Q628 and P609.1 from left to right



Pressure and flow chart at P661 and T652 from left to right



Pressure and flow chart at P643 and T640 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200310
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-03-10	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -22 °C

Comments: Blizzard from Midnight to Afternoon

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Issues with cement, Marsh values greater than 100 for Mix C. Tested Mix C properties with different water cement ratio and calcium chloride percentage.

Work Method and Plan

- Grouting quaternary holes for downstream blanket.
- Grouting plug for upstream blanket
- Casing installation at upstream blanket.

Casing Plug

One (1) casing plugged today for upstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.

T-748 injected 20.2 liters grout @ 2.12 bar (Pressure refusal)

Bedrock Grouting.

Q-739 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 10 min.

- Total 76.7 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.5 bar at a flow rate of 0.3 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-733 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 10 min.
- Total 105.1 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.16 bar at a flow rate of 0.2 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-718 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Switch to Mix C grout after about 360 liters of Mix B grout injected at 0 bar.
- After switched to Mix C, pressure started building up slowly and reached to P max within 25 minutes.
- Total 669.3 liters of grout injected (Mix B= 360L+ Mix C = 309.3L).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.55 bar at a flow rate of 0.3 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-697 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 25 min.
- Total 223.4 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.17 bar at a flow rate of 0.1 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-697 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 15 min.
- Total 111.1 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.23 bar at a flow rate of 0.3 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-718 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.

- Switch to Mix C grout after about 210 liters of Mix B grout injected at 0 bar at 20 liters / min.
- Pressure started building up after about 490 liters of total grouted injected and reached to P max within 15 minutes.
- Total 524.7 liters of grout injected (Mix B= 210L+ Mix C = 314.7L).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.03 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	comment
B	1.65	39	28.5	2	
B	1.68	57	26.3		
C	1.72	63	34.1	1	With w/c =0.55 and calcium chloride = 1%
B	1.63	51	24.1	1.5	
C	1.72	98	24.6		With w/c =0.55 and calcium chloride = 2%
C	1.69	56	29.5	1	With w/c =0.55 and calcium chloride = 1%

- No issue with Mix B
- Mix C with water cement ratio of 0.5 and 2% calcium chloride, still too high marsh value so changed the water cement ratio to 0.55 and calcium chloride to 1% and got better numbers. All Mix C used today follow water cement ratio of 0.55 and 1% calcium chloride except once try 2% calcium chloride and got marsh value of 98 sec. so switch back to 1% calcium chloride.
- Will continue monitoring the Mix C and if cement property changed may go back to original mix C.

Casing installation

- Eight (8) casings installed on Mar 09, 2020, four (4) during day shift and four (4) during the night shift; all at the upstream blanket.
  Four (4) casings (S565, T562, T556 and T550) found dry after completion.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Hole Bottom depth (m)	Water depth (m) [1]	Observations
P571	US	10.54	13.01	13.31	13.4	9	
T568	US	10.53	12.48	12.78	13.1	9	
S565	US	10.45	11.86	12.16	12.55		
T562	US	10.33	9.72	10.02	10.35		
P559	US	9.7	10.39	10.69	10.79	9.13	
T556	US	9.7	9.87	10.17	10.28		
S553	US	9.8	9.7	10	10.11	9	
T550	US	9.6	9.61	9.91	10.01		

[1] Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

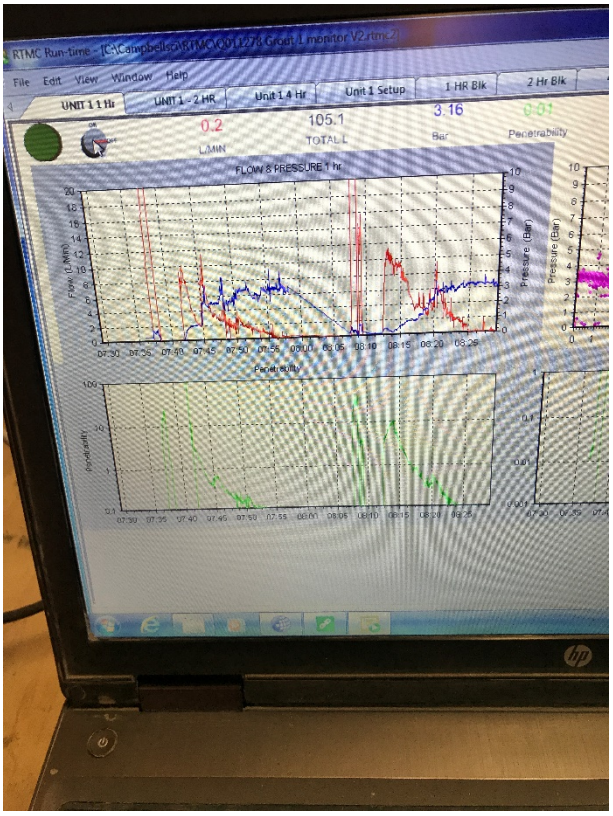
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

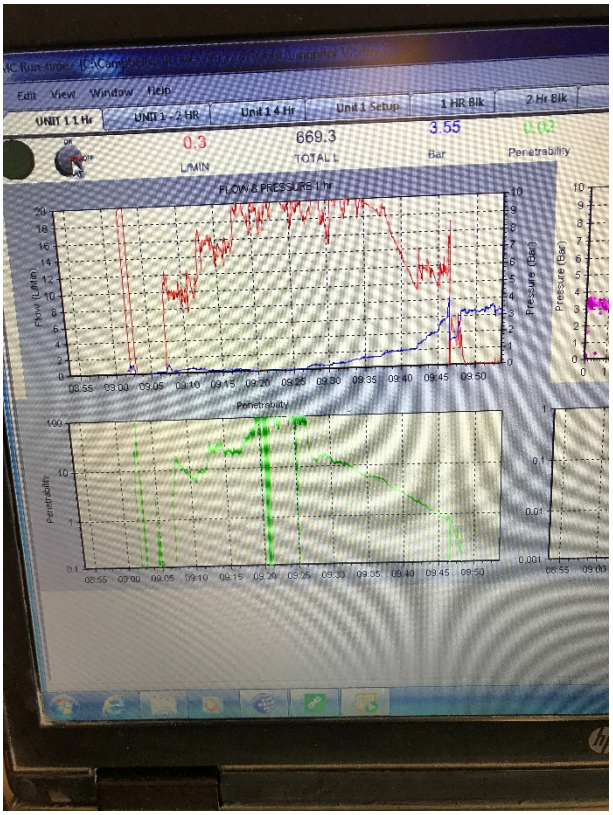
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **10-03-2020** (Date)

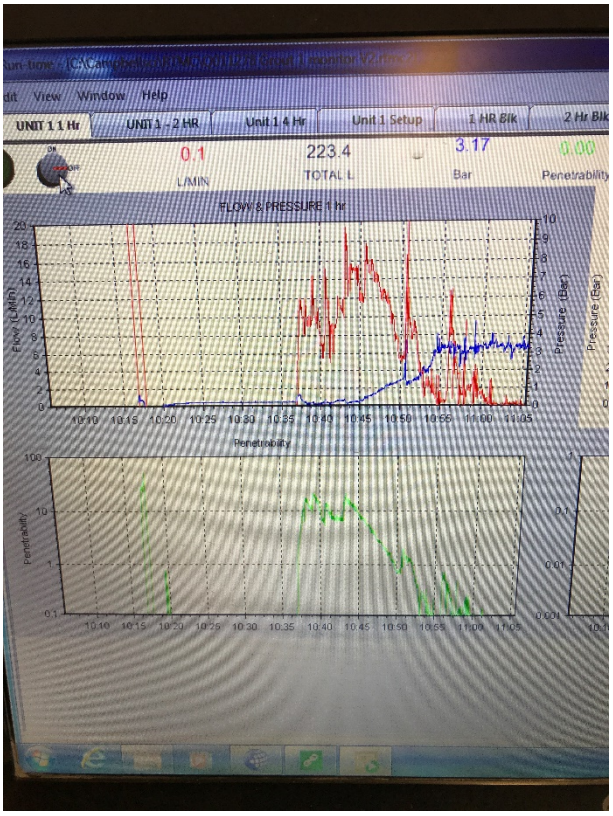
Verified by: *Tom Xue* (Signature) **10-03-2020** (Date)



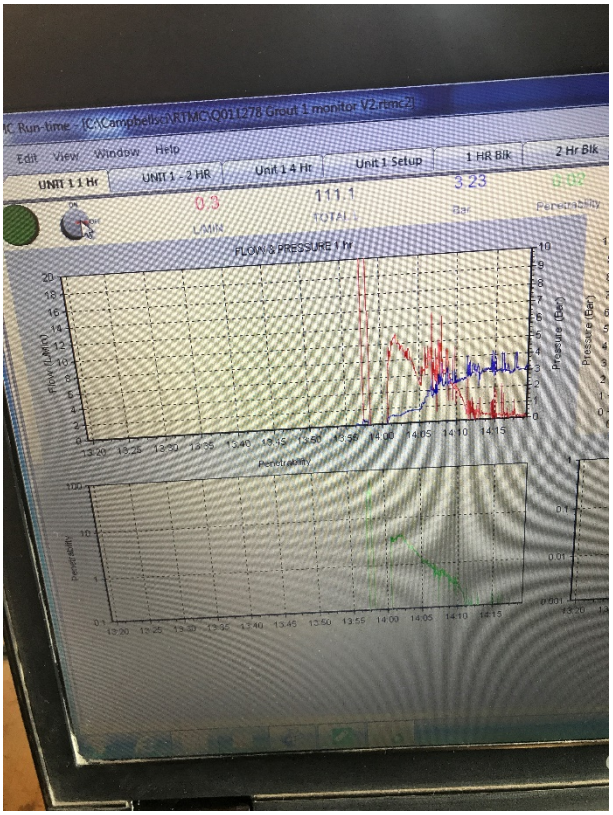
Pressure and flow chart at Q739 and Q733 from left to right



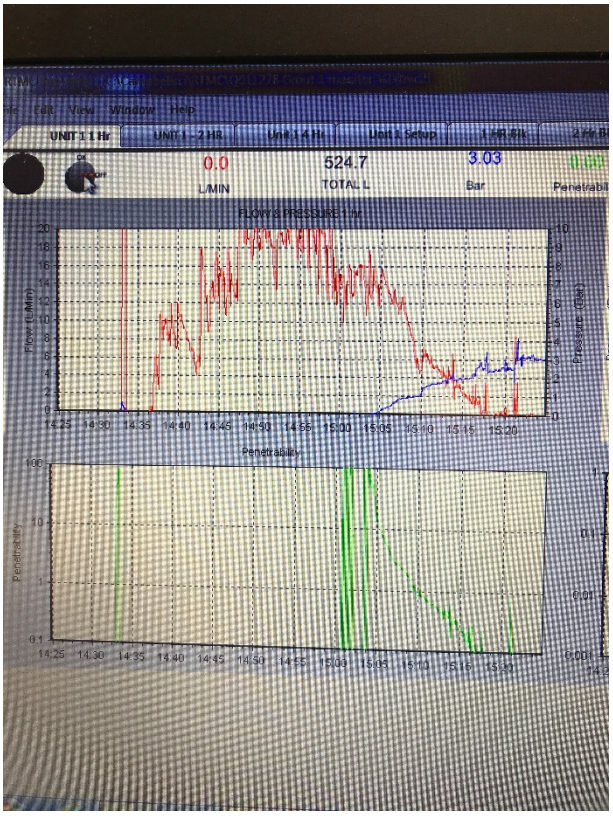
Pressure and flow chart at Q718



Pressure and flow chart at P697



Pressure and flow chart at P692



Pressure and flow chart at P685

Moving injection unit

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200311
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-03-11	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -24 °C

Comments: Blizzard from Midnight to Afternoon

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Attended weekly AEM-SNC coordination meeting.
- Seven (7) additional Quaternary holes for the downstream blanket between 0+176 and 0+224 have been added.

Work Method and Plan

- Grouting plug for upstream blanket
- Casing installation at upstream blanket.

Casing Plug

Fourteen (14) casings plugged today for Upstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.

P-739 injected 23.9 liters grout @ 2.03 bar (Pressure refusal)
T-736 injected 33.3 liters grout @ 1.72 bar (Pressure refusal)
S-733 injected 24.3 liters grout @ 1.95 bar (Pressure refusal)
T-730 injected 17.6 liters grout @ 1.97 bar (Pressure refusal)
P-727 injected 137.8 liters grout @ 2.07 bar (Pressure refusal)
T-724 injected 201.1 liters grout @ 0.52 bar (Vmax)
S-721 injected 200.1 liters grout @ 0.57 bar (Vmax)

T-718 injected 18.7 liters grout @ 2.31 bar (Pressure refusal)
P-715 injected 16.4 liters grout @ 2.16 bar (Pressure refusal)
T-712 injected 57.5 liters grout @ 2.25 bar (Pressure refusal)
S-709 injected 213 liters grout @ 0.62 bar (Vmax)
T-706 injected 18.2 liters grout @ 2.02 bar (Pressure refusal)
P-703 injected 185.6 liters grout @ 0.42 bar (Vmax)
T-700 injected 181.3 liters grout @ 0.25 bar (Vmax)

- Five (5) casings (T724, S721, S709, P703 and T700) ended at Vmax while rest of casings injected grout until reach less than 1 liters/ min grout flow at Pmax and waited for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.73	>100	33	1	With w/c =0.55 and calcium chloride = 1%
C	1.72	80	29.5		With w/c =0.55 and calcium chloride = 1%
C	1.74	79	29	1	With w/c =0.55 and calcium chloride = 1%
C	1.73	70	28.3	1	With w/c =0.55 and calcium chloride = 1%

Casing installation

- Ten (10) casings installed on Mar 10, 2020, five (5) during day shift and five (5) during the night shift; all at the upstream blanket.
  Three (3) casings (S541, P523, and T520) found dry after completion.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Hole Bottom depth (m)	Water depth (m) (1)	Observations
P547	US	10.32	10.22	10.52	10.91	6.5	
T544	US	9.6	9.54	9.84	9.96	9.12	
S541	US	9.7	9.65	9.95	10.05	dry	
T538	US	9.6	9.76	10.06	10.17	9.1	T538 communicate with S541
P535	US	9.5	10.03	10.33	10.44	9.08	
T532	US	9.6	10.31	10.61	10.71	9.01	
S529	US	9.36	9.9	10.2	10.6	7	
T526	US	9.51	9.8	10.1	10.5	7	
P523	US	9.49	9.82	10.12	10.5	dry	
T520	US	9.56	11.02	11.32	10.9	dry	caved at bottom

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

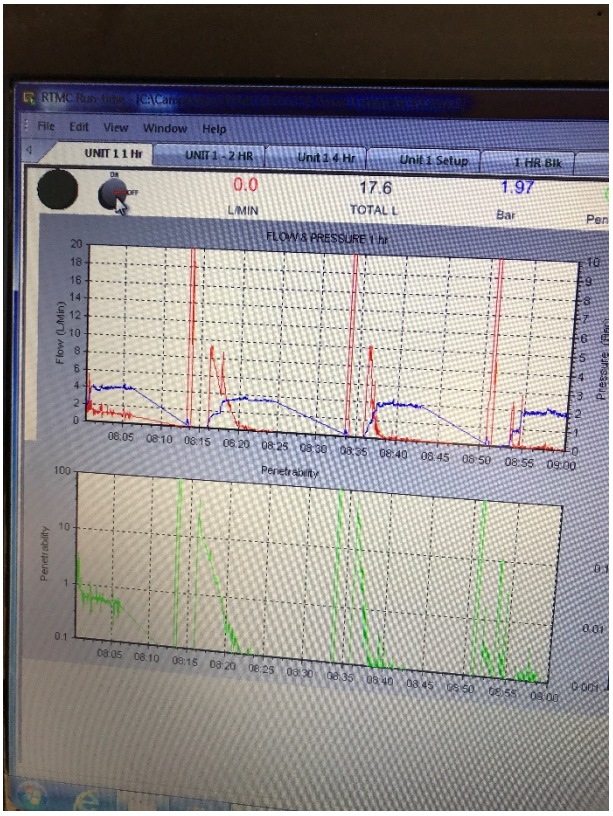
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

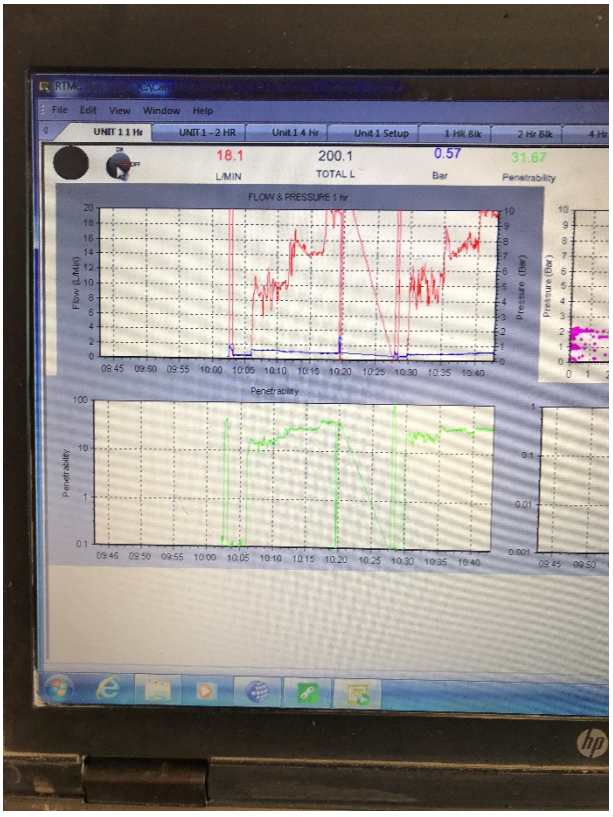
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **11-03-2020** (Date)

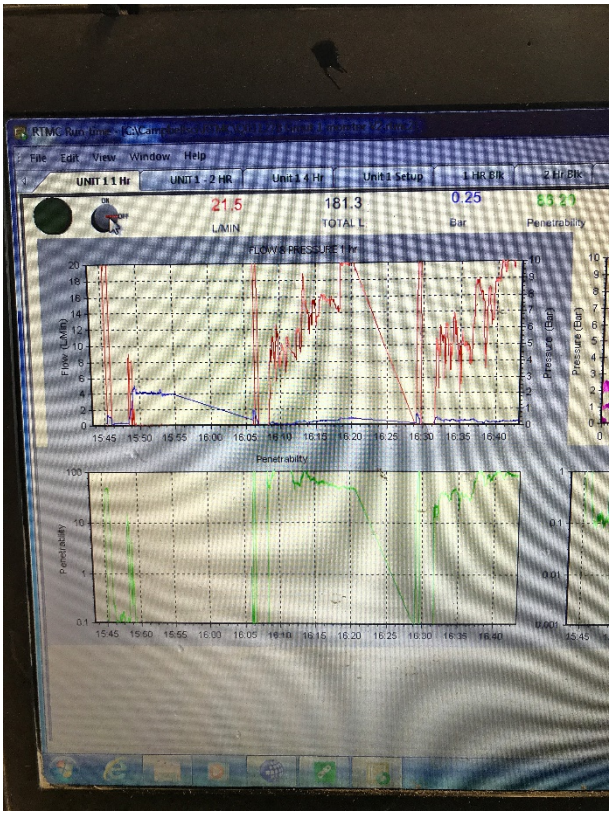
Verified by: *Tom Xue* (Signature) **11-03-2020** (Date)



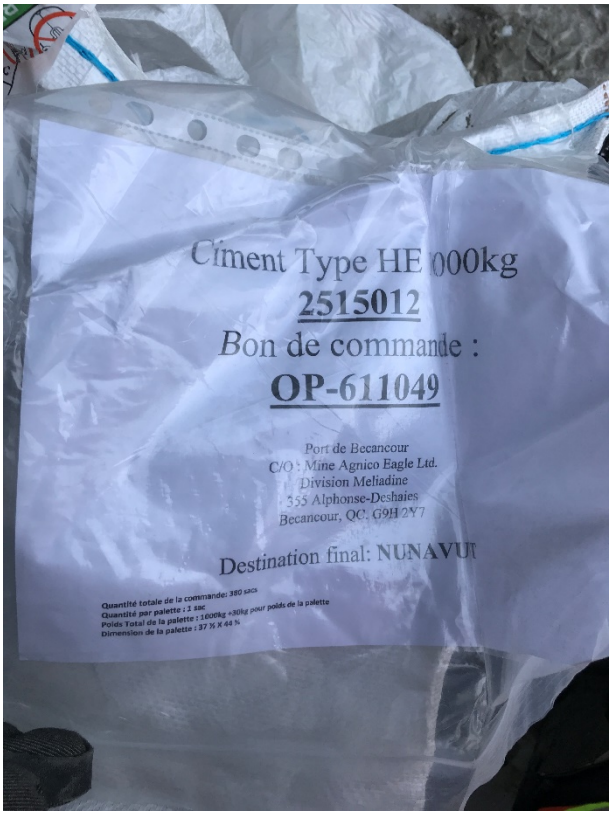
Pressure and flow chart at P739, T736, S733 and T730 from left to right



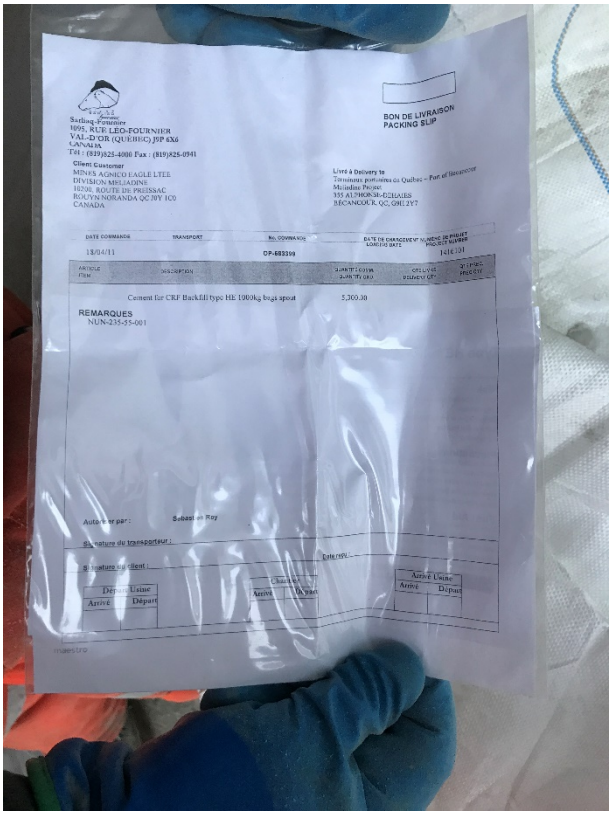
Pressure and flow chart at T724 and S721 from left to right



Pressure and flow chart at T706, P703 and T700 from left to right



Label from bulk cement bag with shipment date unknown



Label from bulk cement bag from 2018 shipment

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200312
Document number

2020-03-12	6:30 am 6:30 pm	669034	Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -32 °C

Comments: Blizzard from Midnight to Afternoon

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Working on weekly report.

Work Method and Plan

- Grouting plug for upstream blanket
- Casing installation for additional Quaternary holes for downstream blaket.
- Drilling into rock for additional Quanternary holes for downstream blanket.

Bedrock Drilling

- Five (5) Quaternary holes drilled today for the downstream blanket..
- The holes were drilled into rock for 5 m grout length.
- No water loss reported on the drilling report.
- All holes were washed for six (6) minutes after completed.
- No communication between the holes in any of the hole during drilling .

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
Q736	14.8	-	-	No caving	No
Q694	14.7	-	-	No caving	No

Q688	15.5	-	-	No caving	No
Q682	15.4	-	-	No caving	No
Q677	15.8	-	-	No caving	No

Casing Plug

Thirteen (13) casings plugged today for Upstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer. At T673, P631, T628 and S625, packer was placed and inflated above the water level due to ice build up along the casing (depth was checked, hole was opened to the bottom of the casing.) and could not push the packer down. Packer was inflated without prefill.

S-697 injected 181.2 liters grout @ 0.84 bar (Vmax)
T-694 injected 38.8 liters grout @ 1.94 bar (Pressure refusal)
P-691 injected 18.4 liters grout @ 1.96 bar (Pressure refusal)
T-688 injected 18.6 liters grout @ 1.92 bar (Pressure refusal)
S-685 injected 18.2 liters grout @ 2.08 bar (Pressure refusal)
T-682 injected 18.9 liters grout @ 2.04 bar (Pressure refusal)
P-679 injected 24.6 liters grout @ 2.08 bar (Pressure refusal)
T-676 injected 179.9 liters grout @ 0.4 bar (Vmax)
S-673 injected 16.5 liters grout @ 2.31 bar (Pressure refusal)
T-634 injected 40.5 liters grout @ 2.18 bar (Pressure refusal)
P-631 injected 197.6 liters grout @ 0.42 bar (Vmax)
T-628 injected 84.1 liters grout @ 2.21 bar (Pressure refusal)
S-625 injected 106.6 liters grout @ 2.23 bar (Pressure refusal)

- Three (3) casings (S697, T676 and P631) ended at Vmax while rest of casings injected grout until reach less than 1 liters/ min grout flow at Pmax and waited for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.71	52	24.5	1	With w/c =0.55 and calcium chloride = 1%
C	1.74	66	27		With w/c =0.55 and calcium chloride = 1%
C	1.70	56	26.5	1	With w/c =0.55 and calcium chloride = 1%
C	1.71	65	26.9		With w/c =0.55 and calcium chloride = 1%

Casing installation

- Eight (8) casings installed on Mar 11, 2020 (As the casing installation continus day and night shift so the casing report is for previous day), five (5) during day shift and three (3) during the night shift; all at the upstream blanket.
  Two (2) casings (S529 and P511) found dry after completion.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Hole Bottom depth (m)	Water depth (m) (1)	Observations
S529	US	9.6	8.82	9.12	9.25		
T526	US	9.6	10.48	10.78	10.75	6.5	
P523	US	9.5	9.81	10.11	10.11	7	
S517	US	9.4	10.48	10.78	10.75	7	
P511	US	9.5	10.09	10.39	10.25		
S505	US	9.5	10.37	10.67	10.76	9.11	
P499	US	9.6	10.68	10.98	11.08	5	
S493	US	9.4	9.83	10.13	10.24	9.05	

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

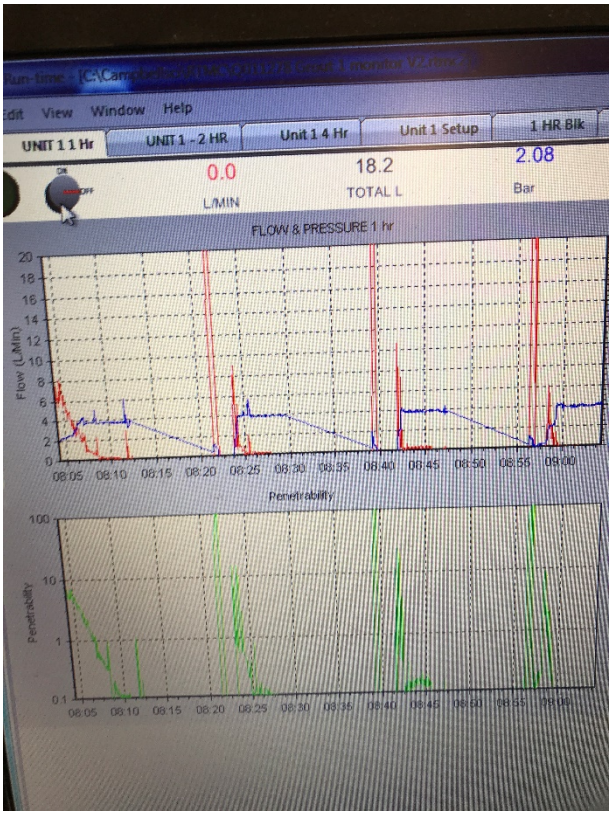
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

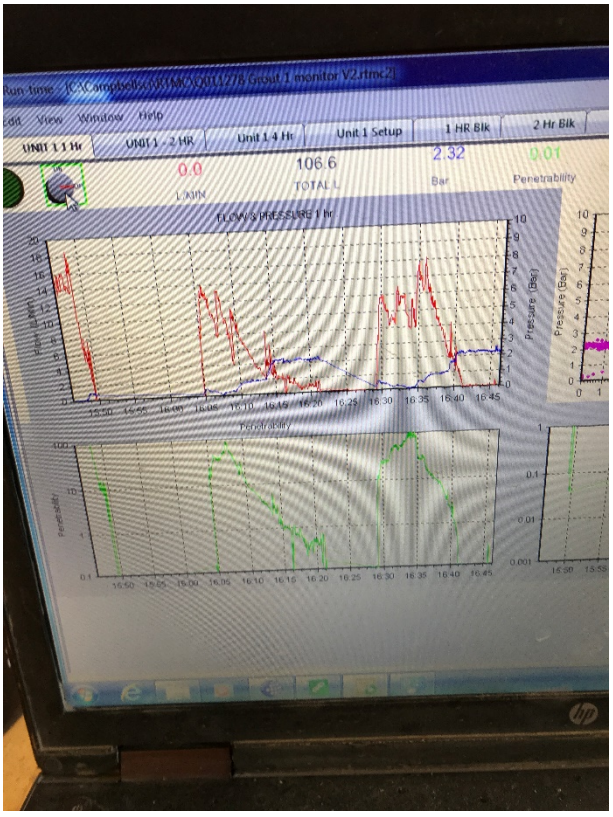
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **12-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **12-03-2020** (Date)



Pressure and flow chart at T694, P691, T686 and S685 from left to right



Pressure and flow chart at T628 and S625 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200313
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-03-13	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -38 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Working on weekly report.
- Casing installation for additional Quaternary holes completed for downstream blanket and rig sent back to Pit.

Work Method and Plan

- Grouting plug for upstream blanket

Bedrock Drilling

No drilling today due to crew shift change

Casing Plug

Six (6) casings plugged today for Upstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer. At P619, T610 and P595, packer was placed and inflated above the water level due to ice buildup along the casing (depth was checked, hole was opened to the bottom of the casing.) and could not push the packer down. Packer was inflated without prefill.

T-622 injected 18.8 liters grout @ 2.23 bar (Pressure refusal)
P-619 injected 37.5 liters grout @ 1.83 bar (Pressure refusal)
T-610 injected 86.7 liters grout @ 2.17 bar (Pressure refusal)

P-607 injected 25.6 liters grout @ 2.09 bar (Pressure refusal)
T-604 injected 23 liters grout @ 2.12 bar (Pressure refusal)
T-6595 injected 127.6 liters grout @ 2.36 bar (Pressure refusal)

- All the casings injected grout until reach less than 1 liters/ min grout flow at Pmax and waited for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.
- Grouting was stopped at 9:30 AM due water pump leakage and resumed grouting at 3 PM.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.74	85	28.5	1	With w/c =0.55 and calcium chloride = 1%
C	1.73	65	22.9	1	With w/c =0.55 and calcium chloride = 1%

Casing installation

- Eight (8) casings installed on Mar 12, 2020 (As the casing installation continues day and night shift so the casing report is for previous day), five (5) during day shift and three (3) during the night shift; one (1) at the upstream blanket and seven (7) at downstream blanket for the additional quaternary holes.
  Three (3) casings (P487, Q295 and Q292) found dry after completion.
- One casing (S-529) was previously installed and deepened on March 13, 2020 from 8.82 m to 9.89 m depth.

Hole	Blanket (US or DS)	Survey bedrock depth (m)	Measured bedrock depth (m)	Casing Bottom depth (m)	Hole Bottom depth (m)	Water depth (m) (1)	Observations
P487	US	9.5	10.88	11.18	11.31		
Q295	DS	9.2	8.68	8.98	9.14		
Q292	DS	9.5	8.6	8.9	9.04		
Q223	DS	10.5	9.59	9.89	9.0	7	
Q220	DS	11.2	10.46	10.76	11.15	7	
Q199	DS	9.9	9.42	9.72	9.81	8.71	
Q197	DS	10.2	10.26	10.56	10.65	9.25	
Q193	DS	10.2	9.76	10.06	10.15	9.15	

(1) Water level measured during casing drilling must be considered very carefully as drilling process induced water in the ground. Stabilized water level will be measured later.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

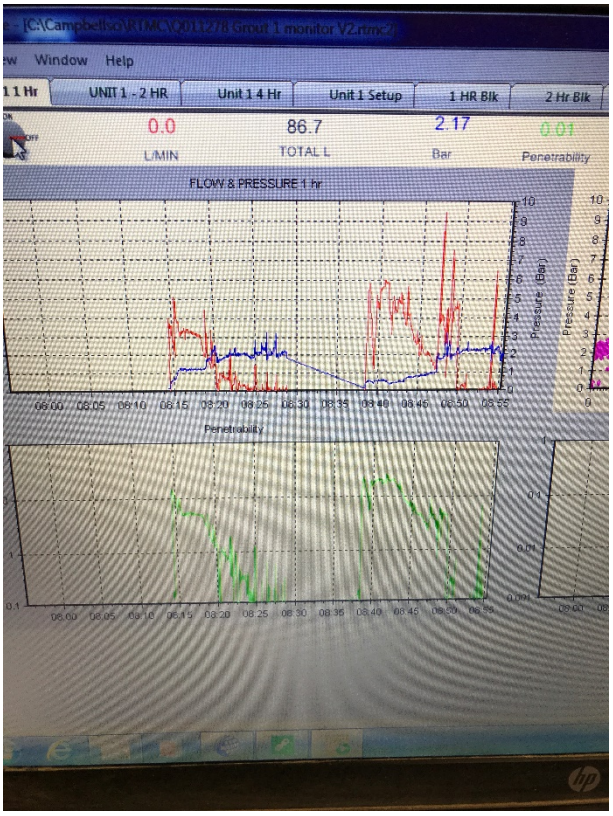
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

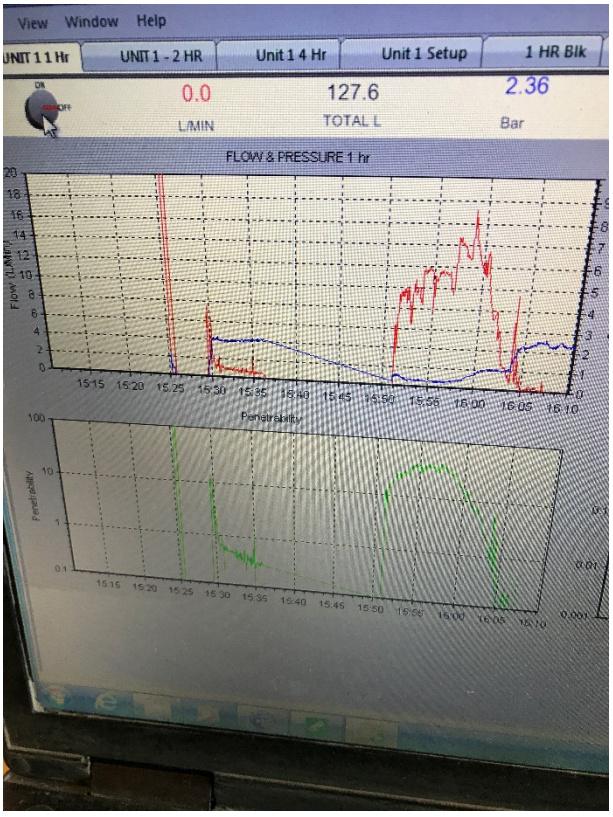
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **13-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **13-03-2020** (Date)



Pressure and flow chart at P619 and T610 from left to right



Pressure and flow chart at T604 and T595 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200314
Document number

2020-03-14	6:30 am 6:30 pm	669034	Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☐ gusts Temperature: -32 °C

Comments: Blizzard in the afternoon.

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- No grouting after (9:30 am due to loader broke down and blizzard in the afternoon.

Work Method and Plan

- Grouting plug for upstream blanket.
- Drilling holes for downstream blanket.

Bedrock Drilling

- One (1) Quaternary and one (1) primary hole in the exclusion zone drilled today for the downstream blanket.
- The holes were drilled into rock for 5 m grout length.
- No water loss reported on the drilling report.
- All holes were washed for six (6) minutes after completed.
- No communication between the holes during drilling.

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
Q628	17.6	-	-	No caving	No
P609.1	18.3	-	-	No caving	No

Casing Plug

Five (5) casings plugged today for Upstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.
At T592, S589 and T586, packer was placed and inflated above the water level due to ice buildup along the casing (depth was checked, holes were opened to the bottom of the casing.) and did not allow the packer to be pushed down.
Packer was inflated without prefill.

T-592 injected 83.7 liters grout @ 2.18 bar (Pressure refusal)
S-589 injected 96.6 liters grout @ 2.34 bar (Pressure refusal)
T-586 injected 199.6 liters grout @ 0.7 bar (Ended at Vmax)
P-583 injected 73.1 liters grout @ 2.29 bar (Pressure refusal)
T-580 injected 25.9 liters grout @ 1.96 bar (Pressure refusal)

- All the casings grout injected until reach less than 1 liters/ min grout flow at Pmax and waited for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.
- Grouting was stopped at 9:30 AM due to loader broke down.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.74	93	22.7	1	With w/c =0.55 and calcium chloride = 1%
C	1.74	64	23.0		With w/c =0.55 and calcium chloride = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

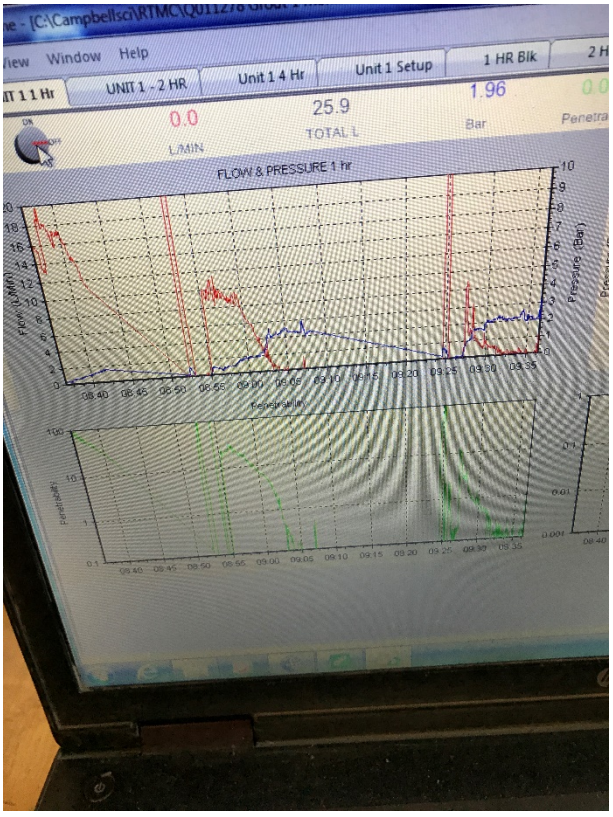
SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **14-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **14-03-2020** (Date)

Pressure and flow chart for T592, S589 and T586 from left to right



Pressure and flow chart for P583 and T580 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200315
Document number

2020-03-15	6:30 am 6:30 pm	669034	Muhammad Saleem
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☐Strong, ☐ gusts Temperature: -14 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Water in the injection unit was at 44C in the morning, Advised crew to bring fresh water.

Work Method and Plan

- Grouting plug for upstream blanket.

Casing Plug

Thirteen (13) casings plugged today for Upstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.
At T562, P559, T544 and S541, packer was placed and inflated above the water level due to ice buildup along the casing (depth was checked, holes were opened to the bottom of the casing.) and did not allow the packer to be pushed down.
Packer was inflated without prefill.

S-577 injected 20.1 liters grout @ 2.18 bar (Pressure refusal)
T-574 injected 24.0 liters grout @ 2.09 bar (Pressure refusal)
P-571 injected 220.5 liters grout @ 1.07 bar (Ended at Vmax)
T-568 injected 229.2 liters grout @ 0.18 bar (Ended at Vmax)
S-565 injected 28.0 liters grout @ 2.13 bar (Pressure refusal)
T-562 injected 51.7 liters grout @ 2.08 bar (Pressure refusal)
P-559 injected 55.1 liters grout @ 2.13 bar (Pressure refusal)

T-556 injected 171.5 liters grout @ 0.24 bar (Ended at Vmax)
S-553 injected 25.0 liters grout @ 1.97 bar (Pressure refusal)
T-550 injected 58.0 liters grout @ 1.92 bar (Pressure refusal)
P-547 injected 20.8 liters grout @ 2.00 bar (Pressure refusal)
T-544 injected 62.2 liters grout @ 1.98 bar (Pressure refusal)
S-541 injected 84.8 liters grout @ 1.98 bar (Pressure refusal)

- All the casings injected grout until reach less than 1 liters/ min grout flow at Pmax and waited for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.74	54	29.9	1	With w/c =0.55 and calcium chloride = 1%
C	1.74	64	25.9		With w/c =0.55 and calcium chloride = 1%
C	1.72	65	28.7	1	With w/c =0.55 and calcium chloride = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

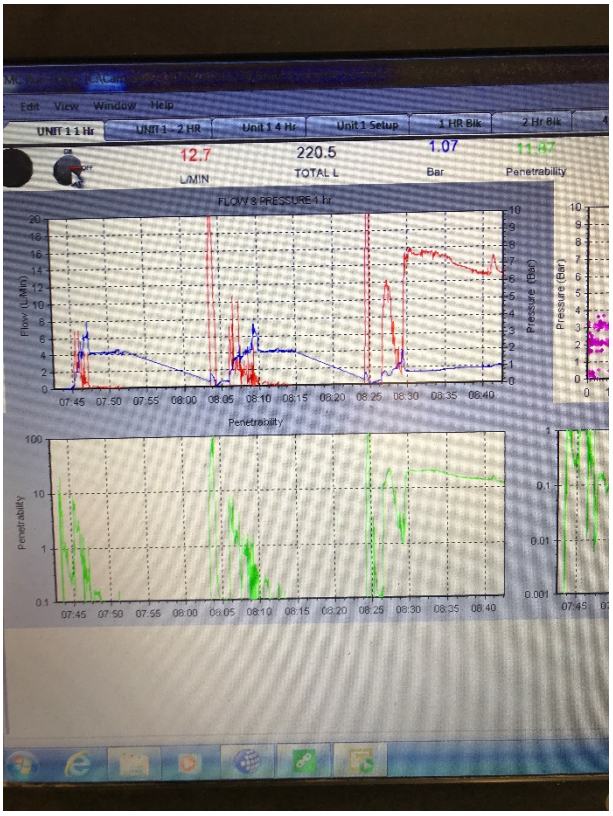
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

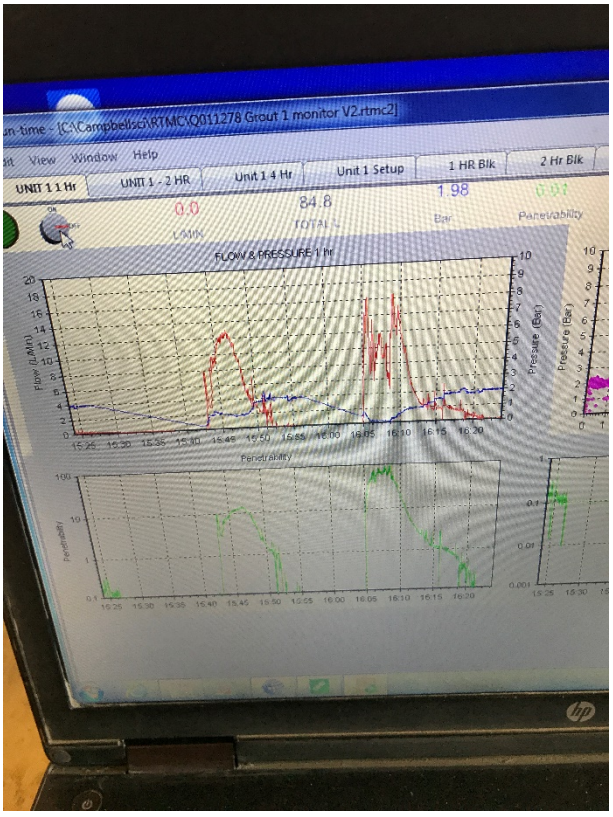
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **15-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **15-03-2020** (Date)



Pressure and flow chart for S577, T574 and P571 from left to right



Pressure and flow chart for T544 and S541 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200316
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-03-16	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☒ gusts Temperature: -22 °C

Comments: Blizzard in the afternoon

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- Issued weekly QA report.

Work Method and Plan

- Grouting plug for upstream blanket.
- Cleaning frozen casings.

Casing Plug

Ten (10) casings plugged today for Upstream blanket and downstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.
At T538, P535, T526, S517 and P511 packer was placed and inflated above the water level due to ice buildup along the casing (depth was checked, holes were opened to the bottom of the casing.) and did not allow the packer to be pushed down. Packer was inflated without prefill.

Upstream Blanket

T-538 injected 171.0 liters grout @ 1.84 bar (Ended at Vmax)
P-535 injected 25.8 liters grout @ 1.98 bar (Pressure refusal)
T-532 injected 23.5 liters grout @ 2.07 bar (Pressure refusal)
S-529 injected 24.3 liters grout @ 2.0 bar (Pressure refusal)
T-526 injected 60.7 liters grout @ 1.8 bar (Pressure refusal)

S-517 injected 8.70 liters grout @ 2.0 bar (Pressure refusal)
P-511 injected 37.5 liters grout @ 1.87 bar (Pressure refusal)
S-506 injected 74.33 liters grout @ 2.03 bar (Pressure refusal)

Downstream Blanket
Q-526 injected 23.1 liters grout @ 2.20 bar (Pressure refusal)
Q-523 injected 20.2 liters grout @ 1.98 bar (Pressure refusal)

- T538 ended at Vmax while rest of all the casings injected grout until reach less than 1 liters/ min grout flow at Pmax and waited for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.74	65	29.5	1	With w/c =0.55 and calcium chloride = 1%
C	1.69	52	28.5		With w/c =0.55 and calcium chloride = 1%
C	1.72	77	29.5	1	With w/c =0.55 and calcium chloride = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

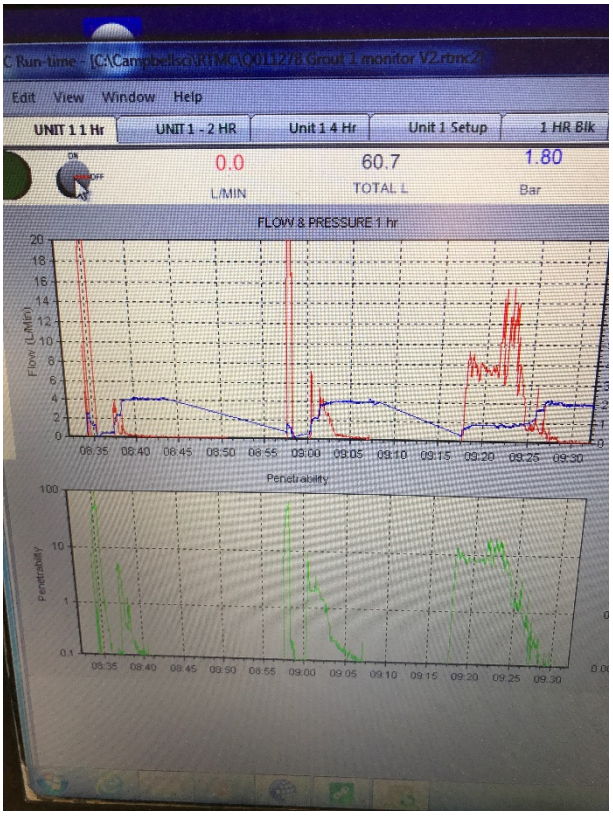
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **16-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **16-03-2020** (Date)



Pressure and flow chart for T532, S529 and T526 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200317
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-03-17	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☐ gusts Temperature: -30 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- KCG received the coordinates for two (2) remaings casings in the exclusion zone. These casings will be installed when rig will be available.

Work Method and Plan

- Grouting plug for upstream blanket.

Casing Plug

Twelve (12) casings plugged today for Upstream blanket and downstream blanket using Mix C without Celbex. Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer. At P487, packer was placed and inflated above the water level due to ice buildup along the casing (depth was checked, hole was opened to the bottom of the casing.) and did not allow the packer to be pushed down. Packer was inflated without prefill.

Upstream Blanket

P-499 injected 17.4 liters grout @ 2.29 bar (Pressure refusal)
S-493 injected 18.6 liters grout @ 1.96 bar (Pressure refusal)
P-487 injected 30.6 liters grout @ 2.29 bar (Pressure refusal)

Downstream Blanket

Q-481 injected 21.1 liters grout @ 2.08 bar (Pressure refusal)
Q-478 injected 55.4 liters grout @ 1.78 bar (Pressure refusal)
Q-295 injected 149.6 liters grout @ 2.20 bar (Vmax)
Q-292 injected 23.4 liters grout @ 1.95 bar (Pressure refusal)
Q-223 injected 48.2 liters grout @ 1.73 bar (Pressure refusal)
Q-220 injected 20.7 liters grout @ 2.12 bar (Pressure refusal)
Q-199 injected 143.3 liters grout @ 0.25 bar (Vmax)
Q-197 injected 19.1 liters grout @ 2.16 bar (Pressure refusal)
Q-193 injected 24.9 liters grout @ 2.05 bar (Pressure refusal)

- Q-295 and Q-199 ended at Vmax while rest of all the casings injected grout until reach less than 1 liters/ min grout flow at Pmax and waited for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.73	65	28.5	1	With w/c =0.55 and calcium chloride = 1%
C	1.76	>100	28.3		With w/c =0.55 and calcium chloride = 1%
C	1.76	98	29.9	1	With w/c =0.55 and calcium chloride = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

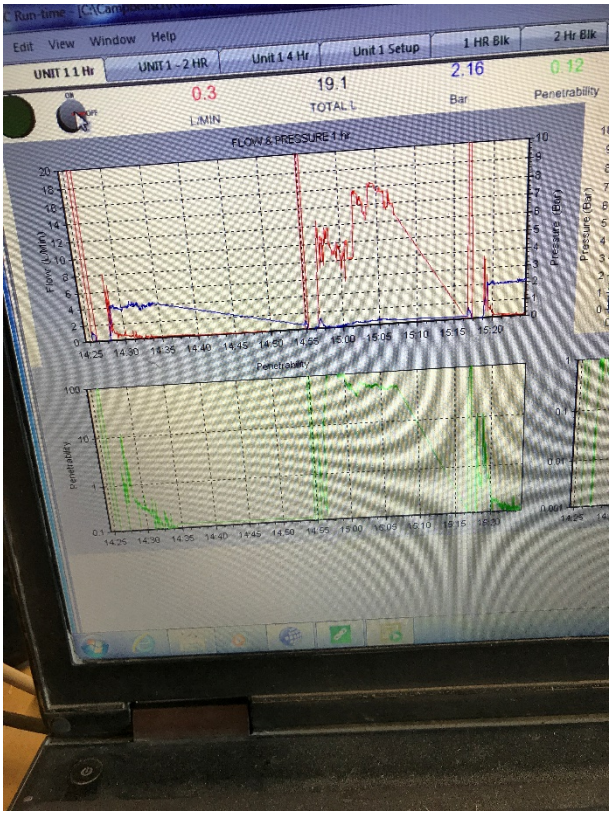
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

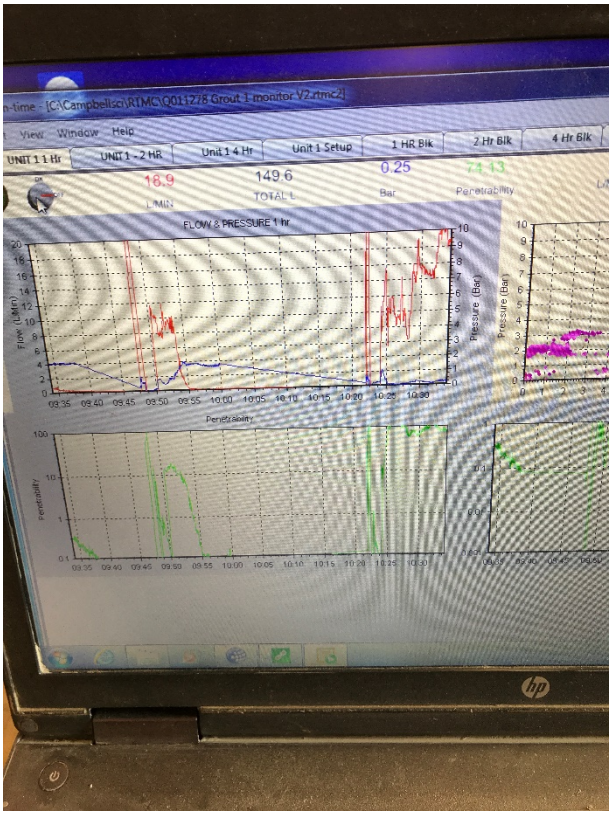
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **17-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **17-03-2020** (Date)



Pressure and flow chart for Q220, Q199 and Q197 from left to right



Pressure and flow chart for Q478 and Q295 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200318
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-03-18	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☐ gusts Temperature: -32 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- No grouting between 9 AM and NOON due to loader was not available at beginning and then some issue with injection unit.

Work Method and Plan

- Grouting plug for upstream blanket.

Casing Plug

Seven (7) casings plugged today for Upstream blanket using Mix C without Celbex.
Packer was placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.
At S-613, S-637 and S-649, packer was placed and inflated above the water level due to ice buildup along the casing (depth was checked, holes were opened to the bottom of the casing.) and did not allow the packer to be pushed down. Packer was inflated without prefill.

Upstream Blanket

T-598 injected 208.4 liters grout @ 1.91 bar (Vmax)
S-601 injected 22.3 liters grout @ 2.18 bar (Pressure refusal)
S-613 injected 5.80 liters grout @ 2.82 bar (Pressure refusal)
T-616 injected 39.3 liters grout @ 2.13 bar (Pressure refusal)

S-637 injected 98.5 liters grout @ 2.11 bar (Pressure refusal)
T-646 injected 191.3 liters grout @ 0.82 bar (Vmax)
S-649 injected 87.0 liters grout @ 1.99 bar (Pressure refusal)

- T-598 and T-649 ended at Vmax while rest of all the casings injected grout until reach less than 1 liters/ min grout flow at Pmax and waited for 5 minutes.
- All the casings plugged today were socketed minimum 0.3 m into bedrock.

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.72	72	27.9	1	With w/c =0.55 and calcium chloride = 1%
C	1.71	80	27.5	1	With w/c =0.55 and calcium chloride = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

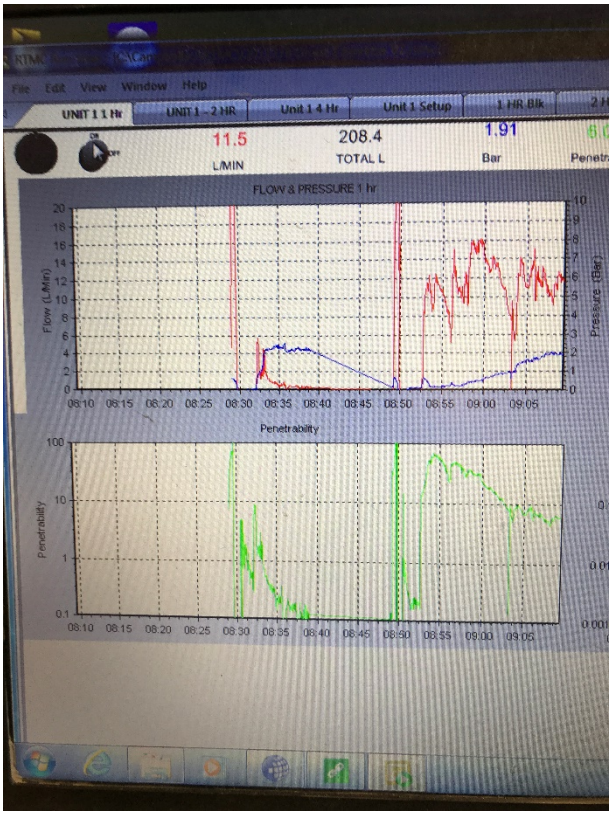
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleed,

SAFE AND SAFETY REMARKS

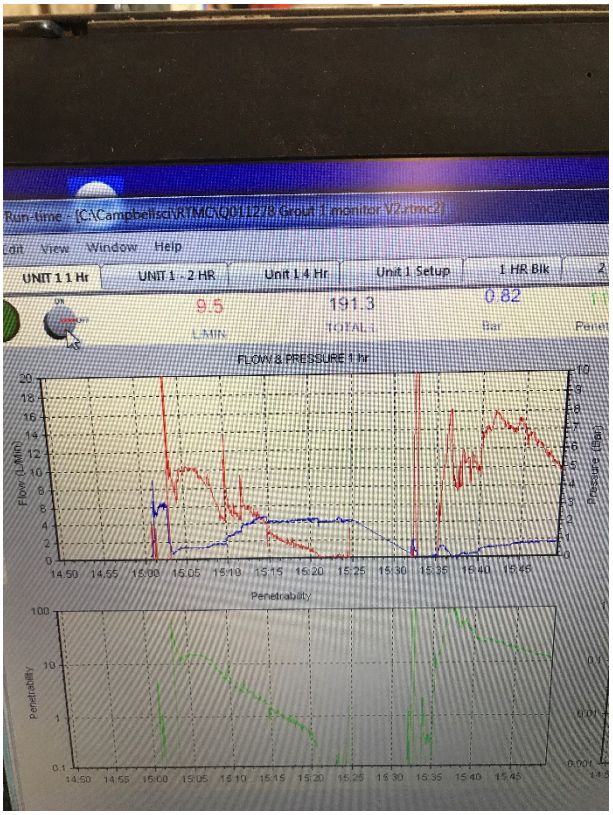
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **18-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **18-03-2020** (Date)



Pressure and flow chart for S-601 and T-598 from left to right



Pressure and flow chart for S-637 and T-646 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200319
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-03-19	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☐Strong, ☐ gusts Temperature: -30 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Attended weekly AEM-SNC coordination meeting.
- Attended SNC-AEM-GC meeting.
- Reviewed GHD reports.
- Updated spread sheet and other QA related activities.
- As the crew is worried about the current uncertain situation, KCG decided to do cleaning only (no drilling or grouting activity) to avoid any injury as the crew cannot focus completely on job and they have crew change tomorrow.

Work Method and Plan

- No drilling or grouting activity, only cleaning equipment and make ready for next shift.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments

SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **19-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **19-03-2020** (Date)

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200320
Document number

Date	Time (Start/End)	Project No.	Prepared by
2020-03-20	6:30 am 6:30 pm	669034	Muhammad Saleem

Project	Client
Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle

Consultant	Contractor
SNC-Lavalin	TCG(KCG)

Weather: ☒Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☐Strong, ☐ gusts Temperature: -30 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Updated spread sheet and other QA related activities.
- Attended AEM-SNC meeting to discuss contingency plan, if SNC has to monitor the grouting program remotely.
- Prepared the QA weekly report.

Work Method and Plan

- No drilling or grouting activity today due to KCG crew change.

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location, batch or other	Scope and comments

SAFE AND SAFETY REMARKS

- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem* (Signature) **20-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **20-03-2020** (Date)

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200321
Document number

2020-03-21	6:30 am 6:30 pm	669034	Muhammad Saleem/ Paul Yong
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☒Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☐ gusts Temperature: -26 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Updated spreadsheet and other QA related activities.
- Cement temperature was found at 44C in the afternoon, cement skid sent back to batching dorm and brought another skid of cement with temperature about 21C.

Work Method and Plan

- Grouting casing plug for upstream blanket
- Drilling additional Quaternary holes for downstream blanket
- Rock grouting for additional quaternary holes on the downstream blanket

Bedrock Drilling

- Two (2) Quaternary holes drilled today.
- The holes were drilled into rock for 5 m grout length.
- No water loss reported on the drilling report.

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
Q526	16.3	-	-	No caving	No
Q481	15.4	-	-	No caving	No

Casing Plug
Four (4) casings plugged today for Upstream blanket using Mix C without Celbex.
Packer placed at about 2 m above the bottom of the casing and about 15 liters grout injected prior to inflate packer.

T-664 injected 29.7 liters grout @ 1.95 bar (Pressure refusal)
T-658 injected 191.6 liters grout @ 1.32 bar (Vmax)
S-745 injected 152.8 liters grout @ 1.18 bar (Vmax)
T-742 injected 49.6 liters grout @ 1.84 bar (Pressure refusal)

Bedrock Grouting. (Downstream Blanket)
Q-736 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pmax was reached after +- 5 min.
- Total 77.6 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.78 bar at a flow rate of 0.6 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-694 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pressure started building up after about 110 liters of grout injected and reached Pmax within 5 min.
- Total 146.2 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.21 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-688 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with Mix B grout to displace water and then after packer inflated, started injection with Mix B grout.
- Pressure started building up after about 100 liters of grout injected and reached Pmax within 10 min.
- Total 183.7 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.21 bar at a flow rate of 0.0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
C	1.71	50	20.0	1.5	With w/c =0.55 and calcium chloride = 1%
C	1.73	77	22.2	1	With w/c =0.55 and calcium chloride = 1%

B	1.63	39	24.5	-	With w/c =0.6 and calcium chloride = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

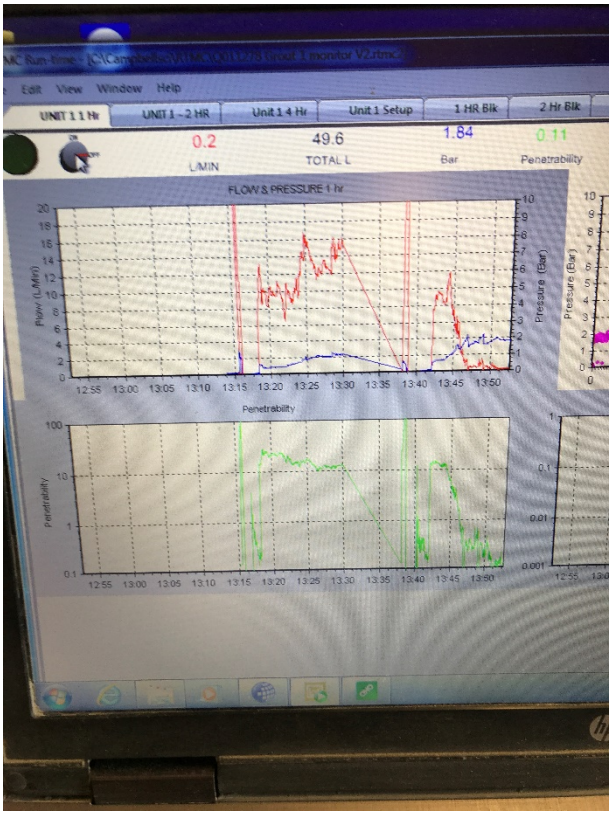
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

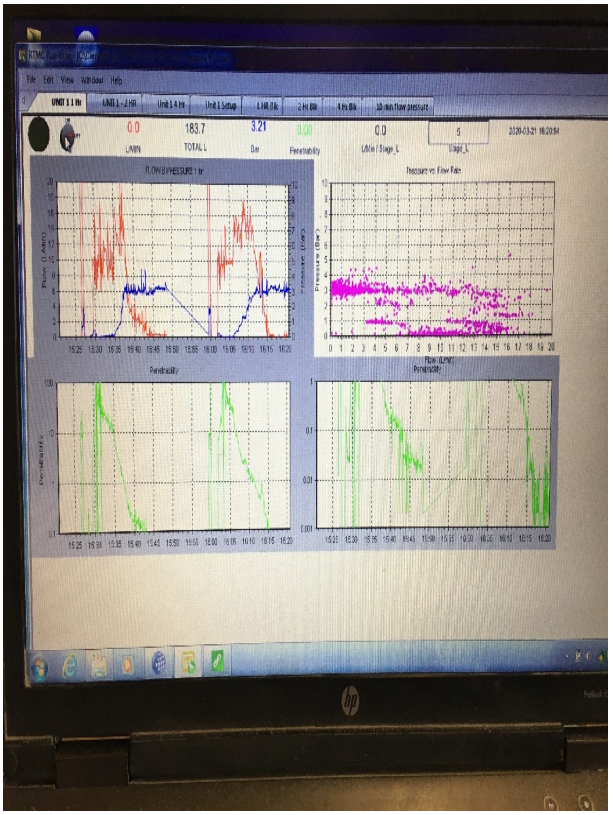
- Dress up properly for extreme cold conditions

Issued by: *Muhammad Saleem / Paul Yong* (Signature) **21-03-2020** (Date)

Verified by: *Tom Xue* (Signature) **21-03-2020** (Date)



Pressure and flow chart for casing plug at S745 and T742 from left to right



Pressure and flow chart at Q694 and Q688 from left to right

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200322
Document number

2020-03-22	6:30 am 6:30 pm	669034	Paul Yong
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☒Light ☐Moderate ☐Strong, ☐ gusts Temperature: -13 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☐Yes ☒No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Updated spreadsheet and other QA related activities.
- Cement temperature was checked and about 26 ˚C.
- Bedrock grouting work interrupted upon Mine's instruction to clear the area due to pipe pickling safety requirement.
- Bedrock grouting work resumed in the afternoon.

Work Method and Plan

- Drilling Primary holes from the east end of the upstream blanket from sta. 691 to sta. 739.
- Rock grouting for additional quaternary holes on the downstream blanket

Bedrock Drilling

- Five (5) Primary holes were drilled into bedrock today for the upstream blanket.
- The holes were drilled into rock for 5 m grout length.
- Water loss are reported for three (3) holes.

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
P-691	16.0	15.5	0.5	No caving	No
P-703	16.5	15.2	1.3	No caving	No
P-715	14.5	14.3	0.2	14.3	No
P-727	16.6	-	-	No caving	No
P-739	14.8	-	-	No caving	No

Note: *P-715 was drilled to 18.8m but the hole collapsed. The final measured depth was at 14.5m. water loss was noticed at 14.3m. Driller should have stopped drilling when no water return is encountered. The hole should be grouted before proceeding to the target depth required.*

Casing Plug
No activity today

Bedrock Grouting. (Downstream Blanket)
Q-682 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 35.4 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 32 min.
- Total 512.1 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.95 bar at a flow rate of 0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-667 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 34 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 8 min.
- Total 87.9 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.13 bar at a flow rate of 0.1 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-628 5 m stage

- Packer was placed at the bottom of the casing.
- Prefilled with 35.1 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 10 min.
- Total 103.5 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 2.89 bar at a flow rate of 0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Grout Test

Mix	Specific Gravity	Marsh Value (sec.)	Grout temperature (°C)	Bleeding (%)	Comment
B	1.68	47	27.5	1.5	With w/c =0.6 and calcium chloride = 1%
B	1.68	45	25.5	2	With w/c =0.6 and calcium chloride = 1%
B	1.71	58	21.5	-	With w/c =0.6 and calcium chloride = 1%

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

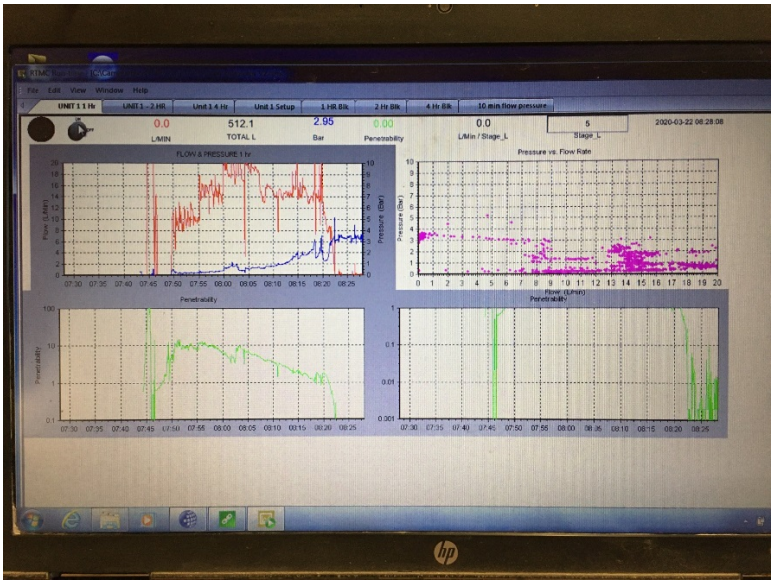
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

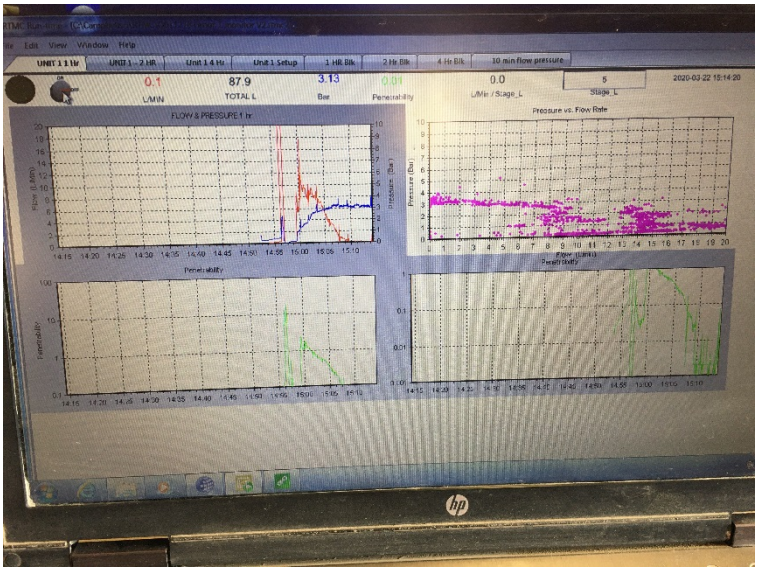
- Dress up properly for extreme cold conditions

Issued by: *Paul Yong* (Signature) **22-03-2020** (Date)

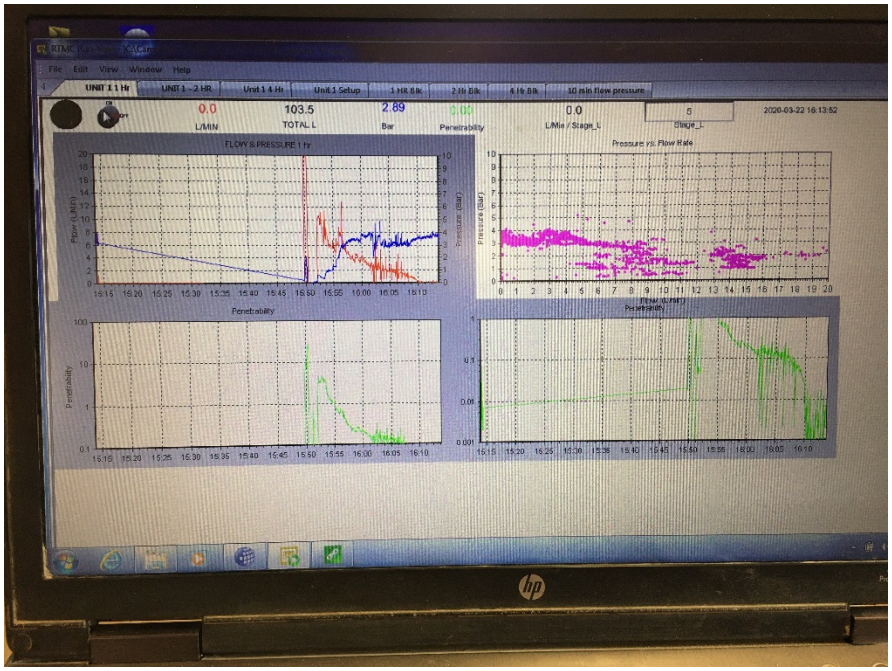
Verified by: *Tom Xue* (Signature) **22-03-2020** (Date)



Pressure and flow chart for Q-682 rock grouting (Downstream blanket)



Pressure and flow chart for Q-667 rock grouting (Downstream blanket)



Pressure and flow chart for Q-628 rock grouting (Downstream blanket)

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200323
Document number

2020-03-23	6:30 am 6:30 pm	669034	Paul Yong
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☐ gusts Temperature: -13 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer.
- Updated spreadsheet and other QA related activities.
- Finished one bedrock grouting in the morning, but halted due to generator failure.
- Work resumed at 1:00 PM.

Work Method and Plan

- Drilling Primary holes from the east end of the upstream blanket.
- Rock grouting in one primary hole and two quaternary holes on the downstream blanket; and one primary hole on the upstream blanket.

Bedrock Drilling

- One (1) hole was drilled into bedrock today for the upstream blanket.
- The hole was drilled into rock for about 5 m grout length.
- No water loss and no caving were reported.

Hole	Total depth (m)	Water loss depth below ground level(m)	Water loss above bottom of the hole (m)	Caving depth (m)	Additional casing (m)
P-679	16.4	-	-	No caving	No

Casing Plug
No activity today

Bedrock Grouting (Downstream Blanket)
P-609.1 (5 m stage)

- Packer was placed at the bottom of the casing.
- Prefilled with 34.5 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 10 min.
- Total 90.2 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.36 bar at a flow rate of 0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-526 (5 m stage)

- Packer was placed at the bottom of the casing.
- Prefilled with 34.5 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 6 min.
- Total 55.5 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.35 bar at a flow rate of 0.1 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-481 (5 m stage)

- Packer was placed at the bottom of the casing.
- Prefilled with 34.8 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 11 min.
- Total 220.8 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.03 bar at a flow rate of 0.2 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Bedrock Grouting (Upstream Blanket)
P-739 (5 m stage)

- Packer was placed at the bottom of the casing.
- Prefilled with 36.8 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 22 min.
- Total 392.5 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.13 bar at a flow rate of 0 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Hole ID	Location	Grouting Length (m)	Calcualted Pmax (bar)	Closing Pressure (bar)	Closing Flowrate (l/min)	Volume Injected (L)	Mix
Q-481	DS	5.00	3.06	3.03	0.2	220.8	Mix B
Q-526	DS	5.08	3.32	3.35	0.1	55.5	Mix B
P-609,1	DS	5.33	3.55	3.36	0	90.2	Mix B
P-739	US	5.17	3.17	3.13	0	392.5	Mix B

Grout Test

Mix	Specific Gravity	Marsh value (second)	Temperature (°C)	Bleeding (%)	Comment
B	1.65	50	26	2	Grout temperature should be controlled between 5˚C and 20 ˚C
B	1.65	42	20	2	
B	1.70	45	18.5	-	

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

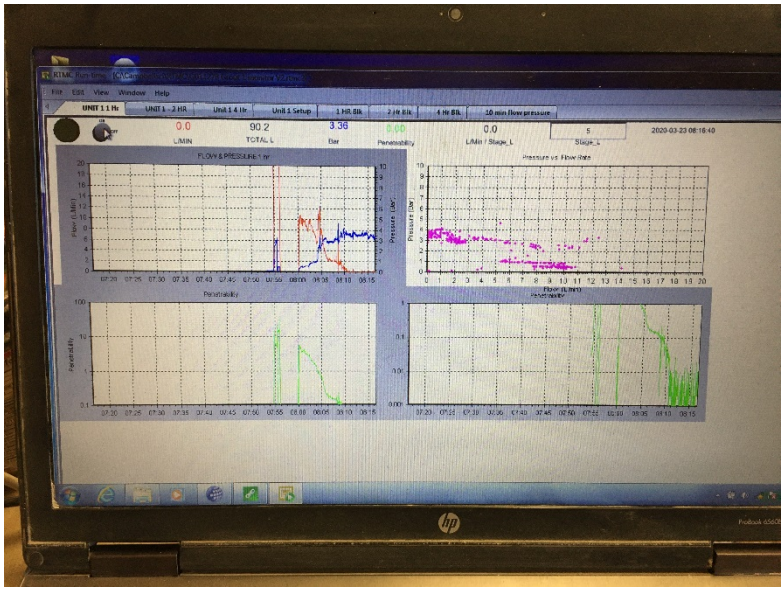
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

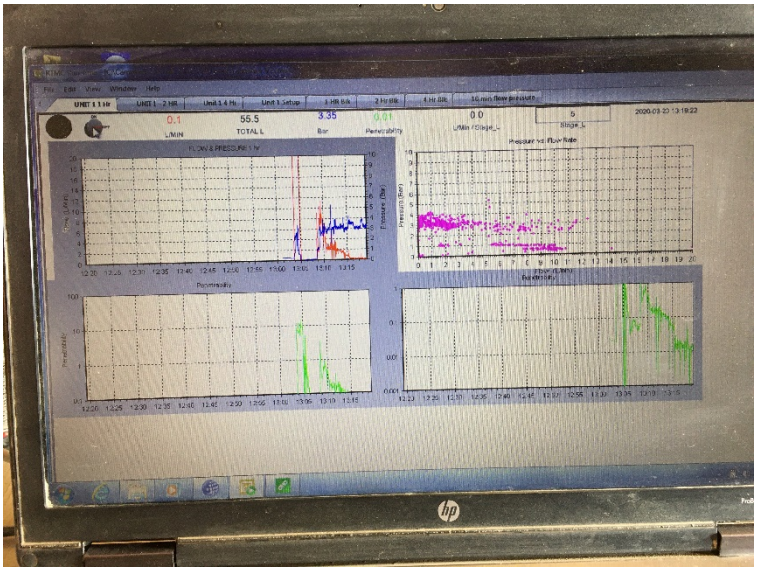
- Dress up properly for extreme cold conditions

Issued by: *Paul Yong* (Signature) **23-03-2020** (Date)

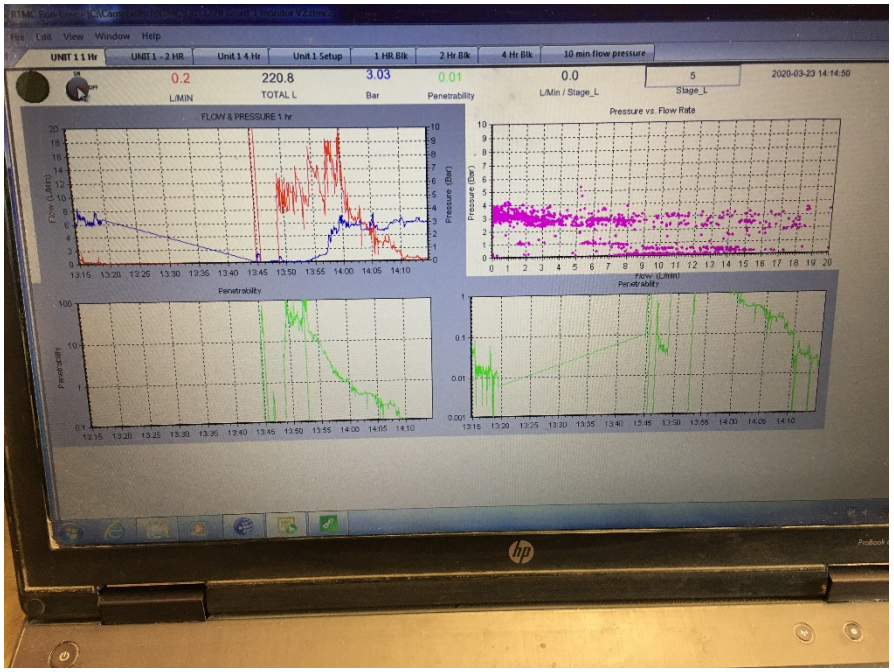
Verified by: *Tom Xue* (Signature) **23-03-2020** (Date)



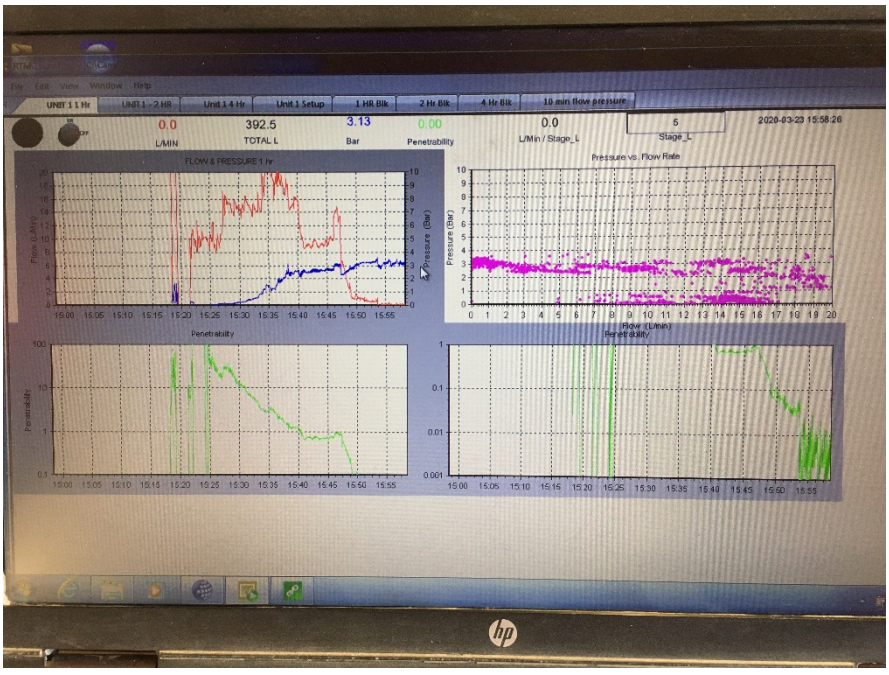
Pressure and flow chart for P-609.1 rock grouting (Downstream blanket)



Pressure and flow chart for Q-526 rock grouting (Downstream blanket)



Pressure and flow chart for Q-481 rock grouting (Downstream blanket)



Pressure and flow chart for P-739 rock grouting (Downstream blanket)

SNC·LAVALIN

DAILY FIELD REPORT
(Detailed)

20200324
Document number

2020-03-24	6:30 am 6:30 pm	669034	Paul Yong
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☐ gusts Temperature: -27 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended special announcement at the camp cafeteria on the mine's decision of following Ontario and Quebec provincial governments' requirements to shut down non-essential business activities.
- Attended daily construction meeting at the Contractor trailer.
- Updated spreadsheet and other QA related activities.
- Continued QA on bedrock grouting along the upstream blanket.
- Received "669034-0000-60CA-0001 Blanket Grouting Site Instructions Rev 01_Addendum 01.pdf" from SNC office.

Work Method and Plan

- Rock drilling in three (3) quaternary holes for the downstream blanket.
- Rock grouting in four (4) primary holes for the upstream blanket.

Bedrock Drilling

- Three (3) Quaternary holes were drilled into bedrock for the downstream blanket.
- The holes were drilled into rock for about 5 m grout length.
- No water loss and no caving were reported.

Hole ID	Bottom of casing (m)	Final hole depth (m)	Water level (m)	Bedrock length (m)	Comments
Q-478	10.10	15.3	-	5.20	No water loss
Q-523	10.12	15.3	-	5.18	No water loss
Q-664	10.65	15.7	-	5.05	No water loss

Casing Plug
No activity today

Bedrock Grouting (Upstream Blanket)

P-727 (5 m stage)
- Packer was placed at the bottom of the casing.
- Prefilled with 35.7 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 10 min.
- Total 94.7 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.56 bar at a flow rate of 0.3 l/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

P-715 (0.9 m stage)
- Grouted to stabilize the collapsing hole wall (0.9m) before drilling further into the bedrock for full stage.
- Packer was placed at the bottom of the casing.
- Prefilled with 11.7 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout of about 480 L and switched to use Mix C of about 228 L.
- Total 627.8 liters of grout injected (Mix B+Mix C).
- Vmax was reached.
- The closing pressure was 1.05 bar at a flow rate of 9.6 l/min.
- No grout communication or leakage observed.
- **Hole left open for further drilling.**

P-703 (5 m stage)
- Packer was placed at the bottom of the casing.
- Prefilled with 36.7 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout (±490 L) and followed by Mix C grout (348 L).
- Pmax was reached after ± 25 min.
- Total 838 liters of grout injected (Mix B + Mix C).
- Waited for 5 minutes after flow rate came below 3 l/min and pressure stabilized at Pmax.
- The closing pressure was 3.53 bar at a flow rate of 0 L/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

P-691 (5 m stage)

- Packer was placed at the bottom of the casing.
- Prefilled with 35.2 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 20 min.
- Total 278.7 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 L/min and pressure stabilized at Pmax.
- The closing pressure was 3.34 bar at a flow rate of 0.1 L/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Hole ID	Grouting Length (m)	Calculated Pmax (bar)	Closing Pressure (bar)	Closing Flowrate (l/min)	Volume Injected (L)	Mix Type	Comments	remarks
P-691	5.26	3.36	3.34	0.1	278.7	Mix B	backfilled after refusal	US
P-703	5.58	3.44	3.53	0	838	Mix B + Mix C	backfilled after refusal	US
P-715	0.9	2.2	1.05	1.05	627.8	Mix B + Mix C	To be redrilled to depth	US
P-727	5.01	3.39	3.56	0.3	94.7	Mix B	backfilled after refusal	US

Grout Test

Mix	Specific Gravity	Marsh value (second)	Temperature (°C)	Bleeding (%)	Grout testing	Comment
Mix B	1.68	42	19.5	1.5	1	Mix B with w/c =0.6 and 1% calcium chloride
Mix B	1.7	44	23.5	1.5	2	Mix B with w/c =0.6 and 1% calcium chloride
Mix C	1.77	103	23	1	3	Mix C with w/c =0.5 and 1% calcium chloride
Mix B	1.67	42	20.5	-	4	Mix B with w/c =0.6 and 1% calcium chloride
Mix C	1.76	63	22.5	-	5	Mix C with w/c =0.5 and 1% calcium chloride
Mix B	1.69	45	19	-	6	Mix B with w/c =0.6 and 1% calcium chloride

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

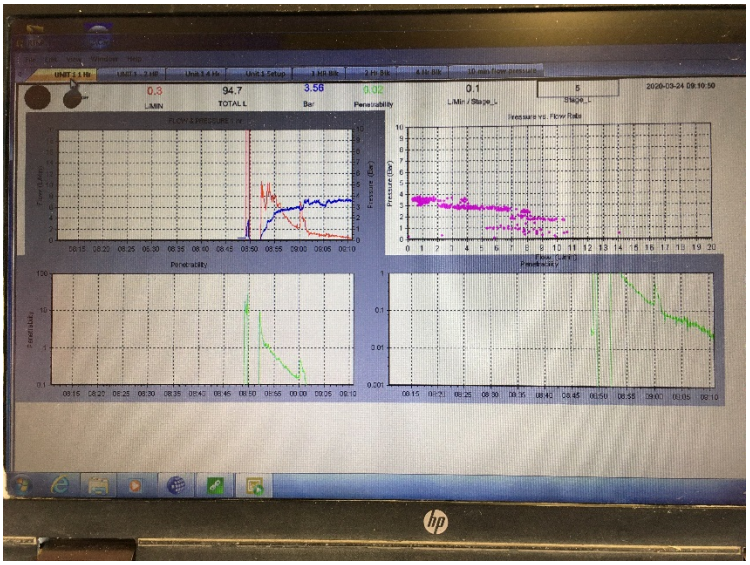
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

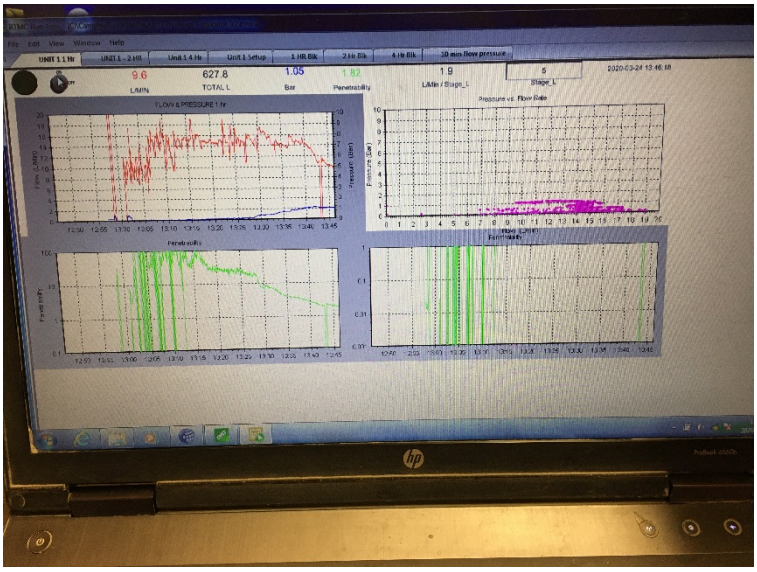
- Dress up properly for extreme cold conditions

Issued by: *Paul Yong* (Signature) **24-03-2020** (Date)

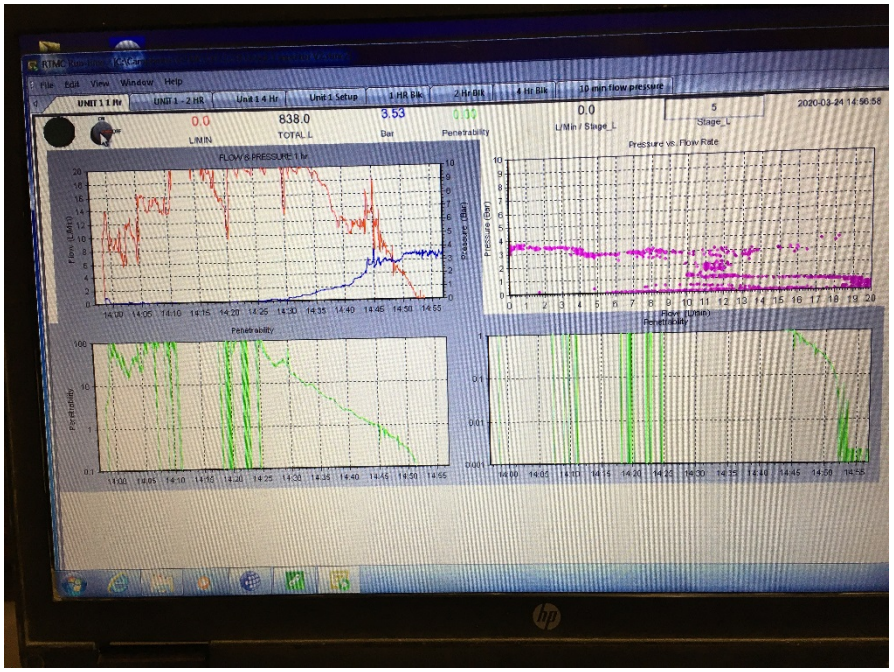
Verified by: *Tom Xue* (Signature) **24-03-2020** (Date)



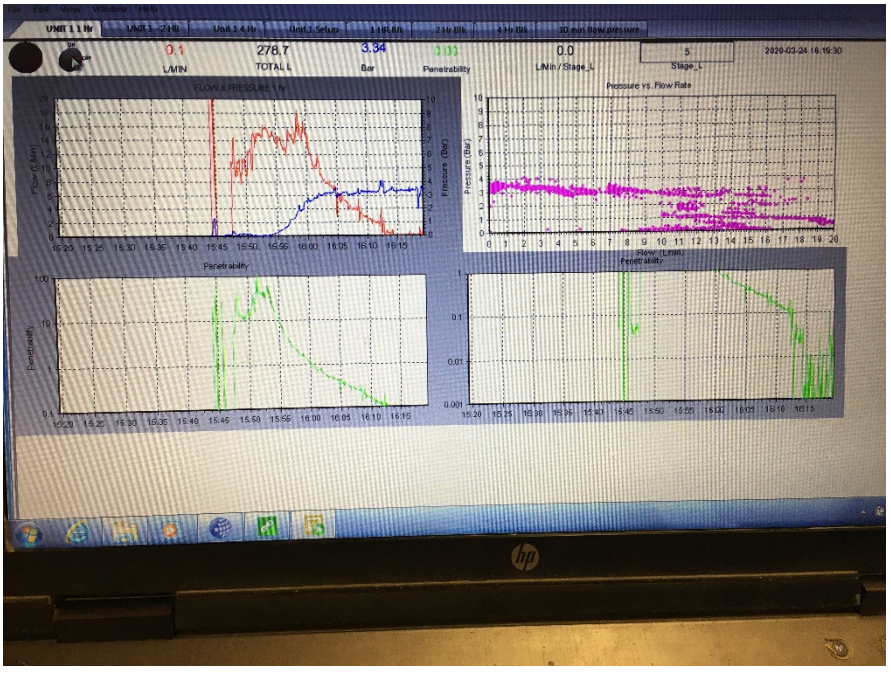
Pressure and flow chart for P-727 rock grouting (Upstream blanket)



Pressure and flow chart for P-715 rock grouting (Upstream blanket)



Pressure and flow chart for P-703 rock grouting (Upstream blanket)



Pressure and flow chart for P-691 rock grouting (Upstream blanket)

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DAILY FIELD REPORT
(Detailed)

20200325
Document number

2020-03-25	6:30 am 6:30 pm	669034	Paul Yong
Date	Time (Start/End)	Project No.	Prepared by

Whale Tail Dike Remedial Drilling and Grouting Works	Agnico Eagle
Project	Client

SNC-Lavalin	TCG(KCG)
Consultant	Contractor

Weather: ☐Sunny ☒Cloudy ☐Rain ☐Storm ☐Snow ☐Glaze

Wind: ☐None ☐Light ☒Moderate ☒Strong, ☐ gusts Temperature: -20 °C

Comments:

Appendix: ☐Yes ☒No Pictures ☒Yes ☐No Inspection report or other:

Picture in the folder:

ACTIVITIES (indicate if test forms were used)

SNC-Lavalin' Activities

- Attended daily construction meeting at the Contractor trailer. Mentioned about the addendum related to blanket holes for upstream blanket sent by SNC office yesterday. One of the requirements is to backfill the casing about 1/3 to ½ of the casing length for primary and secondary holes on the upstream blanket upon grouting refusal. The holes shall be protected to prevent snow or other objects falling into the holes.
- Updated spreadsheet and other QA related activities.
- Continued QA on bedrock grouting along the upstream blanket.
- Stopped grouting work around 10:00 AM as per AEM's instruction.

Work Method and Plan

- Rock grouting in one (1) primary hole for the upstream blanket and three (3) quaternary holes for the downstream blanket.

Bedrock Drilling

- No activity today.

Casing Plug

- No activity today

Bedrock Grouting (Upstream Blanket)

P-679 (5 m stage)

- Packer was placed at the bottom of the casing.
- Prefilled with 39.7 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 10 min.
- Total 146 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 L/min and pressure stabilized at Pmax.
- The closing pressure was3.37 bar at a flow rate of 0.3 L/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting even though it had been instructed to fill 1/3 to ½ of the casing length. Workers have been reminded to carry out the instruction for the next hole in the upstream blanket.**

Bedrock Grouting (Downstream Blanket)

Q-664 (5 m stage)

- Packer was placed at the bottom of the casing.
- Prefilled with 36.7 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 10 min.
- Total 116.4 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 L/min and pressure stabilized at Pmax.
- The closing pressure was 3.2 bar at a flow rate of 0.2 L/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-523 (5 m stage)

- Prefilled with 107.1 L of Mix B grout to displace water and followed by inflation of packer, started injection with Mix B grout.
- Pmax was reached after ± 10 min.
- Total 107.1 liters of grout injected (Mix B).
- Waited for 5 minutes after flow rate came below 3 L/min and pressure stabilized at Pmax.
- The closing pressure was 3.29 bar at a flow rate of 0 L/min.
- No grout communication or leakage observed.
- **Hole backfilled after grouting.**

Q-478 (5 m stage)

- AEM instructed to stop any further rock drilling and grouting work in late morning.
- This hole was plugged using Mix C without injection.

Hole ID	Grouting Length (m)	Calculated Pmax (bar)	Closing Pressure (bar)	Closing Flowrate (l/min)	Volume Injected (L)	Mix Type	Comments	remarks
P-679	5.1	3.29	3.37	0.3	146	Mix B	backfilled after refusal	US
Q-664	5.05	3.2	3.2	0.2	116.4	Mix B	backfilled after refusal	DS
Q-523	5.18	3.32	3.29	0	107.1	Mix B	backfilled after refusal	DS

Grout Test

Mix	Specific Gravity	Marsh value (second)	Temperature (°C)	Bleeding (%)	Grout testing	Comment
Mix B	1.66	46	24.5	2	1	Mix B with w/c =0.6 and 1% calcium chloride
Mix B	1.64	43	21.5	2	2	Mix B with w/c =0.6 and 1% calcium chloride

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

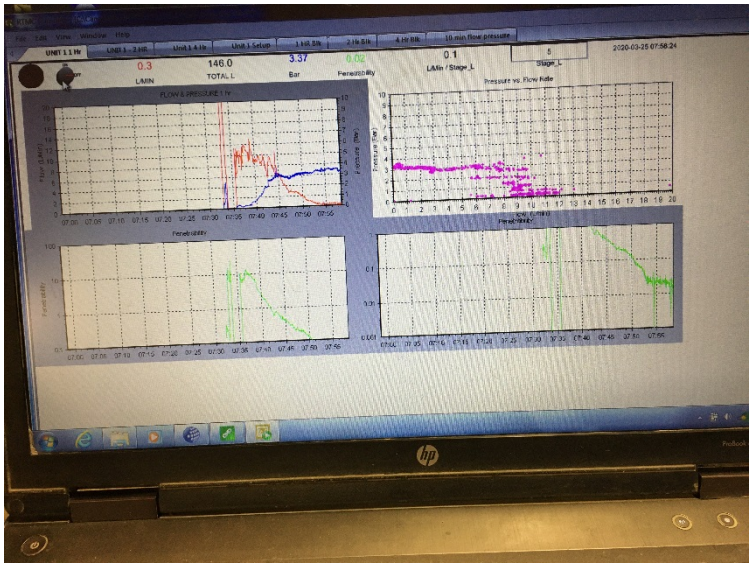
Elements	Location, batch or other	Scope and comments
Grout Testing	Injection Unit	Marsh Funnel, Specific Gravity, Temperature, Bleeding,

SAFE AND SAFETY REMARKS

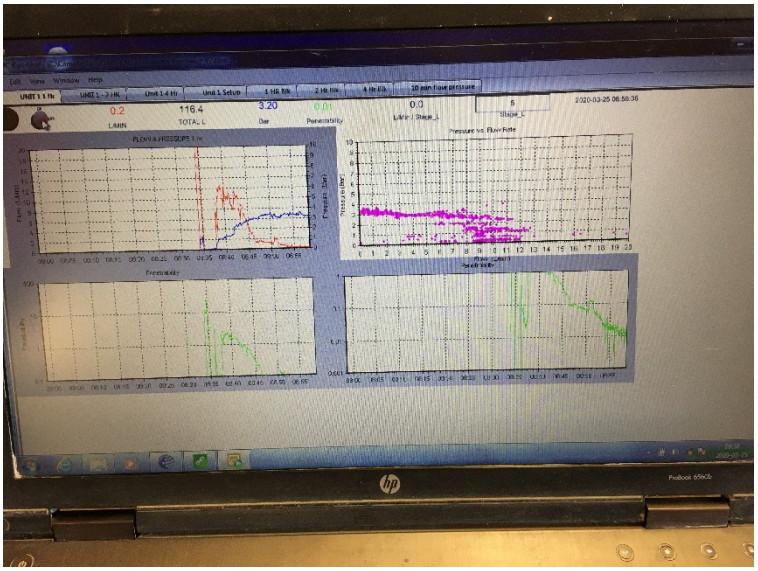
- Dress up properly for extreme cold conditions

Issued by: *Paul Yong* (Signature) **25-03-2020** (Date)

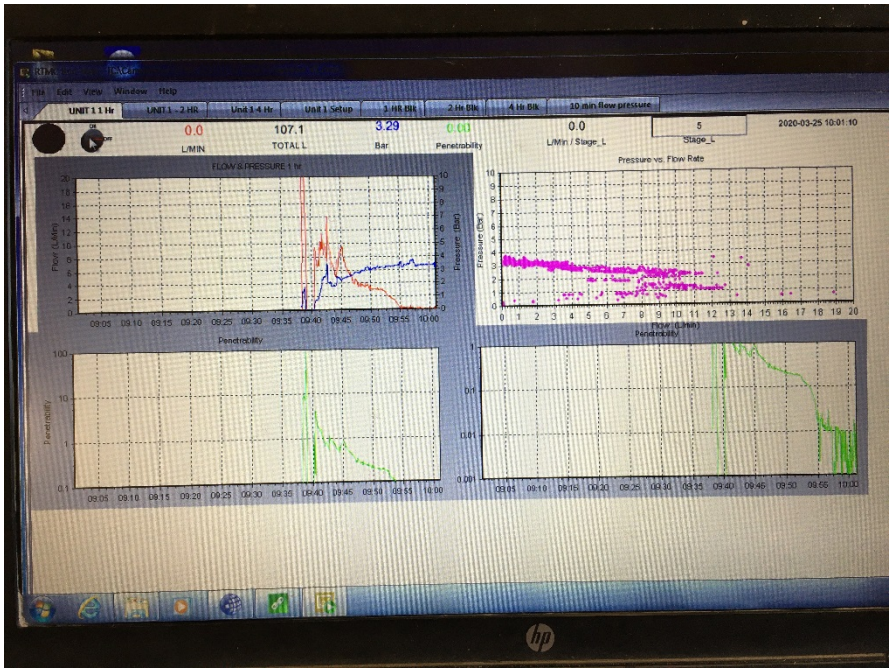
Verified by: *Tom Xue* (Signature) **25-03-2020** (Date)



Pressure and flow chart for P-679 rock grouting (Upstream blanket)



Pressure and flow chart for Q-664 rock grouting (Downstream blanket)



Pressure and flow chart for Q-523 rock grouting (Downstream blanket)

Appendix C- 2: QA Weekly Reports

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WEEKLY REPORT

20191117-WR
Document number

2019/11/11 to 2019/11/17	658309	Muhammad Saleem
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin	KCG	
Consultant	Contractor	

MAIN ACTIVITIES PERFORMED BY SNC-LAVALIN

The main activities during this week were casing drilling for the down stream blanket, grout trial mix and preparation to strat casing plug.

As this is the first weekly report since the start of the work, will also highlight the concerns / issue since the start of the work.

A site meeting was held between AEM, SNC and KGC at the AEM camp office on November 14, 2019 to discuss the strategy and pathforwrad for trial grout mix and blanket grouting. AEM requested to prepare simplified step by step procedure for drilling, casing plug and blanket grouting to be inline with grouting committee recommendations and will be discussed during the next grouting committee meeting.

CASING INSTALLATION

- Casing installation started on November 2, 2019 with day shift crew and night shift crew added on November 4, 2019. Total 60 casings installed during the last week and total 120 casings were installed at the end of the day shift on November 17, 2019.
- At T533.5 the casing bit brocke twice and casing was installed at alternate location in 3rd attempt. QC report indicate that a block encountered at 4.5 m depth causes the trouble.
- At T395.5, P488.5, T521.5 and P524.5, the drilling bit brocken at the bottom of the hole and casing was installed at alternate location nearby the original location.
- KGC was informed to mention the alternate hole location on the daily reports and protect the unsuccessful drilled holes to be backfilled properly during grouting the adjacent hole.
- At T509.5, T659.5, T701.5 and P704.5, casings were socketed into the rock by more than 1 m. Talked to Pier-Eric Mcdonald (AEM), there was confusion in the start and driller was trying to install casing in the competent rock but after clarification they start casing installation properly as per Bedrock elevation provided by SNC or higher if encounterd bedrock either weak or strong.
- KGC Used inclinometer without centralizer to check the verticality of the casing. Contractor informed that they don't have centralizer for 4.5" casing and they will use without centralizer as they used in last winter.
- KGC was informed to check water lavel after casing installation completed. KGC was also informed to monitor the water level at S-686.5 and T-689.5 as QC reported water level at these locations 4.5 m and 5 m respectively during casining installation.

TTRIAL MIXES

Trial mixes for grout injection were done on November 14, 2019 and November 17, 2019. Seven different mixes were tested with various water to cement ratios and admixtures. QC representative conducted tests on the grout to assess physical properties of each mix. A summary of the trial mixes is presented in Table 1.

Table 1: Summary of trial mixe testings

Ingredient	Unit	Mix A	Mix A+	Mix B	Mix B+	Mix C	Mix D	Mix E
Water	Litre	84	84	72	72	60	60	60
Cement Type III	kg	120	120	120	120	120	120	120
Calcium Chloride (2% by weight)	kg	2.4	2.4	2.4	2.4	2.4	1.2	2.4
Celbex (0.2% by weight)	kg	-		-		0.24		
Glenium 3030	ml		480		480			
Rheomac 450	ml						500	250
Property								
Marsh Funnel time	second	30	30	41	32	77	154	163
Specific Gravity	g/cm^3	1.62	1.62	1.73	1.67	1.8	1.75	1.75
Bleeding after 2 hours	%	5	2	1	4	0	-	-
Filtration coefficient	$min^{-1/2}$		0.02					

- KGC didn't have Glenium 3030 on site so the Mix A was test without Glenium 3030 and but later on they brought Glenium 3030 and Rheomac 450 and perform tests.
- KGC has a doubt that the Rheomac 450 was stored for long time in cold weather and it may have changed its properties, this will be monitored closely during the production.
- KGC didn't have Vicate apparatus on site to do initial and final set time of the grout. The vicat apparatus they has was brocken during mobilization and new apparatus is on the way, will do the test when apparatus arrived.
- Grout filtration test was performed on Mix A+ and value found within acceptable range. When try to do test on Mix B+ and E, it shows unexpected behaviour. This test will be performed on other mixes during the next week.
- Requested KGC to provide the calibration certificate for pressure gauges, flowmeter, mud balance, Marsh funnel etc. haven't received yet.

HEADLOSS TEST

Headloss test was performed on November 14, 2019 inside the injection trailer for Mix B and Mix C. For Mix B reading does not looks reliable and the headloss was negligible. For Mix C the head loss was estimated about 10 Kpa / m length of the 1" flexible grout pipe.

CASING PLUG

- KGC was working on the Injection unit most of the week and prep work for grotuting.
- Transferred cement from 1000 kg bag to 20 kg buckets.
- No grouting for casing plug started yet

SAFE AND SAFETY REMARKS

Extreme cold weather conditions, wear proper winter clothing.

PHOTOGRAPHS

Figure 1: A photograph of the casing installation for downstream blanket

Figure 2: A photograph of the Marsh Funnel Calibration

Figure 3: A photograph of the 20 kg cement buckets placed in the heated C-can

Figure 4: Filteration test apparatus

SNC·LAVALIN

WEEKLY REPORT

20191124-WR
Document number

2019/11/18 to 2019/11/24	658309	Jin Dong Du
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

The main activities during this week were casing drilling and grouting for casing plugs for the downstream blanket grouting.
AEM, TCG and SNC-Lalvin site personnel had construction meeting in the early morning of each day.

CASING INSTALLATION

- A total of 47 casings have been installed this week. By Sunday, 88% of the planned casings have been installed.
- Borehole at P356.5m did not reach the bedrock at the max. calculated borehole length (As-built depth of bedrock surface + 500mm).
- The bedrock surface in the borehole at T707.5 m is 2.36m deeper than the calculated max. borehole length.
- TCG was advised that if drill hits bedrock, regardless the length of the casing, casing should be socketed 0.3 m into bedrock
- At Station T353.5m, the bedrock depth and the maximum calculated borehole length are the same elevation; the casing should be drilled further 0.3 m into bedrock;
- TCG was reminded checking depth of the hole with tape after casing installation completed
- TCG was reminded during the daily meeting to bring consistency between the QC and driller reports.
- TCG was requested to provide the casing Inclination reports and casing as built reports. SNC-Lavalin haven't received these reports so far.
- TCG was also requested to inform SNC-Lavalin when they try to clean boreholes.
- TCG was advised to check and fix the discrepancy between the gauge pressure readings and the pressure readings shown in the mornitor. The pressure readings should be same on the gauge of acquisition system in the wood box and on the monitor screen. This may not be critical for grouting the plug, but Contracor shall be ready for the blanket grouting.

CASING PLUG

- The grouting for casing plugs started on November 19. No grouting was carried out on Nov. 22 and and Nov. 23 due to shift change.
- A total of 41 casing plugs have been grouted using Mix C (water cement ratio 0.5, 2% calcium chloride and 0.2% Celbex) based on the trial testing results and in line with grouting committee recommendations.

- Grout testing for each batch was conducted before grouting, the marsh time ranged from 56-85 seconds; specific gravity ranged from 1.62 to 1.82; Bleeding was from <1 to 2%.; temperature of the grout ranged from 17-26°C.
- Packer was placed at about 2 m above the bottom of the casing; and 15 liters grout was injected prior to inflating packer.
- Most casings were injected with grout until reaching approximately 0 liters/ min grout flow at Pmax and waiting for 5 minutes with total grout intake of approximately 17-65 L (28L in average). Due to relatively large intake at low pressures, the grouting in four (4) boreholes ended when Vmax (154-200 L) was reached. Five boholes have small grout intake volumnes (3-13L); three of them have thick cement-bentonite at the bottom which could not be cleaned.
- Considerable amount of cement-bentonite (0.25 to 2m) in four boreholes (T635.5,T722.5, P728.5 and T731.5 shown in drill logs) could not be cleaned as perTCG.
- Further investigations of the materials in the casings and cleaning of these boreholes are required.

SAFE AND SAFETY REMARKS

- Two whip guards were installed closed to the two pressure Gauges during the injection in November 24.
- Extreme cold weather conditions, wear proper winter clothing.

Issued by :	*Jin Dong Du*	**24-11-2019**
	Signature	Date
Verified by :	*Tom Xue*	**24-11-2019**
	Signature	Date

PHOTOGRAPHS

Photo 1: Acquisition system set up inside the injection unit

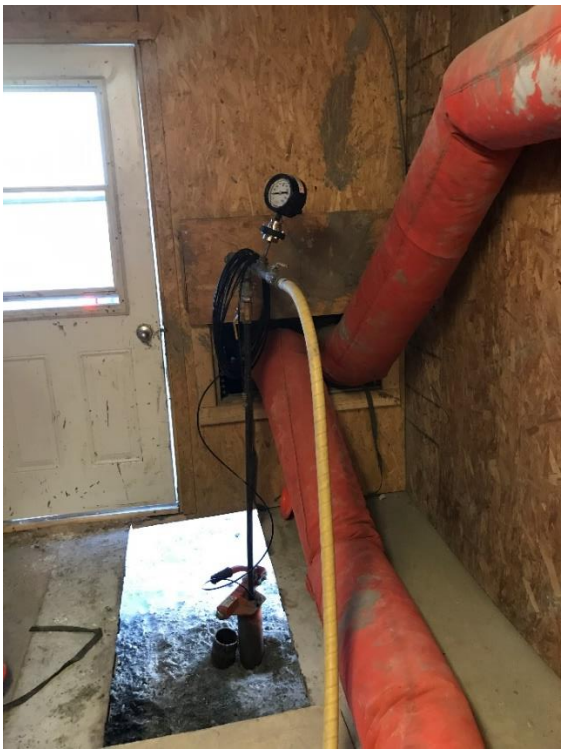

Photo2: Packer installed at T-749.5

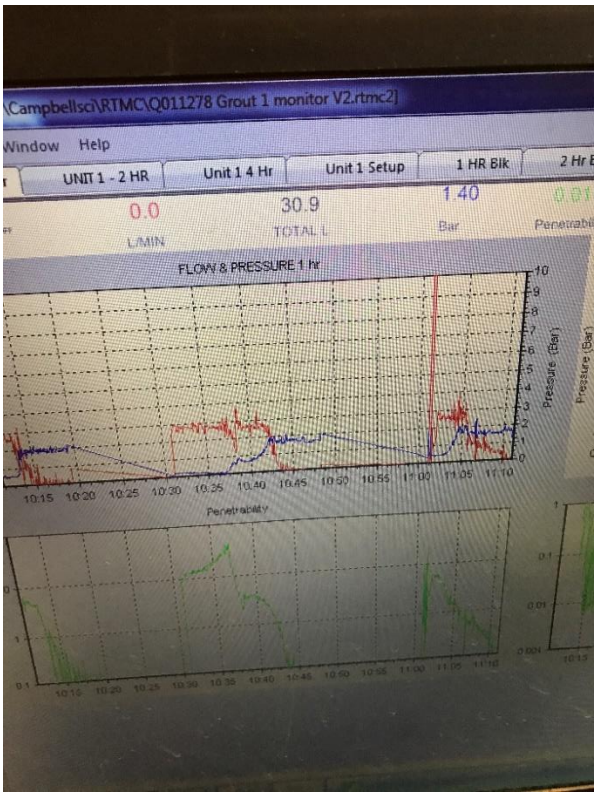

Photo 3: Monitor screen showing Flow and pressure graph vs time

Photo 4: Taking specific gravity reading using mud balance

Photo 5: Center line stake and the casings, looking west from Station 600m

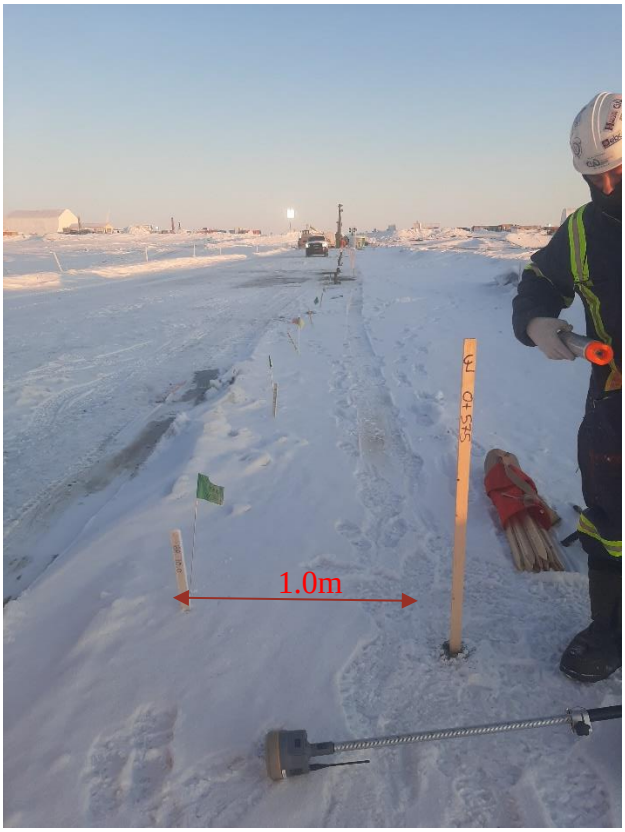

Photo 6: Center line stake and the flags at the unstalled casing locations, looking east from Station 575m

Photo 7: Casings, looking west from Station 344.5m

SNC·LAVALIN

WEEKLY REPORT

20191201-WR
Document number

2019/11/25 to 2019/12/01	669034	Jin Dong Du
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- The main activities during this week were casing drilling, grouting for casing plugs, and bedrock drilling and grouting for the downstream blanket.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- The bedrock grouting started this week for the section between Stations 596.5m to 749.5m near the east abutment.

CASING INSTALLATION

- A total of 16 casings have been installed this week. By Sunday, 98% of the planned casings have been installed; three casings are left to be installed.
- The borehole logs show that the bedrock depth is deeper than the expected depth for a few holes. See the details in the daily reports.
- Some casings have been extended to reach the bedrock (P728.5, P680.5, P404.5, T533.5, P596.5).

CASING PLUG

- A total of 37 casing plugs have been grouted using Mix C (water cement ratio 0.5, 2% calcium chloride and 0.2% Cellbex) based on the trial testing results and in line with grouting committee recommendations.
- Grout testing for each batch was conducted before grouting, the marsh time ranged from 62-80 seconds; specific gravity ranged from 1.67 to 1.75; Bleeding was from <1%.; temperature of the grout ranged from 25-28°C.
- Packer was placed at about 2 m above the bottom of the casing; and 15 liters grout was injected prior to inflating packer.
- Most casings were injected with grout until reaching approximately 0 liters/ min grout flow at Pmax and waiting for 5 minutes with total grout intake of approximately 18-89 L (about 30L in average). Due to relatively large intake at low pressures, the grouting in three (3) boreholes ended when Vmax (163-177 L) was reached.

BEDROCK DRILLING

- Bedrock drilling has been completed for a total of 17 holes. Twelve of them were located in the first section (Stations 596.5 to 749.5m) for the bedrock grouting.
- Some bedrock drilling was conducted in the holes without casing plugs.

BEDROCK GROUTING

- Bedrock grouting has been conducted in four holes (P704.5, P716.5, P728.5 and P740.5) for the section between Station 596.5m to 749.5m in the vicinity of the east abutment.
- As requested by AEM, SNC-Lavalin design team agrees AEM's suggestion to conduct the bedrock grouting starting with Mix C without Cellbex. When injection volume reaches about 400L without pressure building up, Cellbex will be added according to the specifications.
- For those holes without plugs or without proper plugs (P716.5 and P728.5), it was decided to position the packer in the way that the upper half is in the casing and the lower half is in the bedrock underneath.
- The grouting length is between 4.55 to 5.1m.
- Bedrock grouting for three holes was finished at the Vmax (approx. 2000L) at pressure less than 0.72 bar with Mix C. Cellbex was added when about 400-600L of grout was injected. These holes were not backfilled awaiting the further decision.
- Grouting at P728.5 was finished at the Pmax with the Mix C grout without Cellbex being added. Casing in Borehole P728.5 was only about 5cm into the bedrock. The hole was backfilled with Mix C grout after grouting was finished.
- Grout tests were conducted before and when Cellbex was added first time, as well as every 5 batches. The Marsh values became very unstable after Cellbex was added. Although testing results showed very high marsh values, the intake of grout was high without significant pressure. It was hard to control temperature of the grout especially when calcium chloride was added according to the operator of the grout-mix unit.
- The marsh time ranged from 66-86 seconds for the Mix C without Cellbex, 71 to >180 seconds for Mix C with Cellbex added. Specific gravity is quite consistent ranging from 1.7to 1.8; Bleeding was <1.5%.; temperature of the grout ranged from 25-33°C.
-

Hole ID	Date	Grouting Length (m)	Gauge Pressure (Bar)	Volume Injected (L)	Comments
P-704.5	2019-12-01	4.55	0.72	1901	Half of the packer in the casing
P-716.5	2019-12-01	4.67	0.47	1958	No casing plug; half of the packer in the casing
P-728.5	2019-12-01	5.06	3.45	728.5	Casing plug is likely not effective due to 4.6L intake and additional casing being pushed down to reach bedrock; half of the packer in the casing
P-740.5	2019-11-30	5.1	0.15	2079	

DEVELOPMENT OF LOGGING PROCEDURE

The inaccuracy which has been discovered in the field logs for the casing drilling has caused considerable inconvenience for the bedrock grouting. KCG has found the reasons for the occurrence of the inaccuracy. To avoid the similar mistakes to reoccur, it is important for KCG and GHD to develop

a working instruction to guide the field logging process and field data processing for different shifts of the work. It will become more important for the casing drilling for the upstream grouting blanket.

DEVIATION OF BOREHOLES

TCG issued first set of the borehole deviation data for the casing this week. The data shows that deviations from the vertical of many holes are larger than 0.5% which is required in the specifications. It is noted that the accuracy of the measurement by the inclinometer used on site can reach 35% according to the Contractor. The contractor
also mentioned that the current temperature was likely lower than the lowest temperature (-10°C) suggested in the manufacture's instructions.
A more reliable measurement of drilled hole inclinations that meets the specifications is required.

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.

Issued by :	*Jin Dong Du*	**04-12-2019**
	Signature	Date
Verified by :	*Tom Xue*	**04-12-2019**
	Signature	Date

SNC·LAVALIN

WEEKLY REPORT

20191208-WR
Document number

2019/12/02 to 2019/12/08	669034	Muhammad Saleem
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- The main activities during this week were casing drilling, grouting for casing plugs, bedrock drilling and grouting for the downstream blanket and regrouting of the holes that does not meet refusal criteria and ended at Vmax.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- Due to unable to close some holes due to limitation of the use of Celbex with the present grouting system, Open throat pump was installed and start grouting with addiding Celbex through open throat pump instead of adding in the agitator tank.

GROUTING COMMITTEE RECOMMENDATIONS

Grouting committee meeting held between SNC, AEM, KCG and other committee members on Dec 5, 2019 to disscuss current grouting techniques, site finding and challenges including mixes and high takes. The committed meeting recommended to;

- Install open throat pump to use grout with higher percentage of cellbex.
- Remaining holes on the D/S blanket drill and grout in 1.5 m and 3.5 m stages using down stage method.
- Not recommend to use mix D, only Mix C with different percentages of Cellbex.

CASING INSTALLATION & EEXTENDED TO BEDROCK

- A total of 3 casings (S254.5, T365.5 and S434.5) were installed this week. A total of 188 casings have been installed and with this 100% casing installation completed for downstream blanket grouting on Dec 6, 2019
- 11 casings were extended during this week to reach the bedrock (P176.5, P188.5, P272.5, T311.5, T338.5, P344.5, T353.5, P356.5, P380.5, T389.5 and S398.5). these casings previously either not reached the bedrock depth or not embedded in the bedrock. In total 15 casings have been extended to bedrock so far.

CASING PLUG

- A total of 7 casing plugs were grouted during this week and a total of 85 casings have been pluged so far using Mix C (water cement ratio 0.5, 2% calcium chloride and 0.2% Celbex) based on the trial testing results and in line with grouting committee recommendations.
- Grout testing for each batch was conducted before grouting to check Marsh Time, Specific Gravity, Bleeding and Temperature of cement, water and grout.
- Packer was placed at about 2 m above the bottom of the casing; and about 15 liters grout was injected prior to inflating packer.

- All 7 casings during the last week were injected with grout until reaching approximately 0 liters/ min grout flow at Pmax and waiting for 5 minutes with total grout intake of approximately 12.8 – 28.8 L.

BEDROCK DRILLING

- No bedrock drilling happened during this week due to rig brokedown and a total of 17 holes were completed during the previous week.

BEDROCK GROUTING

- Bedrock grouting was conducted in three holes (P692.5, P680.5 and P668.5) for the section between Station 596.5m to 749.5m in the vicinity of the east abutment during this week.
- At P-680 initially the casing was not embedded in the bedrock and Cement bentonite type material was found inside the casing when attempted to plug the casing. During bedrock drilling casing was further extended 1.6 m to embed in the bedrock. As the casing was not plugged and during grouting the packer was installed half in the casing and half in the hole/bedrock.
- All three holes ended at Vmax and only at P692.5 grout stayed in the casing above bedrock elevation but other 2 locations P680 and P668, grout washed out and grout elevation dropped down below bottom of the casing and hole in the rock still remained open. After discusstion with designer it was decided, the holes where grout sytays above the bottom of the casing will be backfilled and holes where grout elevation dropped down to below the bottom of the casings will be re-grouted and instruction was provided by designer to proceed with re-grouting.

Bedrock grouting

Hole ID	Date	Grouting Length (m)	Volume Injected (L)	Mix	Comments	Depth of grout (m)	Empty Length after grouting (m)
P-668,5	2019-12-03	5.66	2327	Mix C without Cellbex = 400 Mic C with Cellbex = 1927		16.37	5.43
P-680.5	2019-12-02	5.51	2064	Mix C no Cellbex = 400 Mix C +Cellbex =1664		17.08	4.99
P-692.5	2019-12-02	5.15	2076	Mix C no Cellbex = 400 Mix C +Cellbex =1601	Backfilled with Mix E on Dec05 2019	10.66	-0.19

BEDROCK RE-GROUTINGD

Due to some holes could not met the refusal criteria, regrouting was conducted and those holes could not met the refusal crirteria 2nd and 3rd re-grouting were completed until the holes meet refusal criteria or closed. As per the site instruction from designer the hole those could not reach the refusal criteria and grout stays above the bottom of the casing after regrouting were backfilled.
Due to P740.5 did not closed even after 3rd Attempt a Site Instruction was issued to use open throat pump with higher percentage of Celbex as per grouting committee recommendations for re-grouting and grouting of holes those already drilled to 5 m in the bedrock.
Due to limitations of the open throat pump (flow rate can not be reduced below 10 liters/min with higher percentage of Celbex), site instruction will be revised to use Open throat pump only for regrouting or when the Vmax is reached using the normal grouting process with mixing 0.2% Cellbex in the agitator tank.

- **1st Re-grouting**

During this week five (5) holes were attempted for 1st regrouting (P668.5, P680.5, P704.5, P716.5 and P740.5) but only one hole (P704.5) met refusal criteria and backfilled after regouting, 2 holes (P P668.5 and P716.5) were closed as the grout stays above the bottom of the casings after Vmax for regrouting reached.

P668.5 was regrouted using open throat pump with higher percentage of Cellbex and rest of the holes grouted using Mix with 0.2% cellbex, Mix D and Mix E

Hole ID	Date	Grouting Length (m	Calcualted Pmax (ba	Target Volume (l	Gauge Pressure (ba	Volume Injected (l	Depth of grout (m	water level	Empty Length after grouting (m	Comments	Mix
P-668,5	2019-12-08	5.43		1200	10	1113	10.33		-0.61	Start with 0.3% Cellebex pressure fluctuate a bit, it goes up to 15 bars and then dropp to less than 1 bar, when stopped at 10 bars and no flow, pressure was still over 2 bars on the gauge.	Mix C= 140 0.3% Cellbex = 180 0.5% Cellebex = 160 0.7% Cellebex = 220 0.9% Cellebex = 150 1.4% Cellebex = 220 2% Cellebex = 43
P-680.5	2019-12-05	4.99	3.48	1200	1.14	1383	16.95	5.65	4.86		Mix C + Cellbex: 450 Mix D: 700 Mix E: 233
P-704,5	2019-12-05	0.31			1.77	5			backfilled		Mix C + Cellbex
P-716,5	2019-12-04	3.44	3.2	1200	1.48	1247	11.3		-0.63		Mix C no Cellbex = 400, Mix C +Cellbex = 400 Mix D = 447
P-740,5	2019-12-04	3.95	2.87	1200	1.86	1401	13.1		3.7		Mix C no Cellbex = 400, Mix C +Cellbex = 400 Mix D = 601

- **2nd Re-grouting**

  During this week two holes were attempted for 2nd re-grouting (P680.5 and P740.5) but only one hole (P680.5) was closed as the grout stays above the bottom of the casings after Vmax for re-grouting reached.

  P680.5 was regrouted using open throat pump with higher percentage of Cellbex and P740.5 was grouted using Mix D but grout washed out and hole stays open after 2nd re-grouting.

Hole ID	Date	Grouting Length (m	Gauge Pressure (ba	Volume Injected (l	Depth of grout (m	Empty Length after grouting (m)	Water level	Comments	Mix
P-680.5	2019-12-08	4.86	20	343	11.55	-0.54		added 0.7% Cellbex at 15l/min flow rate. Still lot of fluctuation in pressure. Grout depth was meaured after 30 minutes of grouting and grout was at about 0.5 m iside the casing.	Nix C = 140 Mix C+Cellbex = 203
P-740,5	2019-12-04	3.7	1.05	445	12.7	3.3	6.07		Mix D

- **3rd Re-grouting**

  During this week only one hole was attempted for 3rd re-grouting (P740.5) and was re-grouted using open throat pump with higher percentage of Celbex. This hole was closed as the grout stays above the bottom of the casing after grouting stopped. Grouting was stopped due to high pressure build up but the flow rate can not be reduced due to limitations of the open throat pump.

Hole ID	Date	Grouting Length (m	Gauge Pressure (bar)	Volume Injected (L)	Depth of grout (m)	Empty Length after	Water level	comments	Mix
P-740,5	2019-12-07	3.3	20	236	7	-2.4	6.07	Using open throat pump, could not control pressure. Pressure jumped up to 20 bar at 20l/min Hole backfilled	Mix C = 90 Mix C+Cellbex 146.5

GROUT TESTING

- Grout tests were conducted before and when Celbex was added first time, as well as every 5 batches. The Marsh values became very unstable after Celbex was added. Although testing results showed very high marsh values, the intake of grout was high without significant pressure. After discussion with the designer it was decided that Marsh time is not required for Mix C with Celbex.
- Marsh values for Mix C ranged from 45 to 70 but few times very high values of more than 100 also observed
- The Specific Gravity and Bleed tests for Mix C without Celbex, Mix C with Celbex and Mix D shows very stable numbers with Specific Gravity ranged from 1.7 to 1.8 and Bleed 0% to 1%
- Vicat test was conducted on Mix C with 0.2% Celbex by weight of the cement and found initial set time of 4 hrs 29 min and final set time of less than 15 hrs.

DEVELOPMENT OF LOGGING PROCEDURE

- The inaccuracy which has been discovered in the field logs for the casing drilling has caused considerable inconvenience for the bedrock grouting. KCG has found the reasons for the occurrence of the inaccuracy. To avoid the similar mistakes to reoccur, in the daily meeting, QA recommended that it is important for KCG to develop a working instruction to guide the filed logging process and filed data processing for different shifts of the work. It will become important for the casing drilling for the upstream grouting blanket.
  As part of the above process, TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting or casing plug.

BOREHOLE INCLINATION CHECK

Didn't received inclination data for rock holes. KCG during the morning construction meeting mentions that they got some strange numbers during the rock hole inclination check and possible due to the rough rock surface. AEM recommended during the morning construction meeting that the inclination check in the rock may not be necessary due the hole deviation will not effect the Secant pile socket as the most part of the bedrock drilling is below the secant pile socket.
No official request been received from AEM or KCG to excempt the inclination check in the rock hole, if received SNC design team will review and decide the appropriate action.

pH AND TURBIDITY RESPONSE

- The AEM weekly water testing results showed that an increase of the PH value from about 7 to 9 for the seepage water in the trench about 15m away from the downstream toe of the dike. It is believed that it is typical to have elevated PH value due to foundation grouting, compared with the typical values ranged from 6-8 historically prior to grouting.
- AEM has decided to increase the frequency of the water testing for the seepage water to twice a day for PH and Turbidity values. This decision will be helpful to monitor and evaluate the effects of the on-going grouting.
- The pH values during this week ranged from 8.79 to 9.2 which are higer than the November values of 7.79 to 8.67. This higher pH values possible due to rock grouting started in last week and shows positive signs of borehole locations intersect with water seepage paths.
- The Turbidity values during this week ranges from 1.69 to 2.85 which are lower than the November 2019 values of 2.91- 2.95 which is positive sign that the grout may not be washed out of the foundation with water seepage unless to some unknown area.

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.

Issued by :	*Muhammad Saleem*	**09-12-2019**
	Signature	Date
Verified by :	*Tom Xue*	**09-12-2019**
	Signature	Date

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WEEKLY REPORT

20191215-WR
Document number

2019/12/09 to 2019/12/015	669034	Muhammad Saleem
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- The main activities during this week were grouting for casing plugs, bedrock drilling and grouting for the downstream blanket and regrouting of the holes that did not meet refusal criteria and ended at Vmax.
- Started drilling and grouting in two stages of 1.5 m and 3.5 m length as per grouting committee recommendations.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- After discussion with AEM and KGC, SNC agreed with AEM proposal of, if the holes on both sides of tertiary hole has a low volume intake, the tertiary hole will be drilled and grouted in single 5 m stage if bedrock conditions permitted.
- KGC requested to try with 400 liters of Mix D with Rheomac 450 after injecting 400 liters of Mix C, after discussion with AEM and Designer agreed to use the Mix D as a trial for few holes.
- Issued Site Instruction for re-grouting and grouting of holes those had been drilled to 5 m depth.

GROUT WITH CELBEX

- Grouting committee recommended to use Mix C with 2% calcium chloride and celbex at different percentages to complete downstream blanket grouting using open throat pump.
- As per KCG with Celbex the grout cannot be injected with flow rate less than 15 l/min due to chances of system clogging with lower flow rate when higher volume of grout being injected.
- Lot of fluctuation in pressure observed while using celbex through open throat pump.
- The holes grouted with celbex using open throat pump were stopped when pressure on the gauge installed at collar reached 10 bar to avoid hydro fracturing in the bedrock.

CASING EEXTENDED TO BEDROCK

- One casings was extended during this week to reach the bedrock (S722.5). This casing previously not reached the bedrock depth. In total 16 casings have been extended to bedrock so far.
- At S602.5 casing was not embedded in the bedrock. Driller observed bedrock at 14.4 m but he did not extend the casing as he thought hole was good and open. Talked to KCG (Alex, he said that KCG will try to grout 1st stage if dosen't work KCG will extend the casing).

CASING PLUG

- Only one casing plug was grouted during this week and a total of 86 casings have been pluged so far using Mix C (water cement ratio 0.5, 2% calcium chloride and 0.2% Celbex) based on the trial testing results and in line with grouting committee recommendations.

- Casing plugged this week at P596.5 was pluged using Mix C without Celbex.
- Grout testing for each batch was conducted before grouting to check Marsh Time, Specific Gravity, Bleeding and Temperature of cement, water and grout.
- Packer was placed at about 2 m above the bottom of the casing; and about 15 liters grout was injected prior to inflating packer.
- The only casing during the last week was injected with grout until reaching approximately 0 liters/ min grout flow at Pmax and waiting for 5 minutes with total grout intake of 53.6 liters.

	Casing Pluged			
Hole ID	Date	Grout Type	Grout Taken (L)	Pressure (Bar)
P-596,5	December 12, 2019	C	53.6	1.93

BEDROCK DRILLING

- Bedrock drilling started on December 11, 2019 for secondary holes starting from eastern limit of blanket grouting where primary holes had been grouted.
- Rock drilling was completed as per grouting committee recommendation in 1.5 m length stage and remaining 3.5 m stage will be drilled after grout has been reached the final set time in first stage.
- P595.5 was drilled in single stage of 5 m length after discussion between SNC, KCG and AEM due to logistic reasons.
- Bedrock drilling started for 2nd stage of 3.5 m length where 1st stage grouting has been completed and grout reached its final set time.
- At S598.5 and S586.5, 2nd stage drilling was completed prior to grout final set time, and KCG was advised that 2nd stage drilling should only be strated when final set time of prvious stage has been reached.
- A total of 14 holes had been drilled during this week for 1st stage grouting between stations 746.5 and 596.5.
- A total of 8 holes had been drilled during this week for 2nd stage grouting between stations 746.5 and 668.5.
- Drilling reports for 1st stage drilling didn't show water loss except few locations but during 2nd stage drilling at majority of locations, water loss was observed during drilling arout 13 m below ground surfsce except S722.5 and S 710.5 where water loss observed at 16 and 17 m respectively below ground surfsce.
- S686.5 and S734.5 were caved to 13.0 m and 13,1 m respectively below ground surface.
- In general 2nd stage drilling data shows that highly fractured rock encountered withing last 2 m of the bedrock drilling at majority of locations drilled during this week.

DOWN STAGE GROUTING

- As per grouting committee recommendations, grouting for down stream blanket switched from single 5m stage method to 1.5 m and 3.5 m stage following down stage grouting methodology.
- Two stage grouting started on December 12, 2019 starting with S746.5 to complete the priopirty zone between stations 749.5 and 596.5
- After two stage grouting method employed, only one hole P596.5 was completed in 5 m single stage due to logistic reasons.

HEAD LOSS TEST

- Head loss was checked for Mix D by comparing the pressures on the monitor screen and the gauge at the collar on December 11, 2019. About 1.6 bar of pressure loss was observed for 12 m long flexible pipe. TCG adjusted the head loss for Mix D in Pmax calculation.

BEDROCK GROUTING

- Bedrock grouting was conducted in section between Station 596.5m and 749.5m in the vicinity of the east abutment during this week.
- At S-722.5 initially the casing was not embedded in the bedrock during casing installation. During bedrock drilling casing was further extended 3.4 m to embed in the bedrock. As the casing was not plugged, during grouting the packer was installed half in the casing and half in the hole/bedrock.

1st Stage Grouting

- During this week a total of eighteen (18) holes were grouted.
- Six (6) holes (P596.5, P620.5, P632.5, P644.5, P656,5 and P728.5) were grouted for 5 m stage length and all of them got refusal with Pmax.
- All holes with refusal backfiled except P632.5 when checked next day, the hole was open to about 2.33 m from bottom. This hole was re-grouted to close.
- Twelve (12) secondary holes between station 614.5 and 746.5 were grouted for 1.5 m satge and all of them got refual with Mix C without celbex.
- All the 1.5 m stage holes left open after refusal to drill for remaining 3.5 m stage length.

	Interface grouting for 1.5 m/5 m stage								
Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Gauge Pressure (bar)	Volume Injected (L)	Mix	Comments	Depth of grout (m)	Empty Length after grouting (m)
P-596,5	2019-12-14	4.72	3.41	3.65	126	Mix C without celbex	backfilled after refusal		
S-614,5	2019-12-14	1.5	2.03	2.15	20.1	Mix C without Cellbex			
P-620,5	2019-12-11	4.75	3.3	3.5	1321	Mix C = 370 Mix D = 951	refusal with Mix D and backfill after grouting		
S-626,5	2019-12-14	1.5	2.17	2.17	34.6	Mix C without Cellbex			
P-632,5	2019-12-11	5.72	4.4	4.4	1427	Mix C = 475 Mix D = 952	refusal with Mix D	14.71	2.33
S-638,5	2019-12-13	1.5	2.24	2.17	16.6	Mix C without Cellbex			
P-644,5	2019-12-11	5.21	3.28	3.3	109.1	Mix C without Cellbex	refusal with Mix C and backfilled after grouting		
S-650,5	2019-12-13	1.5	2.14	2.08	16.5	Mix C without Cellbex			
P-656,5	2019-12-09	4.90	3.41	3.5	1088	Mix C =400 Mix D = 400 Mix C+Cellbex = 288	Stopped at 3.5 bar when flow was less than 1 l/min. could not wait for 5 minute due to possibility of system clogging by cellbex. Check grout depth on Dec 11, 2019 and ok to backfill	11.77	-0.13
S-662,5	2019-12-13	1.5	2.22	2.22	49.6	Mix C without Cellbex			
S-674,5	2019-12-13	1.5	2.19	2.27	90.1	Mix C without Cellbex			
S-686,5	2019-12-13	1.5	1.89	1.93	188	Mix C without Cellbex			
S-698,5	2019-12-13	1.5	1.93	1.93	106.1	Mix C without Cellbex			
S-710,5	2019-12-12	1.5	2.4	2.53	218.8	Mix C without Cellbex			
S-722,5	2019-12-12	1.5	1.63	1.73	447.8	Mix C without Cellbex	no casing plug. Install packer half in the casing and half in the hole. Then raise by 1 m and grout again		
P-728,5	2019-12-12	5.06	3.45	3.45	728.5	Mix C without Cellbex	Casing plug is likely not effective due to 4.6L intake and additional casing being pushed down to reach bedrock; half of the packer in the casing	-	
S-734,5	2019-12-12	1.5	1.97	1.97	72.1	Mix C without Cellbex			
S-746,5	2019-12-12	1.5	2.01	2	18.9	Mix C without Cellbex			

2nd Stage Grouting

- During this week two holes (S686.5 and S698.5) were attempted but in both hole grout elevation dropped down to below the bottom of the 1.5 m stage elevation.
- S686 was grouted with Mix D and S698.5 was grouted with Mix C with celbex adding through open throat pump.
- These holes will be regrouted using celbex through open throat pump to close.
- With the open throught pump (as per TCG) flow rate can not be reduced to below 15 l/min flow rate. So flow rate stays constant and only pressure changes.
- Pressure fluctuate too much with celbex and grouting stopped when pressure goes too high at constant flow rate.

Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Gauge Pressure (bar)	Volume Injected (l)	Mix	Comments	Date	Grouting Length (m)	Calcualted Pmax (bar)	Gauge Pressure (bar)	Volume Injected (L)	Mix	Comments	Depth of grout (m)	Empty Length after grouting (m)
S-674,5	2019-12-13	1.5	2.19	2.27	90.1	Mix C without Celbex		2019-12-14	3.5	3.35	3.45	73.4	Mix C without celbex			
S-686,5	2019-12-13	1.5	1.89	1.93	188	Mix C without Celbex		2019-12-15	3.5	4.18	4.2	1582	Mix C without celbex = 680 Mix D = 902	reached the Pmax but flow rate didn't drop down below 7 l/min	13.15	1.48
S-698,5	2019-12-13	1.5	1.93	1.93	106.1	Mix C without Celbex		2019-12-15	3.5	4.32	10	1605	Mix C without celbex = 310 Mix D = 896 Mix C with celbex = 399	Used celbex with open throat pump and flow rate cannot be reduced below 15 l/m	13.9	2.19

BEDROCK RE-GROUTINGD

Due to some holes could not met the refusal criteria, regrouting was conducted and those holes could not met the refusal crirteria 2nd and 3rd re-grouting were completed until the holes meet refusal criteria or closed. As per the site instruction from designer the holes that grout stayed above the bottom of the casing after regrouting were backfilled.
Due to limitations of the open throat pump (flow rate can not be reduced below 15 liters/min (according to TCG) with higher percentage of Celbex), site instruction was revised to use Open throat pump only for regrouting or when the Vmax is reached using the normal grouting process.

- **1st Re-grouting**

During this week only one hole was attempted for 1st regrouting (P632.5) and met refusal criteria with Mix C without celbex. Hole backfilled after regouting.

	1st re-grouting for 5 m / 1.5 / 3.5 m stage										
Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Target Volume (l)	Gauge Pressure (bar)	Volume Injected (l)	Depth of grout (m)	water level	Empty Length after grouting (m)	Comments	Mix
P-632,5	2019-12-12	2.33	2.57	1200	2.58	167.4				Refusal with Mix C	C

GROUT TESTING

- Grout tests were conducted for 1st batch as well as every 5 batches or when ever Mix changes. The Marsh values was checked only for Mix C without celbex while specific graveity and bleeding values were checked for each mix.
- Marsh values for Mix C ranged mostly from 50 to 80s but few times very high and low values also observed.
- The Specific Gravity and Bleed tests for Mix C without Celbex, and Mix D shows very stable numbers with Specific Gravity ranged from 1.7 to 1.8 and Bleed 0% to 1%
- Vicat test was conducted on Mix C without Celbex by weight of the cement and found initial set time of 4 hrs 22 min and final set time of 9 hrs 15 min.

HOLE DEPTH VERIFICATIONS

- TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting or casing plug to correct the discrepencies in hole depth during casing installations.
- Depth and water level of every hole was checked prior to start grouting or re-grouting.

BOREHOLE INCLINATION CHECK

Did not received borehole inclination data this week.

pH AND TURBIDITY RESPONSE

- Did not received the data during this week. Talked to AEM (Patrice) and they will resume testing soon.

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.

Issued by :	*Muhammad Saleem*	**09-12-2019**
	Signature	Date
Verified by :	*Tom Xue*	**09-12-2019**
	Signature	Date

SNC·LAVALIN

WEEKLY REPORT

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Document number

2019/12/16 to 2020/01/12	669034	Muhammad Saleem
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- This weekly report covers the activities from Dec 16, 2019 to Jan 12, 2020.
- Dec 20, 2019 to Jan 9, 2020 were Christmas holidays and there were no activities during those dates.
- Grouting crew mobilized to site after Christmas break on January 10, 2020.
- The main activities during this week were grouting for casing plugs, test hole drilling, bedrock drilling and grouting for the downstream blanket and regrouting of the holes that did not meet refusal criteria and ended at Vmax.
- Drilling for the remaining holes for the D/S blanket will be carried out in a single 5 m stage except if water loss observed within top 1.5 m drilling or hole collapsed, in such cases down stage grouting method will be employed in two short grouting stages.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- As per revised site instruction Mix D had been used as trial basis prior to use of Mix C with celbex and found successful as there was more control on grout consistency and pressure with Mix D than Mix C with celbex.
- The use of Mix D also preferred after KCG informed that the Mix C with Celbex cannot be grouted with flow rate of less than 15 l/min.

THERMISTOR DATA

- Thermistor installed before Christmas break to monitor bedrock temperature has been removed.
- If free standing water encountered in the holes we assume the bedrock is not frozen and so far water is not frozen in the holes except few inches inside the casing.

CASING EEXTENDED TO BEDROCK

- No more casing extended during this period and casings extended so far are still 16.
- At S602.5 casing was not embedded in the bedrock. Driller observed bedrock at 14.4 m but he did not extend the casing as he thought hole was good and open. Talked to KCG (Alex, he said that KCG will try to grout 1st stage if doesn't work KCG will extend the casing).
- At T719.5 and T725.5, holes caved to 0.4 m above casing and 0.35 m below casing respectively. Driller indicated that bedrock was not encountered during casing drilling. The bedrock surface was found 1.3 m and 2.15 m below casing during rock drilling. KCG don't have machine to extend casing into bedrock at the time. These casings will be extended later when machine available to extend casings.

CASING PLUG

- Nine (9) casing plug were grouted during this period and a total of 95 casings have been plugged so far using Mix C (water cement ratio 0.5, 2% calcium chloride and 0.2% Celbex) based on the trial testing results and in line with grouting committee recommendations.

- Casing plugged this week between station S590.5 and T563.5. S590.5, T587.5, P584.5, T581.5 and S578.5 were plugged using Mix C without Celbex and rest of the casing this week were plugged using Mix C with celbex.

	Casing Pluged				
Hole ID	Date	Grout Type	Grout Taken (L)	Pressure (Bar)	Comments
T-563,5	January 12, 2019	C+	18.7	1.74	
S-566,5	January 12, 2019	C+	19.5	1.9	
P-572,5	January 12, 2019	C+	222	0	reach max volume
T-575,5	January 12, 2019	C+	197.3	0	reach max volume
S-578,5	January 11, 2019	C	201.2	0.2	reach max volume
T-581,5	January 11, 2019	C	25.6	1.96	
P-584,5	January 11, 2019	C	39.2	2.11	
T-587,5	January 11, 2019	C	24	2.14	
S-590,5	January 11, 2019	C	16.2	2.25	

TEST HOLE DRILLING

Two holes S686.5 and S746.5 were re-drilled on January 11, 2020 to check if the grouting is effective or still there is water seepage in the open holes.

S686.5

- S686.5 was drilled to 14.7 m depth. Hole was dry until about 14.2 m depth and water encountered below 14.2 m depth.
- During initial grouting this hole was drilled to 15 m depth but hole was collapsed to 13 m and water loss was also observed at 13 m depth. Hole was grouted during re-grouting with Celbex added through open throat pump.
- Re-drilling indicated that the grout only penetrated to about 1.2 m in the caved rock below caved depth and below that the grouting was not effective.

S746.5

- S746.5 was drilled to about 14.5 m depth. A little bit of water observed at about 9.9 m depth (possible trapped water) but below that hole stayed dry to the bottom at 14.5 m.
- During initial grouting, this hole was drilled to 14.7 m depth and water loss was observed at 13.4 m during drilling and hole was completed after re-grouting with Mix C by adding Celbex through open throat pump.
- Dry hole during re-drilling indicated that the grouting is effective to cut off water seepage at this location.

BEDROCK DRILLING

- Bedrock drilling resumed after Christmas break on Jan 11, 2020 for tertiary holes starting from eastern limit of blanket grouting where secondary holes had been grouted.
- Bedrock drilling will be carried out in a single 5 m stage except if water loss observed within top 1.5m drilling or hole collapsed, in such cases down stage grouting method will be employed in two short grouting stages.
- A total of 13 holes had been drilled during this period for 1st stage grouting between stations 749.5 and 677.5.
- T725.5 and T719.5 were drilled to 13.6 m and 13.4 m respectively, but when pulled rod out both holes caved to just below casing bottom. Initially casing was not embedded into the bedrock at these two locations and KCG informed that they don't have machine to push casing down.
- These holes will be skipped for grouting and when machine available, casing will be embedded 0.3 to 0.5 m into bedrock and then re-drilled.

- Note that at adjacent holes S722.5 and P728.5 casings were also shown deeper bedrock surface and were extended by 3.4 m and 1.7 m respectively.
- None of the hole encountered water loss during drilling.

	interface driling 5m/1.5m					
Hole ID	Date	Bottom of casing (m)	Final hole depth (m)	water level (m)	Bedrock length (m)	Comments
T-677,5	2020-01-12	11.18	16.3		5.12	
T-683,5	2020-01-12	10.81	15.7		4.89	
T-689,5	2020-01-12	10.38	15.8		5.42	
T-695,5	2020-01-11	10.59	15.8		5.21	
T-701,5	2020-01-11	10.2	15.5		5.3	
T-707,5	2020-01-11	12.16	17.5		5.34	
T-713,5	2020-01-11	13.8	19.2		5.4	
T-719,5	2020-01-11	10	13.4		3.4	hole caved to 9.6 m, bedrock at 11.3 m
T-725,5	2020-01-11	9.45	13.6	6.32	4.15	hole caved to 9.8 m bedrock at 11.6 m
T-731,5	2020-01-11	9.9	16	5.88	6.1	caved to 15 m, as per driller bedrock at 11.3 m
T-737,5	2020-01-11	9.37	14.7	6.1	5.33	
T-743,5	2020-01-11	10.83	15.4	6.04	4.57	
T-749,5	2020-01-11	10.29	17.5	15.81	7.21	as per driller bedrock at 12.5 m

DOWN STAGE GROUTING

- After the weekly meeting between SNC and AEM before Christmas break, it was decided that the tertiary holes will be drilled in a single 5 m stage except if water loss observed within top 1.5 m drilling or hole collapsed, in such cases down stage grouting method will be employed in two short grouting stages.

HEAD LOSS

- When adjusting the Mix for thicker grout by increasing the dose of Celbex or Reheomac, the gauge pressure was checked at the collar of the hole to accommodate the head loss in the flexible pipe.

BEDROCK GROUTING

- Bedrock grouting was conducted in section between Station 596.5m and 749.5m in the vicinity of the east abutment during this period.
- Bedrock grouting for tertiary holes started on Jan 12, 2020 starting from station 749.5 moving west.

1st Stage Grouting

- During this period a total of two (2) holes (T749.5 and T743.5) were grouted.
- Both holes grouted in 5 m stage length and reached refusal at Pmax with mix C without celbex.
- All holes with refusal backfilled at the end of pressure grouting.

	Interface grouting for 1.5 m/5 m stage								
Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Gauge Pressure (bar)	Volume Injected (L	Mix	Comments	Depth of grout (m)	Empty Length after grouting (m)
T-743,5	2020-01-12	5	3.25	3.31	421.6	Mix C without Cellbex	backfilled after grouting		
T-749,5	2020-01-12	5	2.99	3	50.2	Mix C without Cellbex	backfilled after grouting		

2nd Stage Grouting

- During this period a total of seven (7) holes were grouted but only four (4) holes (S638.5, S650.5, S710.5 and S722.5) got refusal with Pmax.
- S650.5 got refusal with Mix D while the remaining three (3) holes got refusal with Mix C without celbex.
- Three holes (S622.5, S734.5 and S746.5) the grout elevation dropped down to below the bottom of the 1.5 m stage elevation.
- All three holes were grouted with Mix D.
- These holes will be re-grouted using celbex through open throat pump to close.

	Interface grouting for 3.5 stage								
Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Gauge Pressure (bar)	Volume Injected (L)	Mix	Comments	Depth of grout (m)	Empty Length after grouting (m)
S-638,5	2019-01-11	3.5	3.89	4.36	67.3	Mix C withput Celbex	hole backfilled after grouting		
S-650,5	2019-12-18	3.5	4.46	4.3	823	Mix **C** without celbex = 450 Mix D = 373	checked grout elevation after 2 hrs and backfilled	11.4	-0.39
S-662,5	2019-12-18	3.5	4.6	5.07	961	Mix **C** without celbex = 495 Mix D = 466	checked depth of grout after lunch and hole was open to thr bottom	15.6	4.18
S-710,5	2019-12-17	3.5	4.07	4	264.2	Mix C without celbex	Backfilled after grouting		
S-722,5	2019-12-17	3.5	4.09	4	138.5	Mix C without celbex	Backfilled after grouting		
S-734,5	2019-12-16	3.5	4.26	4.89	649.4	Mix **C** without celbex = 150 Mix D = 499.4	hole left open to check grout elevation prior to backfill	11.89	0.7
S-746,5	2019-12-16	3.5	4.37	4.4	1042	Mix **C** without celbex = 270 Mix D = 772	hole left open to check grout elevation prior to backfill	13.65	2.4

BEDROCK RE-GROUTINGD

Due to some holes could not met the refusal criteria, re-grouting was conducted. As per the site instruction from designer the holes that grout stayed above the bottom of the casing after re-grouting were backfilled.
Due to limitations of the open throat pump (flow rate can not be reduced below 15 liters/min (according to TCG) with higher percentage of Celbex), site instruction was revised to use Open throat pump only for re-grouting or when the Vmax is reached using the normal grouting process.
Pressure fluctuated too much with celbex and grouting stopped when pressure goes too high at constant flow rate to avoid hydraulic jacking of dam foundation and causing other safety concerns

- **1st Re-grouting**

During this period five (5) holes were attempted for 1st re-grouting (S622.5, S686.5, S698.5, S734.5 and S746.5) and all holes met refusal criteria with Mix C with celbex using through open throat pump except S734.5 which got refusal with Mix C without celbex.
S734.5 was backfilled after refusal and other four holes were backfilled after confirming the grout elevation above the bottom of the casing after few hours or next day.

	1st re-grouting for 5 m / 1.5 / 3.5 m stage										
Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Target Volume (l)	Gauge Pressure (bar)	Volume Injected (l)	Depth of grout (m)	water level	Empty Length after grouting (m)	Comments	Mix
S-662,5	2019-12-18	4.18	4.6	1000	10	484.2	8.2		-3.22	Hole backfilled	0.3% Cellbex = 150 0.5% Cellbex = 160 0.7% Cellbex = 174
S-686,5	2019-12-16	3.5	3.72	592	10	669.9	10.04		-0.36	used open throat pump, backfilled on Dec 17, 2019	C with Celbex
S-698,5	2019-12-16	3.5	3.61	876	10	177.7	9.85		-0.56	used open throat pump, backfilled on Dec 17, 2019	C with Celbex
S-734,5	2019-12-17	0.7	3.61	400	3.6	109				backfilled after refusal	Mic C without celbex
S-746,5	2019-12-17	2.4	3.72	1044	10	542.7	7.9		-1.79	grouting stopped when pressure at the colar gauge reached 10 bar	Mix C= 250 0.3% Cellbex = 200 0.5% Cellbex = 92.7

GROUT TESTING

- Grout tests were conducted for 1st batch as well as every 5 batches or whenever Mix changes. The Marsh values was checked only for Mix C without celbex while specific gravity and bleeding values were checked for each mix.
- Marsh values for Mix C ranged mostly from 50 to 80s but few times very high and low values also observed.
- The Specific Gravity and Bleed tests for Mix C without Celbex, and Mix D shows very stable numbers with Specific Gravity ranged from 1.7 to 1.8 and Bleed 0% to 1.5%

HOLE DEPTH VERIFICATIONS

- TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting or casing plug to correct the discrepancies in hole depth during casing installations.
- Depth and water level of every hole was checked prior to start grouting or re-grouting.

BOREHOLE INCLINATION CHECK

Did not received borehole inclination data during this period.

LIST OF CHANGES ON SPECS AND SITE INSTRUCTION AND FIELD WORK

Whale Tail Dike Remedial Grouting Sepecifications and Design Drawings Changes Tracking

Document	Revision	Date Issued	Subject
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PC	2019-10-03	Technical Specifications for Whale Tail Dike Remedial Drilling and Grouting Works Rev. PC was issued for AEM and Grouting Committee's (GC) review and comments. The document was the main topic of the discussion in the Grouting Committee Meeting No.3 held on Oct. 17th, 2019 in Montreal.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	PD	2019-10-28	As per discussions and recommendations from GC Meeting No.3, Technical and Specifications had been updated to Rev PD. Reference can be made to meeting minutes 669034-0000-30MC-0001 for details of the comments and recommendations to the designs.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PE	2019-11-27	Rev. PD had been updated to Rev PE based on recommendations presented in GC's letter Dated Oct. 25, 2019 and further discussions with AME engineers and site staff to implement the simplified approach and path forward proposed by the GC. Phased approach adopated starting with two rows of Blanket Grouting (Phase I) and based on the results of Blanket Grouting to decide the requirement of deepen the Upstream Blanket holes for Curtain Grouting (Phase II)
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	00	2020-01-10	Document Rev. PE had been updated based on comments on received and the discussions and recommendations from GC Meeting No.5 held on December 5, 2019.

Whale Tail Dike Remedial Grouting Site Instructions Changes Tracking

Document	Revision	Date Issued	Subject
SITE INSTRUCTIONS FOR DRILLING AND BLANKET GROUTING (Document Number: 669034-0000-40CA-0001 Rev. 00)	Rev 00	2019-11-19	A technical memo - Site Instructions for Drilling and Blanket Grouting Rev PB was issued on November 19, 2019. The objective of this document is to provide key instructions to the drilling and grouting of the Blanket Holes at the WTD foundation to allow work to start timely before Design Drawings and Specifications are ready and approved. The Site Instructions were prepared based on discussions and comments on Technical Specs Rev PD, Grouting Committee's Letter dated October 25, 2019 and in alignment with the objective of 40 to 50% seepage deduction with simplfied and phased project approach. This document may require update based on the progress and results of the field work.
	Rev 01	2020-01-08	The Site Instructions Rev 00 was updated to Rev 01 to incorporate: (1) modification of the Mix C+ by reducing the Calcium Chloride dosage (2)conditions for drilling and grouting the hole in two stages

Whale Tail Dike Remedial Grouting Fieldwork Instructions Changes Tracking

Document	Date Issued	Subject	Notes
Fieldwork Instruction No.1 (Email)	2019-12-03	Subject: 669034 - Rock Grouting on Grout Mix Change Procedures	This Fieldwork Instruction provide by email dated Dec. 03, 2019 on Subject: **Grout mix change procedures during the Blanket Hole Grouting and Regrouting** (prior to Open Throat Pump is available) based on the on site trial mix results and ground response on grout take and grouting pressure.
Fieldwork Instruction No.2 (FWI 001 Rev 00)	2019-12-07	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 00	This Fieldwork instruction applies to Grouting and Re-grouting of Primary Holes with the application of Celbex using Open Throat Pump as recommended by Grouting Committee (Meeting No. 5 on December 05 2019) that had been drilled per 5 m Stage. The site instruction will be updated as per the progress of the site construction.
Fieldwork Instruction No.3 (FWI 001 Rev. 01)	2019-12-09	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 01	The fieldwork instruction No.2 was updated to introduce Mix D

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.

Issued by :	*Muhammad Saleem*	**16-01-2019**
	Signature	Date
Verified by :	*Tom Xue*	**16-01-2019**
	Signature	Date

SNC·LAVALIN

WEEKLY REPORT

20200119-WR
Document number

2020/01/13 to 2020/01/19	669034	Muhammad Saleem
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- This weekly report covers the activities from Jan 13, 2020 to Jan 19, 2020.
- The main activities during this week were casing deepening, casing cleaning, bedrock drilling and grouting for the downstream blanket.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- KCG drilled tertiary holes in the area where Secondary hole (S614.5 and S626.5) not been completed. As per specifications the Tertiary holes shall only be drilled after the adjacent Primary or Secondary holes has been grouted and past the grout final set time. KCG will prepare the NCR for these holes.
- Cement temperature noted up to 40 C, KCG was advised to check heating in the batching area to control temperature.
- Coarser particles found in the cement buckets, KGC was advised to make cement screened properly while placing into 20 kg buckets.

GROUTING COMMITTEE RECOMMENDATIONS

Grouting committee meeting held between SNC, AEM, KCG and other committee members on Jan 13, 2020 to discuss current grouting techniques, site finding and challenges including use of cable through open throat pump. The committee recommended to;

- Drilling and grouting will be continued in single 5 m stage or 2 short stages as per site conditions until final decision.
- Celebrex in the open throat pump will be added by visual observation and increased until pressure start building up and then continued until refusal. Total Celbex used for the total grout injected will be calculated after grouting completed.

CASING EEXTENDED TO BEDROCK

- Two casings extended during this week and in total 19 casings extended so far.
- At T719.5 and T725.5, driller indicated that bedrock was not encountered during casing drilling. Casing was extended to 11.3m and 11.6 depth at these locations.

CASING PLUG

- No casing plug grouted during this week and a total of 95 casings have been plugged so far using Mix C (water cement ratio 0.5, 2% calcium chloride and 0.2% Celebrex) based on the trial testing results and in line with grouting committee recommendations.
- At few locations Casing were plugged using Mix C without Celbex.

GROUTING TEST HOLE

- The test S686.5 drilled on January 11, 2020 to check if the grouting is effective or still there is water seepage in the open hole is grouted on Jan 17, 2020.
- Injected 61,7 liters of Mix A grout at 2 bar. Pressure refusal achieved within 10 minutes with 0.4 l/min flow rate at 2 bar pressure.

PACKER LOST

T719.5.

- At this location casing was not plugged, Packer was supposed to be placed half in the rock and half in the casing but due to miscalculations packer was fully placed in the rock. After about 520 liters of grout injected at just over 1 bar pressure bypass observed in the casing. When tried to pull the packer it stuck in the hole, tried with the loader but pipe came out from packer. Hole is backfilled with packer inside.
- After reviewing the rock grouting data of the adjacent holes and discussion with Tom Xue (SNC designer), no replacement hole required at this location.
- This is a lessons learn that plug grouting should be done before drilling and grouting in bedrock and packer should be set up in casing to prevent grout bypassing the packer or packer stuck in broken rock.

BEDROCK DRILLING

- Bedrock drilling will be carried out in a single 5 m stage except if water loss observed within top 1.5m drilling or hole collapsed, in such cases down stage grouting method will be employed in two short grouting stages.
- A total of 13 holes had been drilled during this week for 5 m stage length between stations 671.5 and 572.5.
- None of the hole encountered water loss during drilling.
- All holes drilled during this week stayed open to the bottom and no caving observed.
- Quality of drilled holes indicated the effectiveness of grouting during primary and secondary stage.

	interface driling 5m/1.5m					
Hole ID	Date	Bottom of casing (m)	Final hole depth (m)	water level (m)	Bedrock length (m)	Comments
P-572,5	2020-01-14	13.29	19		5.71	
P-584,5	2020-01-14	12.99	18.2		5.21	
T-611,5	2020-01-13	12.27	16.9	5.7	4.63	
T-617,5	2020-01-13	11.46	16.4	5.2	4.94	
T-623,5	2020-01-13	12.38	17.3	5.95	4.92	
T-629,5	2020-01-13	12.37	17.1	6.5	4.73	
T-635,5	2020-01-13	11.92	17.1	6.4	5.18	
T-641,5	2020-01-13	11.21	16.4	5.85	5.19	
T-647,5	2020-01-13	11.9	16.8	5.8	4.90	
T-653,5	2020-01-13	11.47	16.5	5.45	5.03	
T-659,5	2020-01-13	11.1	16.1	5.45	5.00	
T-665,5	2020-01-13	10.66	15.9	5.3	5.24	
T-671,5	2020-01-13	10.25	15.5	5.5	5.25	

BEDROCK GROUTING

- Bedrock grouting was conducted for tertiary holes during this week in section between Station 596.5m and 749.5m in the vicinity of the east abutment.
- Total 44 holes has been completed.

1st Stage Grouting

- During this week a total of twenty (20) Tertiary holes were grouted between station T737.5 and T623.5.

- All the holes grouted in 5 m stage length and reached refusal at Pmax.
- Seven (7) holes (T653.5, T665.5, T683.5, T689.5, T695.5, T707.5 and T737.5) got refusal with mix D.
- One hole (T731.5) was filled with grout due to communication from T737.5.
- One hole (T719.5) grout bypass observed after injecting about 520 liters of mix C without celbex at pressure just over 1 bar. Packer stuck in the hole and lost during retrieval.
- All holes backfilled at the end of pressure grouting except T665.5 and T695.5 were backfilled after confirming the grout elevation above the bottom of the casing.
- All Tertiary holes completed on grout take refusal so far during 1st grouting attempt in 5 m stage length indicated the bedrock improvement after completing primary and secondary holes.

	Interface grouting for 1.5 m/5 m stage								
Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Gauge Pressure (bar)	Volume Injected (L)	Mix	Comments	Depth of grout (m)	Empty Length after grouting (m)
T-623,5	2020-01-18	4.92	3.55	3.61	261.6	Mix C without Cellbex	backfilled after refusal		
T-629,5	2020-01-18	4.73	3.41	3.62	531.9	Mix C without Cellbex	backfilled after refusal		
T-635,5	2020-01-17	5.18	3.45	3.49	64.4	Mix C without Cellbex	backfilled after refusal		
T-641,5	2020-01-17	5.19	3.57	3.7	111	Mix C without Cellbex	backfilled after refusal		
T-647,5	2020-01-16	4.90	3.4	3.37	165.7	Mix C without Cellbex	backfilled after refusal		
T-653,5	2020-01-16	5.03	3.36/4.02	3.91	847	Mix C without Cellbex = 350 L Mix D = 497 L	backfilled after refusal		
T-659,5	2020-01-16	5.00	3.54	3.42	326.7	Mix C without Cellbex	backfilled after refusal		
T-665,5	2020-01-16	5.24	3.43/4.13	4.2	2213	Mix C without Cellbex = 350 L Mix D = 1863 L	backfilled after confirming grout elevation	10.46	-0.20
T-671,5	2020-01-15	5.25	3.33	3.3	184.3	Mix C without Cellbex	backfilled after refusal		
T-677,5	2020-01-15	5.12	3.52	3.52	71	Mix C without Cellbex	backfilled after refusal		
T-683,5	2020-01-15	4.89	3.37/4.03	4.37	1156	Mix C without Cellbex = 370 L Mix D = 786 L	backfilled after refusal		
T-689,5	2020-01-14	5.42	3.28/3.94	4.01	1176	Mix C without Cellbex = 400 L Mix D = 776 L	backfilled after refusal		
T-695,5	2020-01-14	5.21	3.39/4.05	2	2194	Mix C without Cellbex = 445 L Mix D = 1749 L	Checked grout elevation after 4 hours and hole backfilled	10.1	-0.49
T-701,5	2020-01-14	5.3	3.26	3.2	190.5	Mix C without Cellbex	backfilled after refusal		
T-707,5	2020-01-14	5.34	3.58/4.24	4.22	863	Mix C without Cellbex = 550 L Mix D = 313 L	backfilled after refusal		
T-713,5	2020-01-13	5	3.83	3.78	161	Mix C without Cellbex	backfilled after refusal		
T-719,5	2020-01-17	4.8	3.19	2	520	Mix C without Cellbex	Grout bypass, Packer lost in the hole		
T-725,5	2020-01-17	4.9	3.29	3.25	472.2	Mix C without Cellbex	backfilled after refusal		
T-731,5	2020-01-13	5		6	2	Mix C without celbex	**Hole filled with grout due to communication from T737.5. will be backfilled**		
T-737,5	2020-01-13	5	3.35/3.96	4.23	1381	Mix C without Cellbex = 580 L Mix D = 801 L	backfilled after grouting		

GROUT TESTING

- Grout tests were conducted for 1st batch as well as every 5 batches or whenever Mix changes. The Marsh values was checked only for Mix C without celbex while specific gravity and bleeding values were checked for each mix.
- Marsh values for Mix C ranged mostly from 50 to 80s but few times very high and low values also observed, which could be caused by variations of cement particles, grout temperature and W/C ratio
- The Specific Gravity and Bleed tests for Mix C without Celbex, and Mix D shows very stable numbers with Specific Gravity ranged from 1.7 to 1.8 and Bleed 0% to 1.5%
- Vicat test was performed on January 13, 2020 on Mix D and estimated Initial set time of 4 hrs 45 min and final set time of 6hrs. 45 min.
- Filtration test was performed on January 16, 2020 on mix D and calculated filtration coefficient of 0.061 min^-0.5

HOLE DEPTH VERIFICATIONS

- TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting

BOREHOLE INCLINATION CHECK

- Total 44 casings between stations 338.5 and 404.5 were checked for casing inclination during this week.
- The data shows that deviations from the vertical of many holes are larger than 0.5% which is required in the specifications.
- Average deviation checked during this week found 0.89% and the maximum value found is 2.23%.
- Note that the hole inclination in the rock was not been checked as AEM said on Dec. 6, 2019 construction meeting that the inclination check in the rock hole is not necessary as the hole is below the bottom of the cut off wall.

pH AND TURBIDITY RESPONSE

- Only one water testing result for January 15, 2020 was received during this week for the seepage water in the trench about 15 m away from the downstream toe of the dike received.
- The pH values during this week for the single day test were 9.6 and 9.68 in the morning and afternoon respectively which are slightly higher than the December values of 8.79 to 9.2. This higher pH values possible due to rock grouting and shows positive signs of borehole locations intersect with water seepage paths.
- The Turbidity values during this week ranges from 6.2 to 15.8 which are higher than the December 2019 values.
- More turbidity readings needed to properly assess the condition to understand the fluctuation in turbidity values.

LIST OF CHANGES ON SPECS, SITE INSTRUCTION, FIELD WORK AND DEVIATION LIST

Whale Tail Dike Remedial Grouting Sepecifications and Design Drawings Changes Tracking

Document	Revision	Date Issued	Subject
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PC	2019-10-03	Technical Specifications for Whale Tail Dike Remedial Drilling and Grouting Works Rev. PC was issued for AEM and Grouting Committee's (GC) review and comments. The document was the main topic of the discussion in the Grouting Committee Meeting No.3 held on Oct. 17th, 2019 in Montreal.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	PD	2019-10-28	As per discussions and recommendations from GC Meeting No.3, Technical and Specifications had been updated to Rev PD. Reference can be made to meeting minutes 669034-0000-30MC-0001 for details of the comments and recommendations to the designs.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PE	2019-11-27	Rev. PD had been updated to Rev PE based on recommendations presented in GC's letter Dated Oct. 25, 2019 and further discussions with AME engineers and site staff to implement the simplified approach and path forward proposed by the GC. Phased approach adopated starting with two rows of Blanket Grouting (Phase I) and based on the results of Blanket Grouting to decide the requirement of deepen the Upstream Blanket holes for Curtain Grouting (Phase II)
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	00	2020-01-10	Document Rev. PE had been updated based on comments on received and the discussions and recommendations from GC Meeting No.5 held on December 5, 2019.

Whale Tail Dike Remedial Grouting Site Instructions Changes Tracking

Document	Revision	Date Issued	Subject
SITE INSTRUCTIONS FOR DRILLING AND BLANKET GROUTING (Document Number: 669034-0000-40CA-0001 Rev. 00)	Rev 00	2019-11-19	A technical memo - Site Instructions for Drilling and Blanket Grouting Rev PB was issued on November 19, 2019. The objective of this document is to provide key instructions to the drilling and grouting of the Blanket Holes at the WTD foundation to allow work to start timely before Design Drawings and Specifications are ready and approved. The Site Instructions were prepared based on discussions and comments on Technical Specs Rev PD, Grouting Committee's Letter dated October 25, 2019 and in alignment with the objective of 40 to 50% seepage deduction with simplfied and phased project approach. This document may require update based on the progress and results of the field work.
	Rev 01	2020-01-08	The Site Instructions Rev 00 was updated to Rev 01 to incorporate: (1) modification of the Mix C+ by reducing the Calcium Chloride dosage (2)conditions for drilling and grouting the hole in two stages

Whale Tail Dike Remedial Grouting Fieldwork Instructions Changes Tracking

Document	Date Issued	Subject	Notes
Fieldwork Instruction No.1 (Email)	2019-12-03	Subject: 669034 - Rock Grouting on Grout Mix Change Procedures	This Fieldwork Instruction provide by email dated Dec. 03, 2019 on Subject: **Grout mix change procedures during the Blanket Hole Grouting and Regrouting** (prior to Open Throat Pump is available) based on the on site trial mix results and ground response on grout take and grouting pressure.
Fieldwork Instruction No.2 (FWI 001 Rev 00)	2019-12-07	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 00	This Fieldwork instruction applies to Grouting and Re-grouting of Primary Holes with the application of Celbex using Open Throat Pump as recommended by Grouting Committee (Meeting No. 5 on December 05 2019) that had been drilled per 5 m Stage. The site instruction will be updated as per the progress of the site construction.
Fieldwork Instruction No.3 (FWI 001 Rev. 01)	2019-12-09	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 01	The fieldwork instruction No.2 was updated to introduce Mix D

DEVIATION LIST FOR REMEDIAL GROUTING AT WHALE TAIL DIKE

Deviation #	Date Received	Date Responded	Status	Subject	Location/Address	Notes
001	2019-11-10		AEM will manage the situation	QC did not use centerlizer to monitor inclination	multiple locations	Daily Report - Contractor informed that they will use inclino meter without centerlizer as they did last winter but AEM will look if they can findout centerlizer for 4.6" casing.
002	2019-11-14		waiting for apparatus and training	QC did not have Vicat apparatus and did not know how to use filtration apparatus	during Trial mix	Vicat apparatus received and fist vicat test performed on Dec 5, 2029
003	2019-12-06			inclination check in bedrock holes are not been checked. AEM said inclination check is not necessary in the rock hole during daily construction meeting on Dec 6, 2019 and captured on weekly report for week end Dec 07, 2019		As per specs. "Deviation from vertical in the bedrock section of the hole shall not exceed 2% of drilled length."
004	2020-01-13			Drilling of tertiary holes prior to grouted secondary holes	T611.5, T617.5, T623.5, T629.5	Tertiary holes drilled while secondary holes S614.5 and S626.5 were not been grouted yet. As per spec. Tertiary holes shall be drilled in rock after secondary holes has been grouted and grout reached its final set time.
005	2020-01-12			Continuous drilling and grouting of tertiary holes	WTD Tertiary holes	Consective tertiary holes has been drilled and grouted (6 m distance). As per spec. minimum distance between two drilled holes in bedrock is 12 m.

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.
- Blizzard warning was I effect from 11:30 am on January 18, 2020 to Noon time on January 19, 2020

Issued by : *Muhammad Saleem* — Signature — **20-01-2019** — Date

Verified by : *Tom Xue* — Signature — **20-01-2019** — Date

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WEEKLY REPORT

20200126-WR
Document number

2020/01/20 to 2020/01/26	669034	Sebastien Viau
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- This weekly report covers the activities from Jan 20, 2020 to Jan 26, 2020.
- The main activities during this week were casing deepening, casing plug, casing cleaning, bedrock drilling and grouting for the downstream blanket.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- Grouted holes in the area where tertiary holes had been drilled without completing the secondary holes.
- Cement temperature noted up to 40 C, KCG was advised to check heating in the batching area to control temperature.

GROUTING COMMITTEE RECOMMENDATIONS

- No recommendations from grouting committee during this period.

CASING EXTENDED TO BEDROCK

- One casing extended (T599.5) during this week and in total 20 casings extended so far.
- The casing was deepened by 1 m to the final depth of 13.2 m in that hole.

CASING PLUG

- Six (6) casing plug grouted during this week and a total of 101 casings have been plugged so far using Mix C (water cement ratio 0.5, 2% calcium chloride). Some grout mixes used for casing plug have 0.2% of Celbex in it.

	Casing Pluged				
Hole ID	Date	Grout Ty	Grout Taken (L	Pressure (Bar)	Comments
T-533,5	January 20, 2020	C	18.8	1.69	cleaned on Jan 14, 2020
P-548,5	January 20, 2020	C	173.1	1.05	cleaned on Jan 14, 2020
S-554,5	January 20, 2020	C	22.700	1.980	cleaned on Jan 14, 2020
P-560,5	January 20, 2020	C	174.4	0	cleaned on Jan 14, 2020
T-569,5	January 20, 2020	C	197	0.4	clogged at 6.42 m on Jan 11, 2020. cleaned on Jan 14, 2020
T-593,5	January 20, 2020	C	18.3	2.02	clogged at 3 m on Jan 11, 2020

BEDROCK DRILLING

- Bedrock drilling will be carried out in a single 5 m stage except if water loss observed within top 1.5m drilling or hole collapsed, in such cases down stage grouting method will be employed in two short grouting stages.
- A total of twelve (12) holes had been drilled during this week for 5 m stage length between stations 452.5 and 590.5.
- Water loss was observed in four (4) boreholes but none of the water loss was observed in the first 1.5 m in bedrock so all the holes were drilled in one 5 m long stage.
- All holes drilled during this week stayed open to the bottom and no caving observed prior to grouting.

		interface driling 5m/1.5m				
Hole ID	Date	Bottom of casing (i	Final hole depth (m	water lev	Bedrock length (r	Comments
P-452,5	1/21/2020	9.7	15.4	7.61	5.70	water loss at 14.8 m
P-464,5	1/21/2020	10.21	15.2	7.68	4.99	
S-506,5	1/26/2020	10.52	15.7		5.18	
S-518,5	1/26/2020	10.32	15.3		4.98	Water loss at 12.9 m
S-530,5	1/26/2020	10.23	15.4	6.63	5.17	Water loss at 12.8 m
S-542,5	1/26/2020	9.17	14.4	7.03	5.23	Water loss at 12.1 m
P-548,5	1/21/2020	10.46	14.9	6.11	4.44	
S-554,5	1/26/2020	11.13	16.3	6.82	5.17	
P-560,5	1/21/2020	9.80	15	6.8	5.2	
S-566,5	1/26/2020	10.95	16.21	6.6	5.26	
S-578,5	1/26/2020	12.02	17.27	6.63	5.25	
S-590,5	1/26/2020	12.92	18.13	6.68	5.21	

BEDROCK GROUTING

- Bedrock grouting was conducted for primary, secondary and tertiary holes during this week in section between Station 488.5m and 617.5m.
- Total 58 holes has been completed.

1st Stage Grouting

- During this week a total of twelve (12) holes were grouted between station P488.5 and T617.5.
- All the holes grouted in 5 m stage length.
- Nine (9) holes (P488.5, P500.5, P524.5, P536.5, P548.5, P560.5, P584.5, T611.5 and T617.5) reached refusal at Pmax with mix C without Celbex.
- Pmax could not be achieved after 2334 L of grouting in hole S572.5 (450 L of mix C and 1884 L of mix D). This hole was regrouted with 386 L of mix C. Celbex was not required as pressure began to build up after +-200L of mix C.
- In P602.5, Pmax could not be achieved after 1324 L of grouting with mix C. This hole was regrouted with a total of 1173 L (200 L of mix C and 975 L of mix C with Celbex). Celbex was added by observing the pressure to keep gradual increase of pressure. The average percentage of Celbex used in Mix C+ was 1.4% by unit weight of dry cement.
- Packer stuck in hole P524.5 and lost during retrieval. Lesson should be learnt on precisely control the packer settinp up depth/elevation to avoid this from happening.
- All holes backfilled at the end of pressure grouting unless refusal is not reached and re-grouting is required.
- The grout level is now measured after the pressure grouting process and before backfilling in order to confirm that the grout was not washed away.
- Grout level dropped three (3) times during backfilling in hole P476.5. The grout level stabilized after that.
- The two tertiary holes completed during this week indicated the bedrock improvement after completing primary and secondary holes.

	Interface grouting for 1.5 m/5 m stage								
Hole ID	Date	Grouting Length (m)	Calcualted Pr (bar)	Gauge Press (bar)	Volume Inject (L)	Mix	Comments	Depth of grout	Empty Length after grou (m)
P-488.5	1/26/2020	4.77	3.08	2.81	313.9	Mix C	backfilled after refusal		
P-500.5	1/25/2020	4.7	3.1	4.3	59	Mix C	backfilled after refusal		
P-512.5	1/25/2020	6.1	3.6	3.5	680	500 L Mix C + 180 L Mix D	backfilled after refusal		
P-524.5	1/25/2020	4.73	3.28	3.15	467.8	Mix C	Packer stuck in the hole		
P-536.5	1/23/2020	4.51	2.87	2.96	177.5	Mix C	backfilled after refusal		
P-548.5	1/23/2020	4.44	3.06	2.93	61	Mix C	backfilled after refusal		
P-560.5	1/23/2020	5.2	3.04	2.97	158.9	Mix C	backfilled after refusal		
P-572.5	1/22/2020	5.71	3.59/4.27	1.55	2334	Mix C = 450 Mix D = 1884	Will be re-grouted	18.7	5.41
P-584.5	1/21/2020	5.21	3.5	3.9	167.8	Mix C without Cellbex	backfilled after refusal		
S-602.5	1/21/2020	7.03	4.18/4.85	4.6	1323.8	Mix C = 390 Mix D = 933.8	will check the depth tomorrow	19.5	7.030
T-611.5	1/21/2020	4.63	3.43	3.5	47.7	Mix C without Cellbex	backfilled after refusal		
T-617.5	1/21/2020	4.94	3.53	3.5	60.6	Mix C without Cellbex	backfilled after refusal		

	1st re-grouting for 5 m / 1.5 / 3.5 m stage									
Hole ID	Date	Grouting Leng	Calculated Pma	Target Volu (L)	Gauge Pressu (bar)	Volume Injecte (L)	Mix	Comments	depth of gro	Empty Length after grouting
P-572.5	1/23/2020	5.71	3.59		3.6	386	Mix C without Cellbex	backfilled after refusal		
S-602.5	1/22/2020	7.030	4.25	1200	10	**1173**	Mix **C** without celbex = 200 Mix C with celbex = 975	812.5 kg of dry cement and 11.55 kg of celbex used, so in average 1.4% of celbex was used by weight of cement.	11.7	-0.770

GROUT TESTING

- Grout tests were conducted for 1st batch as well as every 5 batches or whenever Mix changes. The Marsh values was checked only for Mix C without celbex while specific gravity, bleeding and temperature values were checked for the other mixes.
- Marsh values for Mix C ranged mostly from 50 to 80s but few times very high and low values also observed, which could be caused by variations of cement particles, grout temperature and W/C ratio. Further investigation and control on grout material are required.
- The Specific Gravity and Bleed tests for Mix C without Celbex, and Mix D shows very stable numbers with Specific Gravity ranged from 1.7 to 1.8 and Bleed 0% to 1.5%.

HOLE DEPTH VERIFICATIONS

- TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting.

BOREHOLE INCLINATION CHECK

- No casing inclination was checked during this week.

pH AND TURBIDITY RESPONSE

- Only one water testing result for January 15, 2020 was received during this week for the seepage water in the trench about 15 m away from the downstream toe of the dike received.
- The pH values were measured on January 21st and 22nd in the morning and in the afternoon. The pH values vary from 9.31 to 10.10 with an average of 9.78 which are slightly higher than the December values of 9.78 to 9.98.
- The Turbidity values during this week ranges from 2.0 to 18.9 with an average of 6.48.

LIST OF CHANGES ON SPECS, SITE INSTRUCTION, FIELD WORK AND DEVIATION LIST

Whale Tail Dike Remedial Grouting Sepecifications and Design Drawings Changes Tracking

Document	Revision	Date Issued	Subject
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PC	2019-10-03	Technical Specifications for Whale Tail Dike Remedial Drilling and Grouting Works Rev. PC was issued for AEM and Grouting Committee's (GC) review and comments. The document was the main topic of the discussion in the Grouting Committee Meeting No.3 held on Oct. 17th, 2019 in Montreal.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	PD	2019-10-28	As per discussions and recommendations from GC Meeting No.3, Technical and Specifications had been updated to Rev PD. Reference can be made to meeting minutes 669034-0000-30MC-0001 for details of the comments and recommendations to the designs.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PE	2019-11-27	Rev. PD had been updated to Rev PE based on recommendations presented in GC's letter Dated Oct. 25, 2019 and further discussions with AME engineers and site staff to implement the simplified approach and path forward proposed by the GC. Phased approach adopated starting with two rows of Blanket Grouting (Phase I) and based on the results of Blanket Grouting to decide the requirement of deepen the Upstream Blanket holes for Curtain Grouting (Phase II)
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	00	2020-01-10	Document Rev. PE had been updated based on comments on received and the discussions and recommendations from GC Meeting No.5 held on December 5, 2019.

Whale Tail Dike Remedial Grouting Site Instructions Changes Tracking

Document	Revision	Date Issued	Subject
SITE INSTRUCTIONS FOR DRILLING AND BLANKET GROUTING (Document Number: 669034-0000-40CA-0001 Rev. 00)	Rev 00	2019-11-19	A technical memo - Site Instructions for Drilling and Blanket Grouting Rev PB was issued on November 19, 2019. The objective of this document is to provide key instructions to the drilling and grouting of the Blanket Holes at the WTD foundation to allow work to start timely before Design Drawings and Specifications are ready and approved. The Site Instructions were prepared based on discussions and comments on Technical Specs Rev PD, Grouting Committee's Letter dated October 25, 2019 and in alignment with the objective of 40 to 50% seepage deduction with simplfied and phased project approach. This document may require update based on the progress and results of the field work.
	Rev 01	2020-01-08	The Site Instructions Rev 00 was updated to Rev 01 to incorporate: (1) modification of the Mix C+ by reducing the Calcium Chloride dosage (2)conditions for drilling and grouting the hole in two stages

Whale Tail Dike Remedial Grouting Fieldwork Instructions Changes Tracking

Document	Date Issued	Subject	Notes
Fieldwork Instruction No.1 (Email)	2019-12-03	Subject: 669034 - Rock Grouting on Grout Mix Change Procedures	This Fieldwork Instruction provide by email dated Dec. 03, 2019 on Subject: **Grout mix change procedures during the Blanket Hole Grouting and Regrouting** (prior to Open Throat Pump is available) based on the on site trial mix results and ground response on grout take and grouting pressure.
Fieldwork Instruction No.2 (FWI 001 Rev 00)	2019-12-07	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 00	This Fieldwork instruction applies to Grouting and Re-grouting of Primary Holes with the application of Celbex using Open Throat Pump as recommended by Grouting Committee (Meeting No. 5 on December 05 2019) that had been drilled per 5 m Stage. The site instruction will be updated as per the progress of the site construction.
Fieldwork Instruction No.3 (FWI 001 Rev. 01)	2019-12-09	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 01	The fieldwork instruction No.2 was updated to introduce Mix D

DEVIATION LIST FOR REMEDIAL GROUTING AT WHALE TAIL DIKE

Deviation #	Date Received	Date Responde	Status	Subject	Location/Address	Notes
001	2019-11-10		AEM will manage the situation	QC did not use centerlizer to monitor inclination	multiple locations	Daily Report – Contractor informed that they will use inclino meter without centerlizer as they did last winter but AEM will look if they can findout centerlizer for 4.6" casing.
002	2019-11-14		waiting for apparatus and training	QC did not have Vicat apparatus and did not know how to use filtration apparatus	during Trial mix	Vicat apparatus received and fist vicat test performed on Dec 5, 2019
003	2019-12-06			inclination check in bedrock holes are not been checked. AEM said inclination check is not necessary in the rock hole during daily construction meeting on Dec 6, 2019 and captured on weekly report for week end Dec 07, 2019		As per specs. "Deviation from vertical in the bedrock section of the hole shall not exceed 2% of drilled length."
004	2020-01-13			Drilling of tertiary holes prior to grouted secondary holes	T611.5, T617.5, T623.5, T629.5	Tertiary holes drilled while secondary holes S614.5 and S626.5 were not been grouted yet. As per spec. Tertiary holes shall be drilled in rock after secondary holes has been grouted and grout reached its final set time.
005	2020-01-12			Continuous drilling and grouting of tertiary holes	WTD Tertiary holes	Consective tertiary holes has been drilled and grouted (6 m distance). As per spec. minimum distance between two drilled holes in bedrock is 12 m.
006	2020-01-28			Drilling of tertiary holes prior to grouted secondary holes	T599.5	Tertiary hole T599.5 drilled while secondary hole S590.5 has not been grouted yet. As per spec. Tertiary holes shall be drilled in rock after secondary holes has been grouted and grout reached its final set time.

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.

Issued by :	*Sebastien Viau*	**28-01-2019**
	Signature	Date
Verified by :	*Tom Xue*	**28-01-2019**
	Signature	Date

SNC·LAVALIN

WEEKLY REPORT

20200131-WR
Document number

2020/01/27 to 2020/01/31	669034	Sebastien Viau
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- This weekly report covers the activities from Jan 27, 2020 to Jan 31, 2020.
- The main activities during this week were casing deepening, casing plug grouting, bedrock drilling and grouting for the downstream blanket and regrouting of the holes that did not meet refusal criteria and ended at Vmax.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- Hole P524.5 had to be regrouted as the packer was set too deep in the initial grout operation and a portion of bedrock had not been grouted.
- Cement temperature is now between 10 and 35° C and mostly around 15° C, which is more appropriate.

GROUTING COMMITTEE RECOMMENDATIONS

- No recommendations from grouting committee during this period.

CASING EXTENDED TO BEDROCK

- Two casing extended (S446.5 and T575.5) during this week and in total 22 casings extended so far.
- The casing of hole S446.5 was deepened by 0.8 m to the final depth of 11.7 m in that hole and the casing of hole T575.5 was deepened by 0.75 m to the final depth of 12.8 m.

CASING PLUG

- Two (2) casing plug grouted during this week and a total of 103 casings have been plugged so far using Mix C (water cement ratio 0.5, 2% calcium chloride). Some grout mixes used for casing plug have 0.2% of Celbex in it.

	Casing Pluged				
Hole ID	Date	Grout Type	Grout Taken (L)	Pressure (Bar)	Comments
S-446,5	January 27, 2020	C	16,3	1,24	cleaned on Jan 14, 2020
T-461,5	January 27, 2020	C	4,2	2	cleaned on Jan 14, 2020

BEDROCK DRILLING

- Bedrock drilling will be carried out in a single 5 m stage except if water loss observed within top 1.5m drilling or hole collapsed, in such cases down stage grouting method will be employed in two short grouting stages.

- A total of sixteen (16) holes had been drilled during this week for 5 m stage length between stations 446.5 and 593.5.
- Water loss was observed in one (1) boreholes but the water loss was not observed in the first 1.5 m in bedrock so the hole was also drilled in one 5 m long stage.
- All holes drilled during this week stayed open to the bottom and no caving observed prior to grouting.

	interface driling 5m/1.5m					
Hole ID	Date	Bottom of casing (m)	Final hole depth (m)	water level (m)	Bedrock length (m)	Comments
S-446,5	2020-01-29	11,52	16,3	15,4	4,78	water loss at 14.1 m
S-458,5	2020-01-28	10,57	16	7,7	5,43	
S-470,5	2020-01-28	10,01	15,1	7,5	5,09	
S-482,5	2020-01-28	8,98	14,2	7,44	5,22	
S-494,5	2020-01-27	10	15,3	7,13	5,30	
T-533,5	2020-01-31	11,30	18,7		7,4	
T-539,5	2020-01-31	10,07	15,2		5,13	
T-545,5	2020-01-31	9,32	16,6		7,28	
T-551,5	2020-01-31	10,39	15,4		5,01	
T-557,5	2020-01-31	10,63	15,8		5,17	
T-563,5	2020-01-31	11,00	16,2		5,2	
T-569,5	2020-01-31	11,75	17		5,25	
T-575,5	2020-01-31	11,73	17,4		5,67	
T-581,5	2020-01-31	12,21	17,2		4,99	
T-587,5	2020-01-31	12,63	17,7		5,2	
T-593,5	2020-01-29	12,78	18	To come	5,22	

BEDROCK GROUTING

- Bedrock grouting was conducted for primary and secondary holes during this week in section between Station 452.5m and 590.5m.
- Total 67 holes has been completed.

1st Stage Grouting

- During this week a total of 10 (10) holes were grouted between station P452.5 and S590.5.
- All the holes grouted in 5 m stage length.
- Nine (9) holes (P452.5, P464.5, P476.5, P530.5, S542.5, S554.5, S566.5, S578.5 and S590.5) reached refusal at Pmax with Mix C without Celbex.
- On January 25th, Primary hole P524.5 was grouted. A volume of 468 L was grouted at a refusal pressure of 3.3 bar. After the grouting process, the packer got stuck in the hole. The hole was left open. On Januray 29th, the hole backfilling process began. After a few minutes and a considerable amount of grout take, it was decided to abandon the backfilling process and regrout the hole. During the new grouting process, Pmax could not be achieved after 2400 L of grouting in this hole (600 L of Mix C and 1800 L of Mix D).
- On January 31st, this hole was regrouted for a second time with a total of 1580 L (270 L of Mix C and 1310 L of Mix C with Celbex). Celbex was added by observing the pressure to keep gradual increase of pressure. The average percentage of Celbex used in Mix C+ was 1.3% by unit weight of dry cement.
- All holes backfilled at the end of pressure grouting or re-grouting process.
- The grout level is now measured after the pressure grouting process and before backfilling in order to confirm that the grout was not washed away.

Interface grouting for 1.5 m/5 m stage									
Hole ID	Date	Grouting Length (m)	Calcualted Pm (bar)	Gauge Pressu (bar)	Volume Inject (L)	Mix	Comments	Depth of grout (i	Empty Length after grout (m)
P-452,5	2020-01-27	5,7	3,1	3,02	88	Mix C	Backfilled after refusal		
P-464,5	2020-01-27	4,99	3	3,98	66	Mix C	Backfilled after refusal		
P-476,5	2020-01-27	4,96	3	3,3	76	Mix C	Backfilled after refusal. Backfill dropped three times before stabilize		
S-530,5	2020-01-29	5,17	3,22	3,47	397	Mix C	Backfilled after refusal		
S-542,5	2020-01-29	5,23	3,12	3,17	352	Mix C	Backfilled after refusal		
S-554,5	2020-01-29	5,17	3,47	3,28	53	Mix C	Backfilled after refusal		
S-566,5	2020-01-29	5,26	3,48	3,18	49	Mix C	Backfilled after refusal		
S-578,5	2020-01-27	5,25	3,48	3,4	361	Mix C	Backfilled after refusal		
S-590,5	2020-01-27	5,21	3,48	3,5	120	Mix C	Backfilled after refusal		

Grouting of P524.5 (repeat of the first stage)

Hole ID	Date	Grouting Leng	Calcualted Pm (bar)	Gauge Pressu (bar)	Volume Injec d (L)	Mix	Comments	Depth of grout	Empty Length after
P-524,5	2020-01-29	4,73	3,3	2.5	2400	Mix C without celbex = 600 L + Mix D = 1800	Not closed, will have to be regrouted.		

Regrouting of P524.5

H SNC·LAVALIN	Empty Length after grouting (m)	Date	Grouting Length (m)	Calcualted Pmax (ba	Target Volume (L)	Gauge Pressure (bar	Volume Injected (L)	Mix	Comments	depth of grout (m	Empty Length after grouting (m
P-524,5		2020-01-31	4,73		2000	10	1580	Mix **C** without celbex = 270 Mix C with celbex = 1310	An average of 1.3% of celbex was used by weight of cement.		Will be checked on 2020-02-01 if 2nd regrout is required

GROUT TESTING

- Grout tests were conducted for 1st batch as well as every 5 batches or whenever Mix changes. The Marsh values was checked only for Mix C without celbex while specific gravity, bleeding and temperature values were checked for Mixes C and D.

Date	BH#	Grout testing	Time	Marsh value (second)	Specific Gravity	Temperature (°C)	Bleeding (%)	Vicat Test	Remarks
27-01-2020	P-476.5	1		85	1,78	26,5	2		Mix C
	P-464.5	2		45	1,72	25,5	---		Mix C
	P-461.5	3		65	1,76	18,0	---		Mx C
	S-590.5	4		77	1,76	22,0	1,5		Mix C
	S-578.5	5		84	1,78	22,5	---		Mix C
29-01-2020	S-566.5	1		60	1,78	18,5	1		Mix C
	S-542.5	2		58	1,76	18,0	---		Mix C
	S-530.5	3		55	1,76	14,5	---		Mix C
	S-524.5	4		65	1,78	19,0	---		Mix C
	S-524.5	5		---	1,79	21,0	0		Mix D
	S-524.5	6		---	1,81	18,0	---		Mix D
	S-524.5	7		---	1,83	19,5	---		Mix D
31-01-2020	S-524.5	1		65	1,77	19,5			Mix C without Celbex
	S-524.5	2		71	1,78	15,5			Mix C without Celbex
	S-524.5	3		66	1,78	17,0			Mix C without Celbex
	S-524.5	4		82	1,80	21,0			Mix C without Celbex

- Marsh values for Mix C ranged mostly from 50 to 80s with one very low value (45 sec.) which could be caused by variations of cement particles, grout temperature and W/C ratio. Further investigation and control on grout material are required.

- The Specific Gravity and Bleed tests for Mix C without Celbex, and Mix D shows very stable numbers with Specific Gravity ranged from 1.72 to 1.83 and Bleed 0% to 2.0%.

HOLE DEPTH VERIFICATIONS

- TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting.

BOREHOLE INCLINATION CHECK

- No casing inclination was checked during this week.

pH AND TURBIDITY RESPONSE

- No pH and Turbidity measures were taken this week.

LIST OF CHANGES ON SPECS, SITE INSTRUCTION, FIELD WORK AND DEVIATION LIST

Whale Tail Dike Remedial Grouting Sepecifications and Design Drawings Changes Tracking

Document	Revision	Date Issued	Subject
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PC	2019-10-03	Technical Specifications for Whale Tail Dike Remedial Drilling and Grouting Works Rev. PC was issued for AEM and Grouting Committee's (GC) review and comments. The document was the main topic of the discussion in the Grouting Committee Meeting No.3 held on Oct. 17th, 2019 in Montreal.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	PD	2019-10-28	As per discussions and recommendations from GC Meeting No.3, Technical and Specifications had been updated to Rev PD. Reference can be made to meeting minutes 669034-0000-30MC-0001 for details of the comments and recommendations to the designs.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PE	2019-11-27	Rev. PD had been updated to Rev PE based on recommendations presented in GC's letter Dated Oct. 25, 2019 and further discussions with AME engineers and site staff to implement the simplified approach and path forward proposed by the GC. Phased approach adopated starting with two rows of Blanket Grouting (Phase I) and based on the results of Blanket Grouting to decide the requirement of deepen the Upstream Blanket holes for Curtain Grouting (Phase II)
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	00	2020-01-10	Document Rev. PE had been updated based on comments on received and the discussions and recommendations from GC Meeting No.5 held on December 5, 2019.

Whale Tail Dike Remedial Grouting Site Instructions Changes Tracking

Document	Revision	Date Issued	Subject
SITE INSTRUCTIONS FOR DRILLING AND BLANKET GROUTING (Document Number: 669034-0000-40CA-0001 Rev. 00)	Rev 00	2019-11-19	A technical memo - Site Instructions for Drilling and Blanket Grouting Rev PB was issued on November 19, 2019. The objective of this document is to provide key instructions to the drilling and grouting of the Blanket Holes at the WTD foundation to allow work to start timely before Design Drawings and Specifications are ready and approved. The Site Instructions were prepared based on discussions and comments on Technical Specs Rev PD, Grouting Committee's Letter dated October 25, 2019 and in alignment with the objective of 40 to 50% seepage deduction with simplfied and phased project approach. This document may require update based on the progress and results of the field work.
	Rev 01	2020-01-08	The Site Instructions Rev 00 was updated to Rev 01 to incorporate: (1) modification of the Mix C+ by reducing the Calcium Chloride dosage (2)conditions for drilling and grouting the hole in two stages

Whale Tail Dike Remedial Grouting Fieldwork Instructions Changes Tracking

Document	Date Issued	Subject	Notes
Fieldwork Instruction No.1 (Email)	2019-12-03	Subject: 669034 - Rock Grouting on Grout Mix Change Procedures	This Fieldwork Instruction provide by email dated Dec. 03, 2019 on Subject: **Grout mix change procedures during the Blanket Hole Grouting and Regrouting** (prior to Open Throat Pump is available) based on the on site trial mix results and ground response on grout take and grouting pressure.
Fieldwork Instruction No.2 (FWI 001 Rev 00)	2019-12-07	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 00	This Fieldwork instruction applies to Grouting and Re-grouting of Primary Holes with the application of Celbex using Open Throat Pump as recommended by Grouting Committee (Meeting No. 5 on December 05 2019) that had been drilled per 5 m Stage. The site instruction will be updated as per the progress of the site construction.
Fieldwork Instruction No.3 (FWI 001 Rev. 01)	2019-12-09	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 01	The fieldwork instruction No.2 was updated to introduce Mix D

DEVIATION LIST FOR REMEDIAL GROUTING AT WHALE TAIL DIKE

Deviation #	Date Received	Date Responded	Status	Subject	Location/Address	Notes
001	2019-11-10		AEM will manage the situation	QC did not use centerlizer to monitor inclination	multiple locations	Daily Report - Contractor informed that they will use incline meter without centerlizer as they did last winter but AEM will look if they can findout centerlizer for 4.6" casing.
002	2019-11-14		waiting for apparatus and training	QC did not have Vicat apparatus and did not know how to use filtration apparatus	during Trial mix	Vicat apparatus received and fist vicat test performed on Dec 5, 2029
003	2019-12-06			inclination check in bedrock holes are not been checked. AEM said inclination check is not necessary in the rock hole during daily construction meeting on Dec 6, 2019 and captured on weekly report for week end Dec 07, 2019		As per specs. "Deviation from vertical in the bedrock section of the hole shall not exceed 2% of drilled length."
004	2020-01-13			Drilling of tertiary holes prior to grouted secondary holes	T611.5, T617.5, T623.5, T629.5	Tertiary holes drilled while secondary holes S614.5 and S626.5 were not been grouted yet. As per spec. Tertiary holes shall be drilled in rock after secondary holes has been grouted and grout reached its final set time.
005	2020-01-12			Continuous drilling and grouting of tertiary holes	WTD Tertiary holes	Consective tertiary holes has been drilled and grouted (6 m distance). As per spec. minimum distance between two drilled holes in bedrock is 12 m.
006	2020-01-26			Drilling of tertiary holes prior to grouted secondary holes	T599.5	Tertiary hole T599.5 drilled while secondary hole S590.5 has not been grouted yet. As per spec. Tertiary holes shall be drilled in rock after secondary holes has been grouted and grout reached its final set time.
007	2020-01-29			Primary hole grouted at the same moment as the adjacent secondary hole.	P524.5	On January 29th, an attempt to backfill hole P524,5 was made. It was found that the packer was set too deep and the bedrock was not entirely grouted. A regrout operation was required. The adjacent secondary hole has already been grouted the same day. Split spacing method sequence was not followed.

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.

Issued by :	*Sebastien Viau*	**02-02-2019**
	Signature	Date
Verified by :	*Tom Xue*	**02-02-2019**
	Signature	Date

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WEEKLY REPORT

20200206-WR
Document number

2020/02/01 to 2020/02/06	669034	Sebastien Viau
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- This weekly report covers the activities from Feb 1st, 2020 to Feb 6th, 2020.
- The main activities during this week were casing plug grouting, bedrock drilling and grouting for the downstream blanket.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- AEM chose not to proceed with nightshift works for Whale Tail Dike injection. AEM also decided to proceed with all the downstream blanket. The decision to do all tertiary hole or not from sta. 450 to the end of the dike for the downstream blanket is still pending.
- Cement temperature is now between 10 and 35° C and mostly around 15° C, which is more appropriate.

GROUTING COMMITTEE RECOMMENDATIONS

- No recommendations from grouting committee during this period.

CASING EXTENDED TO BEDROCK

- No casing were extended to bedrock during this week. A total of twenty two (22) casings were extended so far.

CASING PLUG

- Twenty-one (21) casing plugs grouted during this week and a total of 124 casings have been plugged so far using Mix C (water cement ratio 0.5, 2% calcium chloride). Some grout mixes used for casing plug have 0.2% of Celbex in it.
- Two of the casing plugs (T425.5 and T371.5) reached Vmax. No casing plug was regrouted even if Vmax was reached.

	Casing Pluged				
Hole ID	Date	Grout Ty	Grout Taken (L	Pressure (Bar)	Comments
P-368,5	February 6, 2020	C	105,5	2,16	Cleaned on Feb 3, 2020
T-371,5	February 3, 2020	C	216,3	0,95	Cleaned on Feb 2, 2020
S-374,5	February 3, 2020	C	38,6	1,66	
T-377,5	February 3, 2020	C	22	1,67	
P-380,5	February 3, 2020	C	31,2	1,91	
T-383,5	February 3, 2020	C	21,3	2,48	Cleaned on Feb 2, 2020
S-386,5	February 3, 2020	C	27	2,25	
T-389,5	February 3, 2020	C	63	2	
P-392,5	February 2, 2020	C	59,6	1,87	
T-395,5	February 2, 2020	C	18	1,94	
S-398,5	February 2, 2020	C	27,4	1,9	
T-401,5	February 2, 2020	C	19,9	1,82	Cleaned on Feb 2, 2020
P-404,5	February 2, 2020	C	20,4	1,95	
T-407,5	February 2, 2020	C	82,6	1,82	
S-410,5	February 2, 2020	C	47	1,84	
T-413,5	February 2, 2020	C	18	1,82	Cleaned on Feb 2, 2020
P-416,5	February 2, 2020	C	23,5	1,84	
T-419,5	February 2, 2020	C	32	1,74	
S-422,5	February 2, 2020	C	40	1,8	
T-425,5	February 1, 2020	C	184,9	0,6	
S-434,5	February 1, 2020	C	20,7	1,64	

BEDROCK DRILLING

- Bedrock drilling will be carried out in a single 5 m stage except if water loss observed within top 1.5m drilling or hole collapsed, in such cases down stage grouting method will be employed in two short grouting stages.
- A total of twenty (20) holes had been drilled during this week for 5 m stage length between stations 380.5 and 527.5.
- No water loss was observed in all the holes drilled in bedrock this week.
- All holes drilled during this week stayed open to the bottom and no caving observed prior to grouting.
- So without water loss or caving, all holes were drilled in one 5 m long stage.

	interface driling 5m/1.5m					
Hole ID	Date	Bottom of casing (m)	Final hole depth (m)	water level (m)	Bedrock length (m)	Comments
P-380,5	2020-02-04	12.65	17	8.8	4.35	
P-392,5	2020-02-04	12.88	17.8	9.42	4.92	
P-404,5	2020-02-03	14.82	19.8	10	4.98	
P-416,5	2020-02-03	11.15	16.2	7.5	5.05	
P-428,5	2020-02-03	10.69	15.7	7.2	5.01	
T-443,5	2020-02-02	10.60	15.8		5.20	Water level will be measured prior to grouting
T-449,5	2020-02-02	11.12	16		4.88	Water level will be measured prior to grouting
T-455,5	2020-02-02	10.54	15.8		5.26	Water level will be measured prior to grouting
T-461,5	2020-02-02	10.46	15.8	7.3	5.34	
T-467,5	2020-02-02	10.20	15.5	7.85	5.30	
T-473,5	2020-02-02	9.95	15	7.75	5.05	
T-479,5	2020-02-02	10.34	15.4	6.11	5.06	
T-485,5	2020-02-02	9.78	15.1	6.5	5.32	
T-491,5	2020-02-02	10	15.1	7.2	5.10	
T-497,5	2020-02-02	10	16	7.05	6.00	
T-503,5	2020-02-02	10.29	15.3	7.1	5.01	
T-509,5	2020-02-02	11.40	16.4	6.14	5.00	
T-515,5	2020-02-02	11.19	16.48	6.95	5.29	
T-521,5	2020-02-02	10.18	15.2	6.82	5.02	
T-527,5	2020-02-02	10.36	15.8	7.44	5.44	

BEDROCK GROUTING

- During this week, bedrock grouting was conducted for secondary and tertiary holes of the second section (Sta. +-605 to +-440) and the first primary holes for the next section (Sta. +-440 towards 130).
- Contractor/AEM decided to start the primary holes of the next section before closing all the tertiary hole of the previous section.
- Total 92 holes has been completed.

1st Stage Grouting

- During this week a total of twenty-five (25) holes were grouted between station 380.5 and 505.5.
- All the holes grouted in 5 m stage length.
- All holes reached Pmax and none required regrouting.
- Twenty-three (23) holes reached refusal at Pmax with Mix C without Celbex.
- Two (2) holes reached refusal at Pmax with Mix D (with Rheomac).
- In hole T563.5, after a total volume of ± 1000 L (400 L of Mix C and 600 L of Mix D), the Pmax was reached but the flow stayed at 7 L/min for ± 30 min. After 30 min, it was decided to double the quantity of Rheomac. The hole was eventually closed with Mix D after a total of 1633 L of gout.
- All holes backfilled at the end of pressure grouting process.
- The grout level is now measured after the pressure grouting process and before backfilling in order to confirm that the grout was not washed away. In two holes, grout level was found lower than the bottom of the casing at the end of the grouting process. The packer was reinstalled in it and Pmax was reached immediately with no grout take so these holes were backfilled.

Interface grouting for 1.5 m/5 m stage

Hole ID	Date	Grouting Length (m)	Calcualted Pm (bar)	Gauge Pressu (bar)	Volume Inject (L)	Mix	Comments	Depth of grout (i	Empty Length after grout (m)
P-380,5	2020-02-06	4,35	3,39	3,43	181	Mix C	Backfilled after refusal	11,23	-1,42
P-392,5	2020-02-06	4,92	3,45	3,68	116	Mix C	Backfilled after refusal	12	-0,88
P-404,5	2020-02-06	4,98	3,35	3,4	140,8	Mix C	Backfilled after refusal	14,1	-0,72
P-416,5	2020-02-06	5,05	3,34	3,23	69,2	Mix C	Backfilled after refusal	11	-0,15
P-428,5	2020-02-06	5,01	3,21	3,3	68	Mix C	Backfilled after refusal	10,8	0,11
S-446,5	2020-02-01	4,78	3,07	3,08	72,8	Mix C	backfilled after refusal	9,5	-2,02
S-458,5	2020-02-01	5,43	3,26	2,88	57,5	Mix C	backfilled after refusal	10,2	-0,37
S-470,5	2020-02-01	5,09	2,99	3,04	70,4	Mix C	backfilled after refusal	9	-1,01
S-482,5	2020-02-01	5,22	3,09	3,04	71,8	Mix C	backfilled after refusal	8	-0,98
S-494,5	2020-02-01	5,3	3,09	3,02	120,6	Mix C	backfilled after refusal	9,5	-0,50
S-506,5	2020-02-01	5,18	3,22	2,96	208,8	Mix C	backfilled after refusal	9,48	-1,04
S-518,5	2020-02-01	4,98	3,1	3,38	94,9	Mix C	backfilled after refusal	9,8	-0,52
T-533,5	2020-02-05	7,71	4,55	4,49	1288	400L Mix C + 888L Mix D	Backfilled after refusal	11,1	-0,20
T-539,5	2020-02-05	5,22	3,08	2,97	241	Mix C	Backfilled after refusal	7	-3,07
T-545,5	2020-02-05	7,5	3,88	3,89	231	Mix C	Backfilled after refusal	8,9	-0,42
T-551,5	2020-02-04	5,13	3,11	3,1	361	Mix C	Backfilled after refusal	10,12	-0,27
T-557,5	2020-02-04	5,56	3,25	3,44	53	Mix C	Backfilled after refusal	11,35	0,72
T-563,5	2020-02-04	5,81		3,96	1633	400L Mix C + 1233L Mix D	Backfilled after refusal	9,7	-1,30
T-569,5	2020-02-04	5,4	3,36	2,98	56,6	Mix C	Backfilled after refusal	11,35	-0,40
T-575,5	2020-02-04	5,68	3,47	3,43	251	Mix C	Backfilled after refusal	12	0,27
T-581,5	2020-02-03	4,99	3,41	3,4	214,4	Mix C	Backfilled after refusal	11,5	-0,71
T-587,5	2020-02-03	5,2	3,61	79,2	36,8	Mix C	Backfilled after refusal	11,07	-1,56
T-593,5	2020-02-03	5,22	3,37	3,41	205,8	Mix C	Backfilled after refusal	12,7	-0,08
T-599,5	2020-02-03	5,1	3,47	3,9	150,6	Mix C	Backfilled after refusal	12,5	-0,70
T-605,5	2020-02-03	5,25	3,74	4,03	77,9	Mix C	Backfilled after refusal	12,2	

GROUT TESTING

- Grout tests were conducted for 1st batch as well as every 5 batches or whenever Mix changes. The Marsh values was checked only for Mix C without celbex while specific gravity, bleeding and temperature values were checked for Mixes C and D.

Date	BH#	Grout testing	Time	Specific Gravity	Marsh value (second)	Temperature (°C)	Bleeding (%)	Vicat Test	Remarks
01-02-2020	S-518.5	1	7h00	1,78	75	21,0	---		Mix C
	S-506.5	2	9h00	1,77	58	20,5	1		Mix C
	S-494.5	3	9h30	1,79	77	23,0	---		Mix C
	S-470.5	4	11h00	1,76	55	24,5	---		Mix C
	S-446.5	5	14h00	1,79	82	21,5	1,5		Mix C
02-02-2020	S-422.5	1	9h00	1,75	52	24,0	1,5		Mx C
	T-413.5	2	10h30	1,77	65	26,5	---		Mix C
	T-407.5	3	14h00	1,79	80	27,5	1,5		Mix C
	P-392.5	4	15h30	1,78	71	25,5	---		Mix C
03-02-2020	T-389.5	1	7h00	1,76	54	25,5	1,5		Mix C
	T-371.5	2	9h15	1,78	65	28,5	---		Mix C
	T-605.5	3	13h30	1,78	63	29,0	1,5		Mix C
	T-593.5	4	15h00	1,79	65	26,5	---		Mix C
02-04-2020	T-575.5	1	7h00	1,80	75	29,0	1		Mix C
	T-563.5	2	8h45	1,78	77	27,0	---		Mix C
	T-563.5	3	9h15	1,81	---	25,5	0		Mix D
	T-563.5	4	9h45	1,81	---	19,5	---		Mix D
	T-557.5	5	14h30	1,77	66	24,5	---		Mix C
	T-551.5	6	15h30	1,78	71	19,5	---		Mix C
05-02-2020	T-545.5	1	10h15	1,76	53	18,5	---		Mix C
	T-539.5	2	14h00	1,78	64	19,5	1		Mix C
	T-533.5	3	15h00	1,78	62	14,5	---		Mix C
	T-533.5	4	15h30	1,81	---	14,0	---		Mix D
	T-533.5	5	16h00	1,82	---	16,5	---		Mix D
06-02-2020	P-428.5	1	8h30	1,76	54	19,5	1,5		Mix C
	P-404.5	2	10h30	1,78	65	18,0	---		Mix C
	P-392.5	3	14h00	1,78	63	18,5	1,5		Mix C
	P-380.5	4	15h00	1,79	65	16,5	---		Mix C

- Marsh values for Mix C ranged mostly from 50 to 80s but mostly in the 60‘s/70’s.

- The Specific Gravity and Bleed tests for Mix C without Celbex, and Mix D shows very stable numbers with Specific Gravity ranged from 1.75 to 1.82 and Bleed 0% to 1.5%. Specific gravity is slightly higher for Mix D and the bleeding is lower.

HOLE DEPTH VERIFICATIONS

- TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting.

BOREHOLE INCLINATION CHECK

- Casing inclination was checked during this week. The results has not been transmitted to the QA yet.

pH AND TURBIDITY RESPONSE

- No pH and Turbidity measures were taken this week.

LIST OF CHANGES ON SPECS, SITE INSTRUCTION, FIELD WORK AND DEVIATION LIST

Whale Tail Dike Remedial Grouting Sepecifications and Design Drawings Changes Tracking

Document	Revision	Date Issued	Subject
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PC	2019-10-03	Technical Specifications for Whale Tail Dike Remedial Drilling and Grouting Works Rev. PC was issued for AEM and Grouting Committee's (GC) review and comments. The document was the main topic of the discussion in the Grouting Committee Meeting No.3 held on Oct. 17th, 2019 in Montreal.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	PD	2019-10-28	As per discussions and recommendations from GC Meeting No.3, Technical and Specifications had been updated to Rev PD. Reference can be made to meeting minutes 669034-0000-30MC-0001 for details of the comments and recommendations to the designs.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PE	2019-11-27	Rev. PD had been updated to Rev PE based on recommendations presented in GC's letter Dated Oct. 25, 2019 and further discussions with AME engineers and site staff to implement the simplified approach and path forward proposed by the GC. Phased approach adopated starting with two rows of Blanket Grouting (Phase I) and based on the results of Blanket Grouting to decide the requirement of deepen the Upstream Blanket holes for Curtain Grouting (Phase II)
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	00	2020-01-10	Document Rev. PE had been updated based on comments on received and the discussions and recommendations from GC Meeting No.5 held on December 5, 2019.

Whale Tail Dike Remedial Grouting Site Instructions Changes Tracking

Document	Revision	Date Issued	Subject
SITE INSTRUCTIONS FOR DRILLING AND BLANKET GROUTING (Document Number: 669034-0000-40CA-0001 Rev. 00)	Rev 00	2019-11-19	A technical memo - Site Instructions for Drilling and Blanket Grouting Rev PB was issued on November 19, 2019. The objective of this document is to provide key instructions to the drilling and grouting of the Blanket Holes at the WTD foundation to allow work to start timely before Design Drawings and Specifications are ready and approved. The Site Instructions were prepared based on discussions and comments on Technical Specs Rev PD, Grouting Committee's Letter dated October 25, 2019 and in alignment with the objective of 40 to 50% seepage deduction with simplfied and phased project approach. This document may require update based on the progress and results of the field work.
	Rev 01	2020-01-08	The Site Instructions Rev 00 was updated to Rev 01 to incorporate: (1) modification of the Mix C+ by reducing the Calcium Chloride dosage (2)conditions for drilling and grouting the hole in two stages

Whale Tail Dike Remedial Grouting Fieldwork Instructions Changes Tracking

Document	Date Issued	Subject	Notes
Fieldwork Instruction No.1 (Email)	2019-12-03	Subject: 669034 - Rock Grouting on Grout Mix Change Procedures	This Fieldwork Instruction provide by email dated Dec. 03, 2019 on Subject: **Grout mix change procedures during the Blanket Hole Grouting and Regrouting** (prior to Open Throat Pump is available) based on the on site trial mix results and ground response on grout take and grouting pressure.
Fieldwork Instruction No.2 (FWI 001 Rev 00)	2019-12-07	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 00	This Fieldwork instruction applies to Grouting and Re-grouting of Primary Holes with the application of Celbex using Open Throat Pump as recommended by Grouting Committee (Meeting No. 5 on December 05 2019) that had been drilled per 5 m Stage. The site instruction will be updated as per the progress of the site construction.
Fieldwork Instruction No.3 (FWI 001 Rev. 01)	2019-12-09	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 01	The fieldwork instruction No.2 was updated to introduce Mix D

DEVIATION LIST FOR REMEDIAL GROUTING AT WHALE TAIL DIKE

Deviation #	Date Received	Date Responded	Status	Subject	Location/Address	Notes
001	2019-11-10		AEM will manage the situation	QC did not use centerlizer to monitor inclination	multiple locations	Daily Report - Contractor informed that they will use inclino meter without centerlizer as they did last winter but AEM will look if they can findout centerlizer for 4.6" casing.
002	2019-11-14		waiting for apparatus and	QC did not have Vicat apparatus and did not know how to use filtration	during Trial mix	Vicat apparatus received and fist vicat test performed on Dec 5, 2029
003	2019-12-06			inclination check in bedrock holes are not been checked. AEM said inclination check is not necessary in the rock hole during daily construction meeting on Dec 6, 2019 and captured on weekly		As per specs. "Deviation from vertical in the bedrock section of the hole shall not exceed 2% of drilled length."
004	2020-01-13			Drilling of tertiary holes prior to grouted secondary holes	T611.5, T617.5, T623.5, T629.5	Tertiary holes drilled while secondary holes S614.5 and S626.5 were not been grouted yet. As per spec. Tertiary holes shall be drilled in rock after secondary holes has been grouted and grout reached its final set
005	2020-01-12			Continuous drilling and grouting of tertiary holes	WTD Tertiary holes	Consective tertiary holes has been drilled and grouted (6 m distance). As per spec. minimum distance between two drilled holes in bedrock is

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.

Issued by :	*Sebastien Viau*	**07-02-2019**
	Signature	Date
Verified by :	*Tom Xue*	**07-02-2019**
	Signature	Date

APPENDICES

A1: KGC As-Built Profile Progress

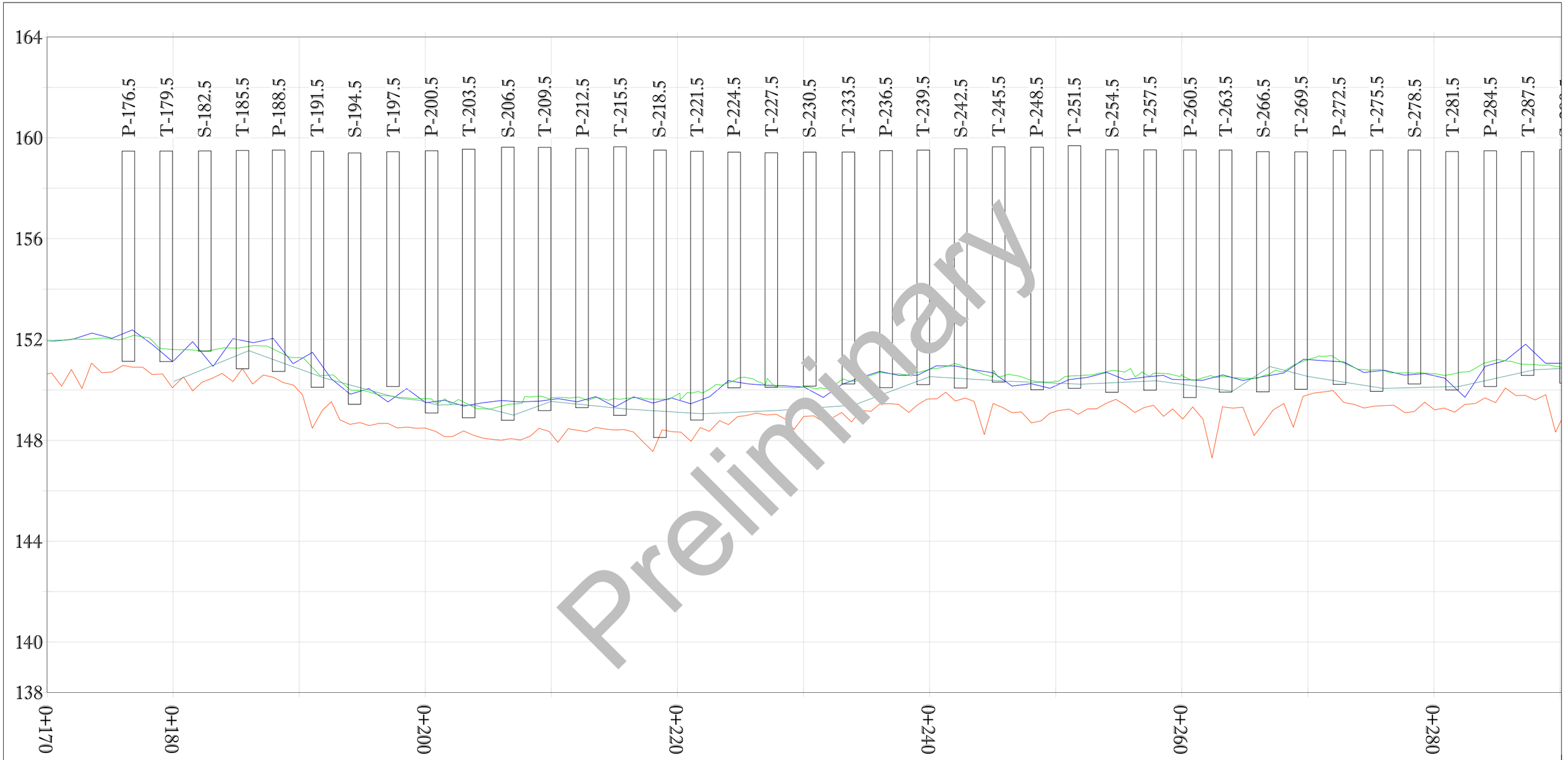
A2: AEM Seepage Report

A1: KCG As-Built Profile Progress

Please note that the following items need to be incorporated in the updated the As-Built Profile progress:

- For those boreholes which were injected in two stages of 1.5 m and 3.5 m stage length, 1.5 m stage needs to be included in the as built.
- The latest water level inside each casing measured before grouting should be presented.
- Color coding should be based on the total volume injected during the initial and all re-grouting over the stage length.

INJECTION DOWNSTREAM PHASE 2 2019 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

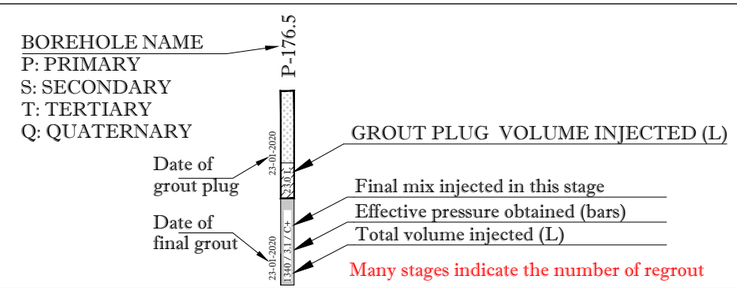
SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved

BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY



- TOP DIKE AS-BUILT EL. 159.0
- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET

PREPARED BY : MARC-ANDRÉ BLACKBURN
DATE : 07-02-2020
CON-FD-235

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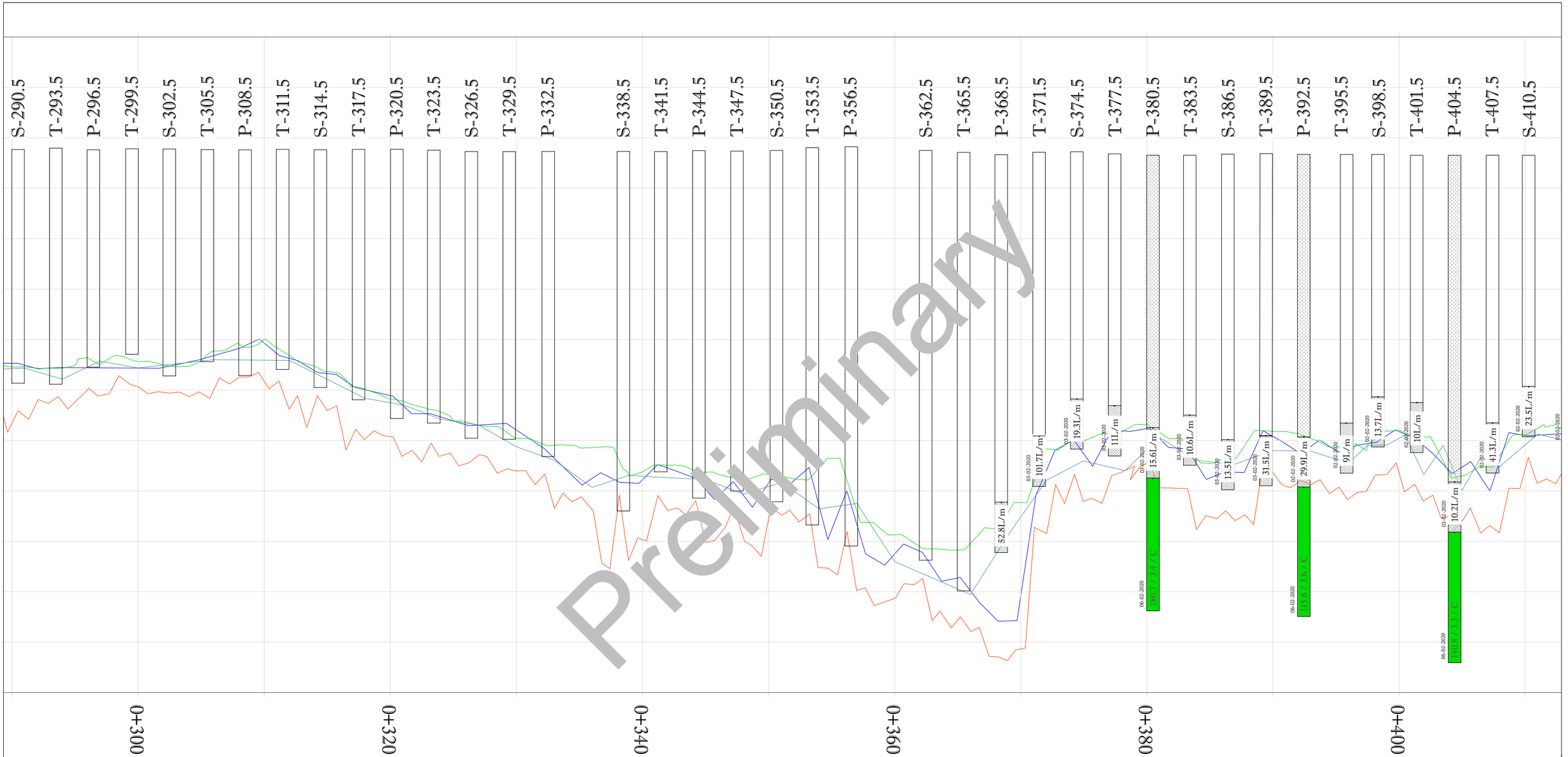
INJECTION DOWNSTREAM PHASE 2 2019 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved

BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY

P-176.5

Date of grout plug

GROUT PLUG VOLUME INJECTED (L)

Final mix injected in this stage
Effective pressure obtained (bars)
Total volume injected (L)

Date of final grout

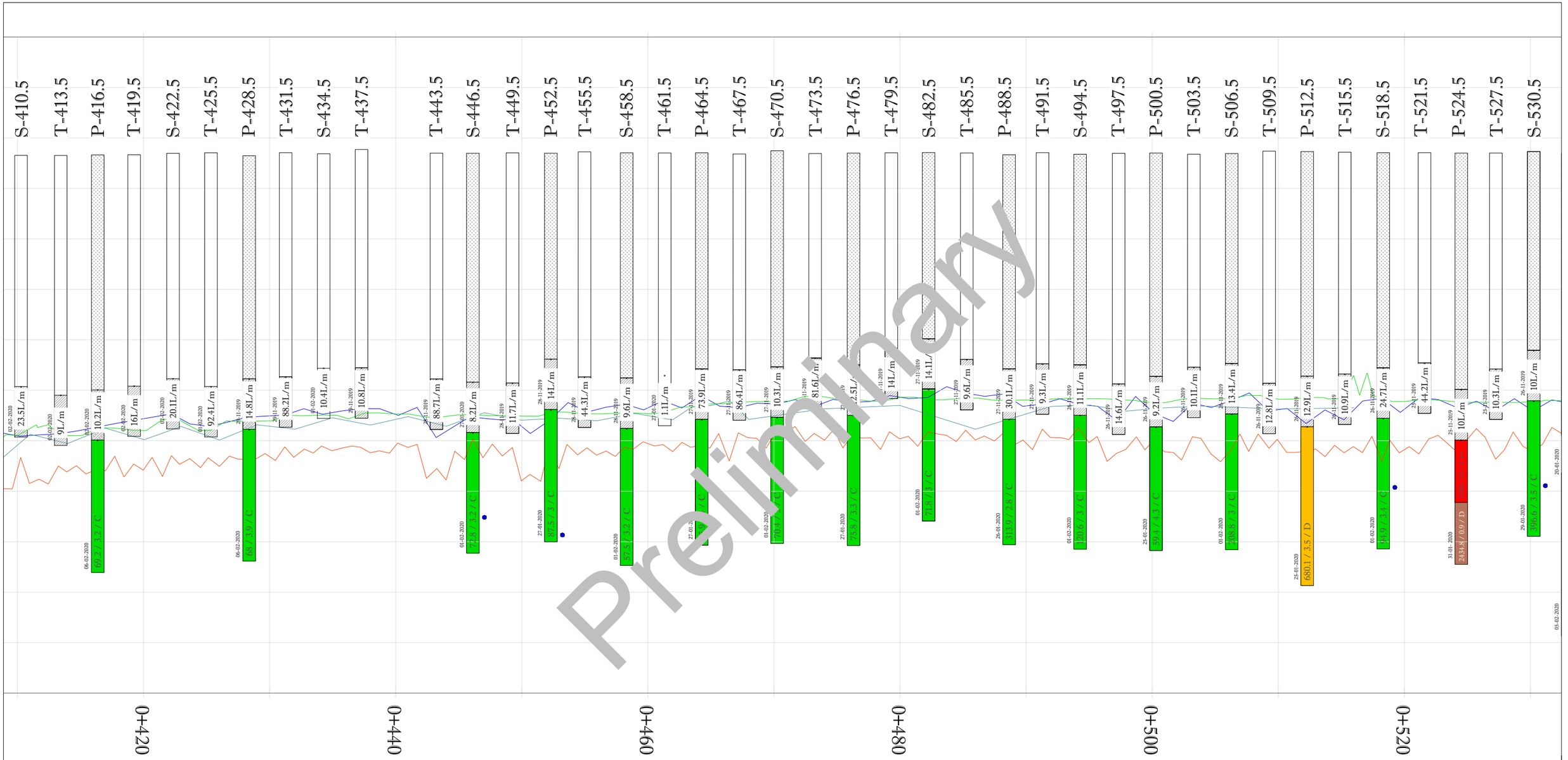
Many stages indicate the number of regrout

- TOP DIKE AS-BUILT EL. 159.0
- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET

KIVALLIQ CONTRACTORS GROUP LTD

PREPARED BY : MARC-ANDRÉ BLACKBURN
DATE : 07-02-2020
CON-FD-235

INJECTION DOWNSTREAM PHASE 2 2019 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
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- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET

PREPARED BY : MARC-ANDRÉ BLACKBURN
DATE : 07-02-2020
CON-FD-235

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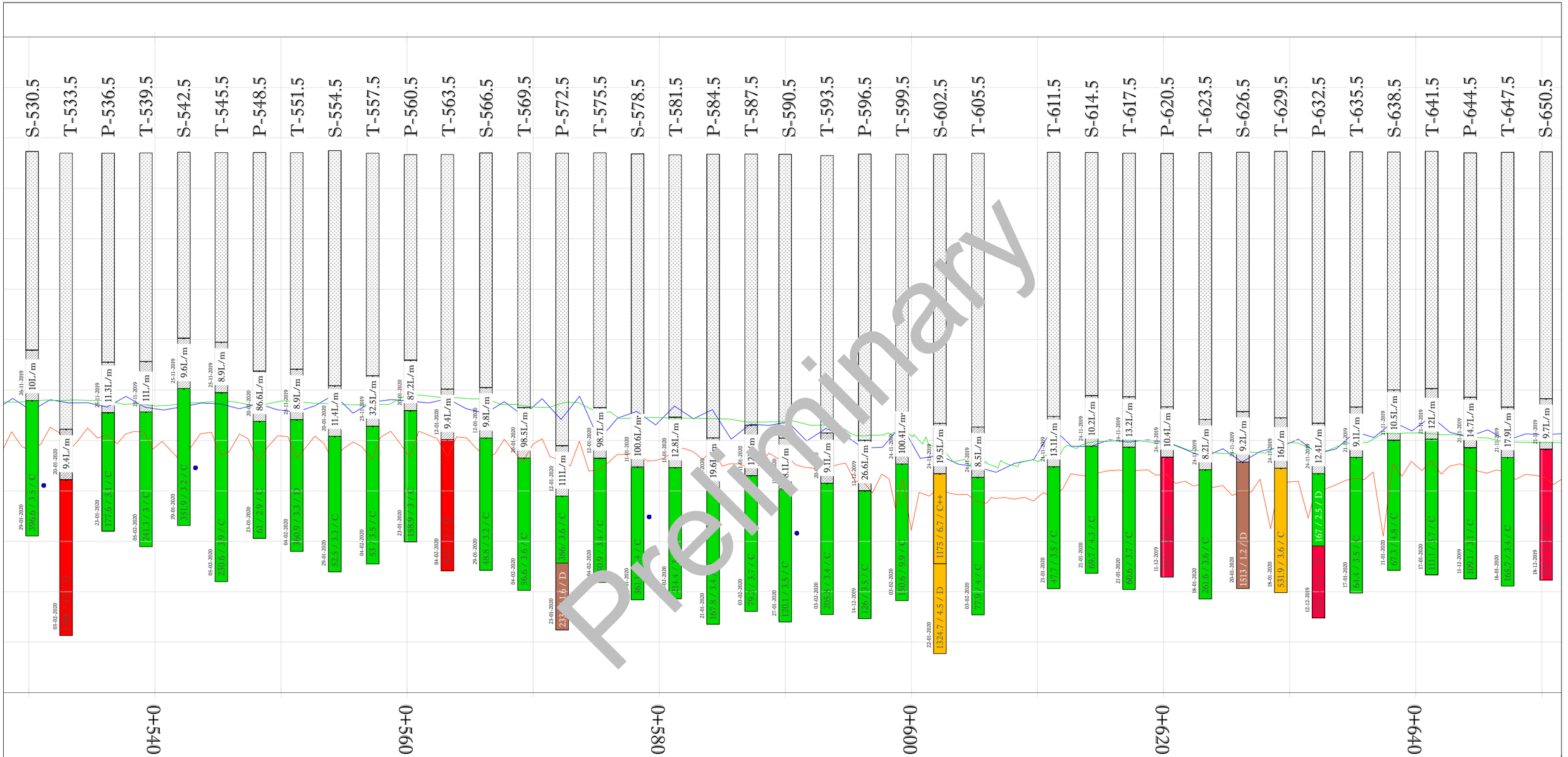
INJECTION DOWNSTREAM PHASE 2 2019 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
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BOREHOLE NAME
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S: SECONDARY
T: TERTIARY
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P-176.5

GROUT PLUG VOLUME INJECTED (L)

Date of grout plug

Final mix injected in this stage
Effective pressure obtained (bars)
Total volume injected (L)

Date of final grout

Many stages indicate the number of regrout

- TOP DIKE AS-BUILT EL. 159.0
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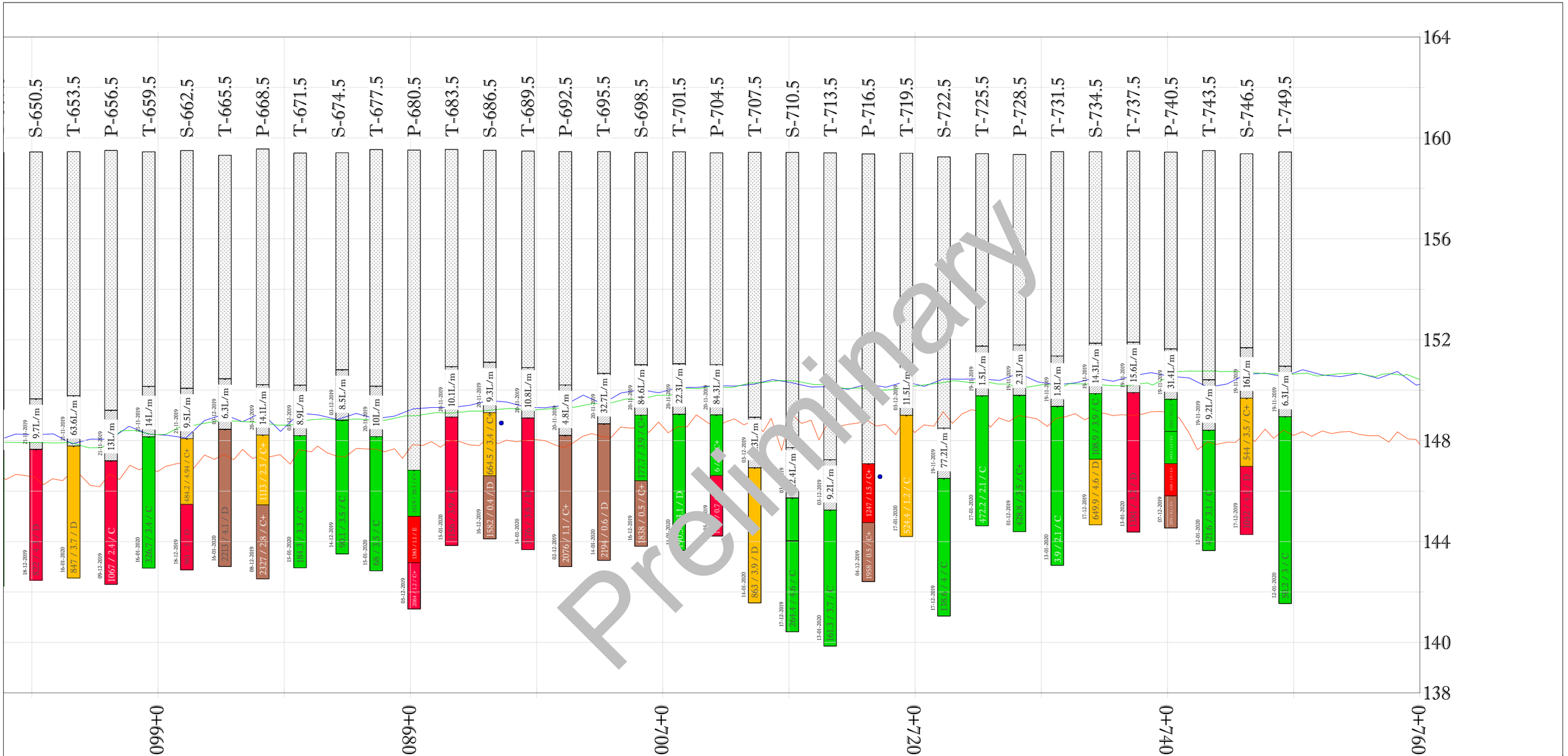
- BOTTOM OF SECANT PILE ROCK SOCKET

PREPARED BY : MARC-ANDRÉ BLACKBURN
DATE : 07-02-2020
CON-FD-235

INJECTION DOWNSTREAM PHASE 2 2019 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
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P-176.5

GROUT PLUG VOLUME INJECTED (L)

Date of grout plug

Final mix injected in this stage
Effective pressure obtained (bars)
Total volume injected (L)

Date of final grout

Many stages indicate the number of regrout

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KIVALLIQ CONTRACTORS GROUP LTD

PREPARED BY : MARC-ANDRÉ BLACKBURN
DATE : 07-02-2020
CON-FD-235

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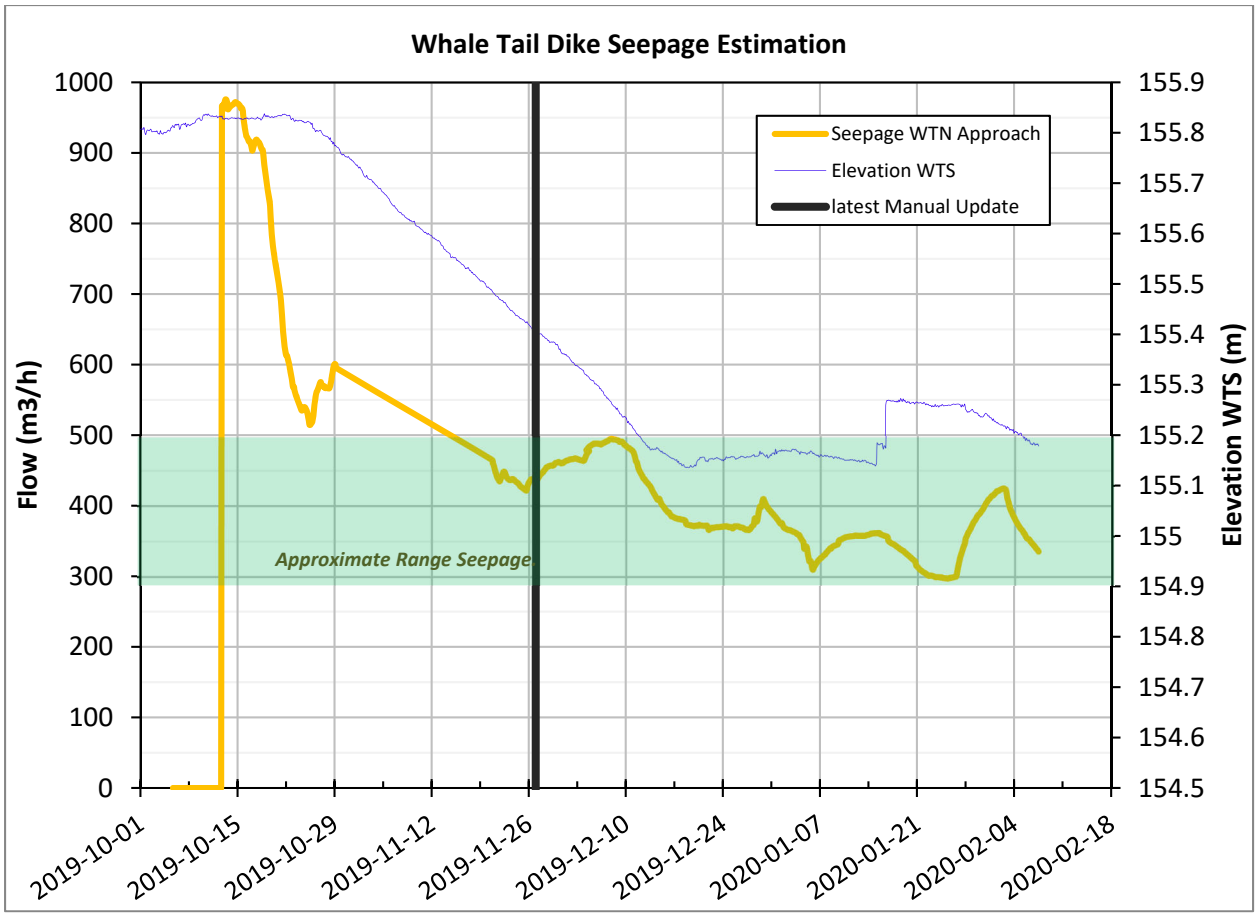
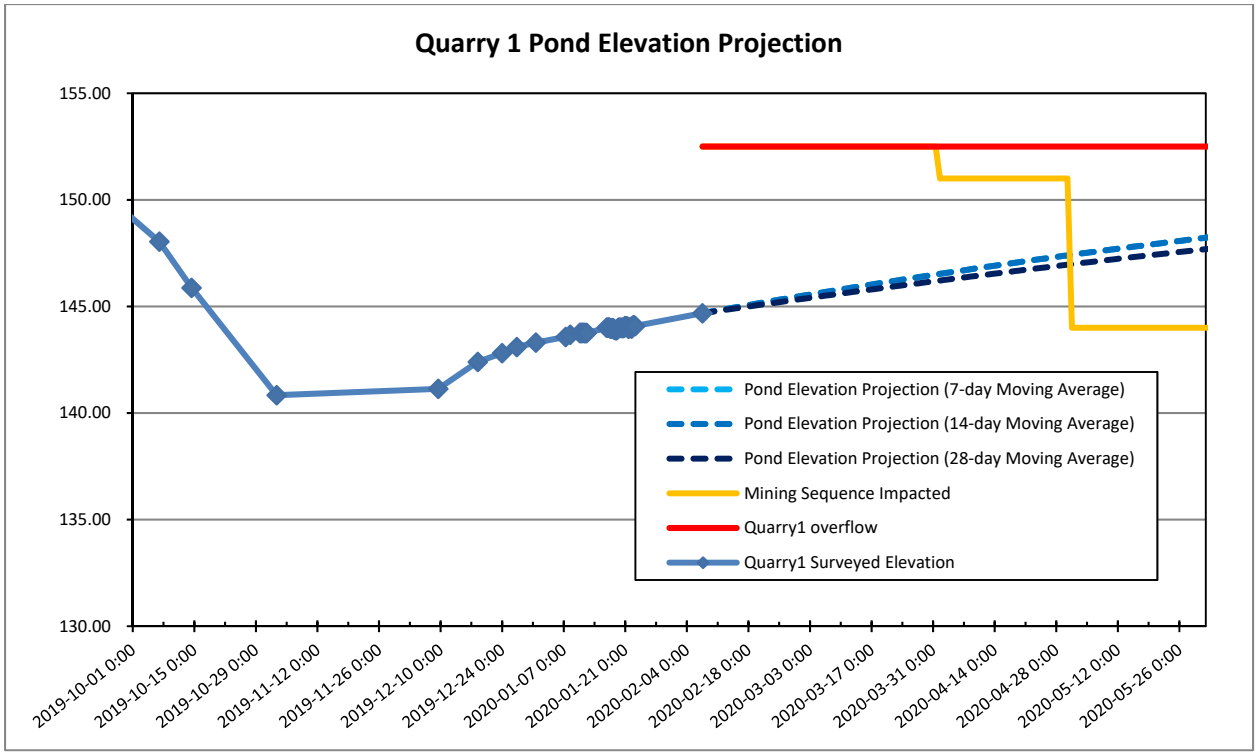
A2: AEM Seepage Report


Whale Tail Dike Seepage Estimation
Flow (m3/h)
Elevation WTS (m)
Seepage WTN Approach
Elevation WTS
latest Manual Update
Approximate Range Seepage
1000
900
800
700
600
500
400
300
200
100
0
155.9
155.8
155.7
155.6
155.5
155.4
155.3
155.2
155.1
155
154.9
154.8
154.7
154.6
154.5
2019-10-01
2019-10-15
2019-10-29
2019-11-12
2019-11-26
2019-12-10
2019-12-24
2020-01-07
2020-01-21
2020-02-04
2020-02-18


Quarry 1 Pond Elevation Projection
Pond Elevation Projection (7-day Moving Average)
Pond Elevation Projection (14-day Moving Average)
Pond Elevation Projection (28-day Moving Average)
Mining Sequence Impacted
Quarry1 overflow
Quarry1 Surveyed Elevation
155.00
150.00
145.00
140.00
135.00
130.00
2019-10-01 0:00
2019-10-15 0:00
2019-10-29 0:00
2019-11-12 0:00
2019-11-26 0:00
2019-12-10 0:00
2019-12-24 0:00
2020-01-07 0:00
2020-01-21 0:00
2020-02-04 0:00
2020-02-18 0:00
2020-03-03 0:00
2020-03-17 0:00
2020-03-31 0:00
2020-04-14 0:00
2020-04-28 0:00
2020-05-12 0:00
2020-05-26 0:00

Notes:

1. WTN curve is in m^3/h while WTS is in elevation. AEM is working on update to have everything in m3/h to avoid confusion
2. Currently all pit inflow go to Quarry 1.
3. Because it is winter time now, it's assumed that the only outflow of WTS and inflow WTN is the seepage. When no other pumping occurs AEM convert the elevatin to m^3 based on a storage capacity curve. No direct measurement of the seepage rate is available.

SNC·LAVALIN

WEEKLY REPORT

20200213-WR
Document number

2020/02/07 to 2020/02/13	669034	Muhammad Saleem
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- This weekly report covers the activities from Feb 7th, 2020 to Feb 13th, 2020.
- No activity on Feb 7th, 2020 due to cross shift.
- The main activities during this week were casing plug grouting, bedrock drilling and grouting for the downstream blanket.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- Signed NCR prepared by TCG, one for drilled tertiary holes prior to grouting adjacent Secondary (S614.5 and S626.5) hole and other for packer stuck at T719.5
- After reviewing the grout take in tertiary holes (i.e: T479.5 and the adjacent holes: P476.5 and S482.5 OR T461 and adjacent holes S458.5 and P464.5), SNC had a discussion with AEM. AEM decided to grout all tertiary holes for the downstream blanket.
- AEM and SNC agreed to the KCG proposal of starting grouting for Tertiary holes with Mix B.
- Some impurities found in the cement causing fluctuation in pressure and flowrate, advised KCG to proper control of screening and batching of 20 kg cement buckets.

GROUTING COMMITTEE RECOMMENDATIONS

- Received comments from grouting committee through AEM email. Response has been prepared and submitted to AEM.
- As per grouting committee recommendations (email dated Feb 2nd, 2020), the weekly report of week ending on Feb 6 has been revised and re-submitted to include KCG As Built profile progress drawings and Water Seepage estimation from AEM.

CASING EXTENDED TO BEDROCK

- No casing were extended to bedrock during this week. A total of twenty two (22) casings were extended so far.

CASING PLUG

- Thirty seven (37) casing plugs grouted during this week and a total of 161 casings have been plugged so far using Mix C (water cement ratio 0.5, 2% calcium chloride). Some grout mixes used for casing plug have 0.2% of Celbex in it.
- Four (4) of the casing plugs (S254.5, P260.5, T293.5 and S326.5) reached Vmax and rest of the casing plug reached pressure refusal.
- No casing plug was regrouted even if Vmax was reached.

	Casing Pluged				
Hole ID	Date	Grout Type	Grout Taken (L)	Pressure (Bar)	Comments
T-251,5	February 10, 2020	C	20.1	2.04	
S-254,5	February 10, 2020	C	156.9	0.3	Ended at Vmax
T-257,5	February 10, 2020	C	19.3	2.01	
P-260,5	February 10, 2020	C	162.6	0	Ended at Vmax
T-263,5	February 10, 2020	C	38.7	2.16	
S-266,5	February 10, 2020	C	30.5	1.76	
T-269,5	February 10, 2020	C	75.3	1.53	
P-272,5	February 10, 2020	C	32.8	1.32	
T-275,5	February 10, 2020	C	27.5	1.58	
S-278,5	February 10, 2020	C	26.6	1.46	
T-281,5	February 10, 2020	C	27.8	1.51	
P-284,5	February 10, 2020	C	28.5	1.75	
T-287,5	February 10, 2020	C	20.4	1.77	
S-290,5	February 9, 2020	C	28.8	1.45	
T-293,5	February 9, 2020	C	151.2	0.3	Ended at Vmax
P-296,5	February 9, 2020	C	26.4	2.01	
T-299,5	February 9, 2020	C	22	2.02	
S-302,5	February 9, 2020	C	18.6	1.95	
T-305,5	February 9, 2020	C	28.3	1.51	
P-308,5	February 9, 2020	C	38.2	1.55	
T-311,5	February 9, 2020	C	24.9	1.5	
S-314,5	February 9, 2020	C	23.4	1.44	
T-317,5	February 9, 2020	C	31.3	1.57	
P-320,5	February 9, 2020	C	23.9	2.04	
T-323,5	February 9, 2020	C	25.5	1.76	
S-326,5	February 9, 2020	C	184.1	0.2	Ended at Vmax
T-329,5	February 9, 2020	C	60.3	1.66	
P-332,5	February 8, 2020	C	28.4	1.63	
S-338,5	February 8, 2020	C	21.8	2.01	Cleaned on Feb 3, 2020
T-341,5	February 8, 2020	C	43.8	2.7	Cleaned on Feb 3, 2020
P-344,5	February 8, 2020	C	32.7	1.71	
T-347,5	February 8, 2020	C	24.5	1.74	
S-350,5	February 8, 2020	C	24.3	1.95	
T-353,5	February 8, 2020	C	22	1.94	
P-356,5	February 8, 2020	C	173.9	2.14	
S-362,5	February 8, 2020	C	32.3	2.26	
T-365,5	February 8, 2020	C	25.5	2.2	

Note: Vmax for P356.5 = 242.9 L

BEDROCK DRILLING

-
- A total of Fifteen (15) holes had been drilled during this week for 5 m stage length between stations 260.5 and 434.5.
- No water loss was observed in all the holes drilled in bedrock this week.
- All holes drilled during this week stayed open to the bottom and no caving observed prior to grouting.
- So without water loss or caving, all holes were drilled in one 5 m long stage.
- All the hole washed out after drilling.
- Water level was not measured right after the drilling but measured prior to grouting when water level in the hole stabilized.

	interface driling 5m/1.5m					
Hole ID	Date	Bottom of casing (m)	Final hole depth (m)	water level (m)	Bedrock length (m)	Comments
P-260,5	2020-02-12	9.45	14.5		5.05	water level will be measured prior to grouting
P-272,5	2020-02-12	8.60	14		5.40	water level will be measured prior to grouting
P-284,5	2020-02-12	9.00	14.2		5.20	water level will be measured prior to grouting
P-296,5	2020-02-12	8.33	13.4	7.75	5.07	Water level measured on Feb 14, 2020
P-308,5	2020-02-12	8.20	13	7.9	4.80	Water level measured on Feb 14, 2020
P-320,5	2020-02-11	10.40	15.2	6.8	4.80	Water level measured on Feb 14, 2020
P-332,5	2020-02-11	11.70	16.5	8.85	4.80	Water level measured on Feb 14, 2020
P-344,5	2020-02-11	13.43	18.4	8.9	4.97	Water level measured on Feb 14, 2020
P-356,5	2020-02-10	15.30	20.3	9.7	5.00	Water level measured on Feb 13, 2020
P-368,5	2020-02-10	15.60	20.7	9.5	5.10	Water level measured on Feb 13, 2020
S-386,5	2020-02-10	12.66	18	9.3	5.34	Water level measured on Feb 12, 2020
S-398,5	2020-02-10	11.00	16	9.4	5.00	Water level measured on Feb 12, 2020
S-410,5	2020-02-09	10.75	15.5	7.8	4.75	Water level measured on Feb 12, 2020
S-422,5	2020-02-09	10.57	15.5	7.9	4.93	Water level measured on Feb 12, 2020
S-434,5	2020-02-09	10.19	15	7.9	4.81	Water level measured on Feb 12, 2020

BEDROCK GROUTING

- During this week, bedrock grouting was conducted for tertiary holes where primary and secondary holes have been grouted between the station 443.5 and 527.5.
- A total of 105 holes have been completed up to date.

1st Stage Grouting

- During this week a total of fifteen (15) holes were grouted between station 443.5 and 527.5.
- All the holes grouted in 5 m stage length.
- All holes reached Pmax except one hole T479.5 which ended at maximum volume and no regrouting required.
- Grout elevation was checked for T479.5 and found 0.35 m above the bottom of the casing, so backfilled without regrout.
- Twelve (12) holes reached refusal at Pmax with Mix C without Celbex.
- Two (2) holes reached refusal at Pmax with Mix B.
- All holes backfilled at the end of pressure grouting process and T479.5 was backfilled next day after confirming the grout elevation inside the casing.
-

	Interface grouting for 1.5 m/5 m stage									
Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Closing Pressure (bar)	Closing Flowrate (l/min)	Volume Injected (L)	Mix	Comments	Depth of grout (m)	Empty Length after grouting (m)
T-443,5	2020-02-13	5.2	3.21	3.02	0	271.3	200 L Mix B + 71.3 L Mix C	backfilled after refusal		
T-449,5	2020-02-13	4.88	2.51	2.72	0.9	73.5	Mix B	backfilled after refusal		
T-455,5	2020-02-13	5.26	2.38	2.59	1.7	66.4	Mix B	backfilled after refusal		
T-461,5	2020-02-13	5.34	3.18	3.06	0.2	423.9	Mix C	backfilled after refusal		
T-467,5	2020-02-13	5.3	3.1	3.05	0.4	70.6	Mix C	backfilled after refusal		
T-473,5	2020-02-13	5.05	2.95	2.99	0.5	211.9	Mix C	backfilled after refusal		
T-479,5	2020-02-12	5.06	3.1/3.75	3.82	7.7	2300	610 L Mix C + 1690 L Mix D	backfilled after confirming grout elevation on Feb 13, 2020	10	-0.34
T-485,5	2020-02-12	5.32	3.11	3.08	0	45.6	Mix C	backfilled after refusal		
T-491,5	2020-02-12	5.10	3.01	3.04	0	371.8	Mix C	backfilled on Feb 13, 2020		
T-497,5	2020-02-12	6.00	3.32	3.34	0.5	63.3	Mix C	backfilled on Feb 13, 2020		
T-503,5	2020-02-11	5.01	3.11	3.11	0.2	123.2	Mix C	backfilled after refusal		
T-509,5	2020-02-11	5	3.28	3.3	0.6	75.8	Mix C	backfilled after refusal		
T-515,5	2020-02-11	5.29	3.42	3.42	0.2	467.6	Mix C	backfilled after refusal		
T-521,5	2020-02-11	5.02	3.12	3.1	0.3	133.3	Mix C	backfilled after refusal		
T-527,5	2020-02-11	5.44	3.14	3.14	0.3	261	Mix C	Backfilled after refusal		

GROUT TESTING

- Grout tests were conducted for 1st batch as well as every 5 batches or whenever Mix changes. The Marsh values was checked only for Mix B and Mix C without celbex while specific gravity, bleeding and temperature values were checked for Mixes B, C and D.

Date	BH#	Grout testing	Time	Specific Gravity	Marsh value (second)	Temperature (°C)	Bleeding (%)	Vicat Test	Remarks
11-02-2020	T527.5	1		1.79	96	13.0	1		Mix C
	T515.5	2		1.77	57	21.0	1		Mix C
		3		1.79	82	11.0			Mix C
12-02-2020	T497.5	1		1.77	62	30.0	1		Mix C
	T485.5	2		1.75	78	15.5	1		Mix C
	T479.5	3		1.78	---	25.8	0		Mix D
		4		1.77	---	15.2	---		Mix D
13-02-2020	T473.5	1		1.76	62	25.0	1		Mix C
	T461.5	2		1.74	60	30.0			Mix C
	T455.5	3		1.67	44	23.0	2		Mix B
	T443.5	4		1.76	84	23.0			Mix C

- Marsh values for Mix C ranged mostly from 60 to 80s but some lower and higher values also observed.
- Only one test was completed on Mix B and measured Marsh value of 44s.

- The Specific Gravity and Bleed tests for Mix C without Celbex, and Mix D shows very stable numbers with Specific Gravity ranged from 1.75 to 1.82 and Bleed 0% to 1 %. Specific gravity is slightly higher for Mix D and the bleeding is lower.

- The specific gravity for Mix B on one test conducted during this week was 1.67 and bleeding 2%.

- Some fluctuation with Marsh value, possible issue with cement from different bulk bags, also some chunks found in the grout causing fluctuation in pressure and flow rate during grouting.
- KCG was advised to better control the screening and filling of 20 KG buckets.

HOLE DEPTH VERIFICATIONS

- TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting.

BOREHOLE INCLINATION CHECK

- Inclination check has been completed for the downstream blanket casing.
- The data shows that deviations from the vertical of many holes are larger than 0.5% which is required in the specifications.
- Average deviation for downstream casings found 0.82% and the maximum value found is 3.53%.
- Note that the hole inclination in the rock was not been checked as AEM said on Dec. 6, 2019 construction meeting that the inclination check in the rock hole is not necessary as the hole is below the bottom of the cut off wall.

pH AND TURBIDITY RESPONSE

- No pH and Turbidity measures were taken this week.

LIST OF CHANGES ON SPECS, SITE INSTRUCTION, FIELD WORK AND DEVIATION LIST

Whale Tail Dike Remedial Grouting Sepecifications and Design Drawings Changes Tracking

Document	Revision	Date Issued	Subject
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PC	2019-10-03	Technical Specifications for Whale Tail Dike Remedial Drilling and Grouting Works Rev. PC was issued for AEM and Grouting Committee's (GC) review and comments. The document was the main topic of the discussion in the Grouting Committee Meeting No.3 held on Oct. 17th, 2019 in Montreal.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	PD	2019-10-28	As per discussions and recommendations from GC Meeting No.3, Technical and Specifications had been updated to Rev PD. Reference can be made to meeting minutes 669034-0000-30MC-0001 for details of the comments and recommendations to the designs.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PE	2019-11-27	Rev. PD had been updated to Rev PE based on recommendations presented in GC's letter Dated Oct. 25, 2019 and further discussions with AME engineers and site staff to implement the simplified approach and path forward proposed by the GC. Phased approach adopated starting with two rows of Blanket Grouting (Phase I) and based on the results of Blanket Grouting to decide the requirement of deepen the Upstream Blanket holes for Curtain Grouting (Phase II)
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	00	2020-01-10	Document Rev. PE had been updated based on comments on received and the discussions and recommendations from GC Meeting No.5 held on December 5, 2019.

Whale Tail Dike Remedial Grouting Site Instructions Changes Tracking

Document	Revision	Date Issued	Subject
SITE INSTRUCTIONS FOR DRILLING AND BLANKET GROUTING (Document Number: 669034-0000-40CA-0001 Rev. 00)	Rev 00	2019-11-19	A technical memo - Site Instructions for Drilling and Blanket Grouting Rev PB was issued on November 19, 2019. The objective of this document is to provide key instructions to the drilling and grouting of the Blanket Holes at the WTD foundation to allow work to start timely before Design Drawings and Specifications are ready and approved. The Site Instructions were prepared based on discussions and comments on Technical Specs Rev PD, Grouting Committee's Letter dated October 25, 2019 and in alignment with the objective of 40 to 50% seepage deduction with simplfied and phased project approach. This document may require update based on the progress and results of the field work.
	Rev 01	2020-01-08	The Site Instructions Rev 00 was updated to Rev 01 to incorporate: (1) modification of the Mix C+ by reducing the Calcium Chloride dosage (2)conditions for drilling and grouting the hole in two stages

Whale Tail Dike Remedial Grouting Fieldwork Instructions Changes Tracking

Document	Date Issued	Subject	Notes
Fieldwork Instruction No.1 (Email)	2019-12-03	Subject: 669034 - Rock Grouting on Grout Mix Change Procedures	This Fieldwork Instruction provide by email dated Dec. 03, 2019 on Subject: **Grout mix change procedures during the Blanket Hole Grouting and Regrouting** (prior to Open Throat Pump is available) based on the on site trial mix results and ground response on grout take and grouting pressure.
Fieldwork Instruction No.2 (FWI 001 Rev 00)	2019-12-07	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 00	This Fieldwork instruction applies to Grouting and Re-grouting of Primary Holes with the application of Celbex using Open Throat Pump as recommended by Grouting Committee (Meeting No. 5 on December 05 2019) that had been drilled per 5 m Stage. The site instruction will be updated as per the progress of the site construction.
Fieldwork Instruction No.3 (FWI 001 Rev. 01)	2019-12-09	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 01	The fieldwork instruction No.2 was updated to introduce Mix D

DEVIATION LIST FOR REMEDIAL GROUTING AT WHALE TAIL DIKE

Deviation #	Date Received	Date Responded	Status	Subject	Location/Address	Notes
001	2019-11-10		AEM will manage the situation	QC did not use centerlizer to monitor inclination	multiple locations	Daily Report - Contractor informed that they will use inclino meter without centerlizer as they did last winter but AEM will look if they can findout centerlizer for 4.6" casing.
002	2019-11-14		waiting for apparatus and	QC did not have Vicat apparatus and did not know how to use filtration	during Trial mix	Vicat apparatus received and fist vicat test performed on Dec 5, 2029
003	2019-12-06			inclination check in bedrock holes are not been checked. AEM said inclination check is not necessary in the rock hole during daily construction meeting on Dec 6, 2019 and captured on weekly		As per specs. "Deviation from vertical in the bedrock section of the hole shall not exceed 2% of drilled length."
004	2020-01-13			Drilling of tertiary holes prior to grouted secondary holes	T611.5, T617.5, T623.5, T629.5	Tertiary holes drilled while secondary holes S614.5 and S626.5 were not been grouted yet. As per spec. Tertiary holes shall be drilled in rock after secondary holes has been grouted and grout reached its final set
005	2020-01-12			Continuous drilling and grouting of tertiary holes	WTD Tertiary holes	Consective tertiary holes has been drilled and grouted (6 m distance). As per spec. minimum distance between two drilled holes in bedrock is
006	2020-02-13	2020-02-13	accepted	Use of Mix B in Tertiary Holes	WTD Tertiary holes	AEM and SNC agreed with the KCG proposal of using Mix B in Tertiary holes.

SAFE AND SAFETY REMARKS

- Extreme cold weather conditions wear proper winter clothing.

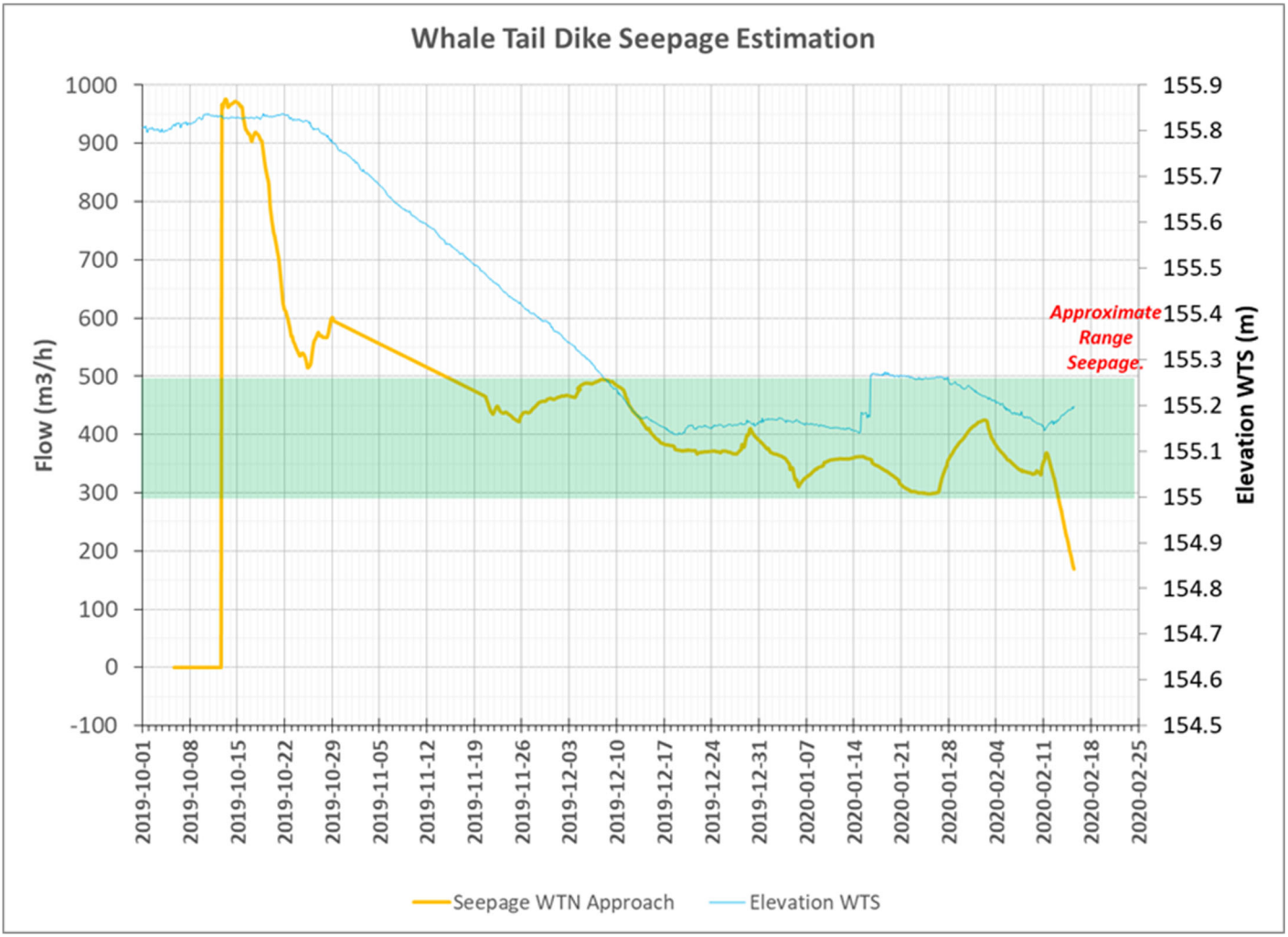
Issued by :	*Sebastien Viau*	**14-02-2019**
	Signature	Date
Verified by :	*Tom Xue*	**14-02-2019**
	Signature	Date

APPENDICES

A1: AEM Seepage Report

A2: KGC As-Built Profile Progress

A1: AEM Seepage Report



Notes:

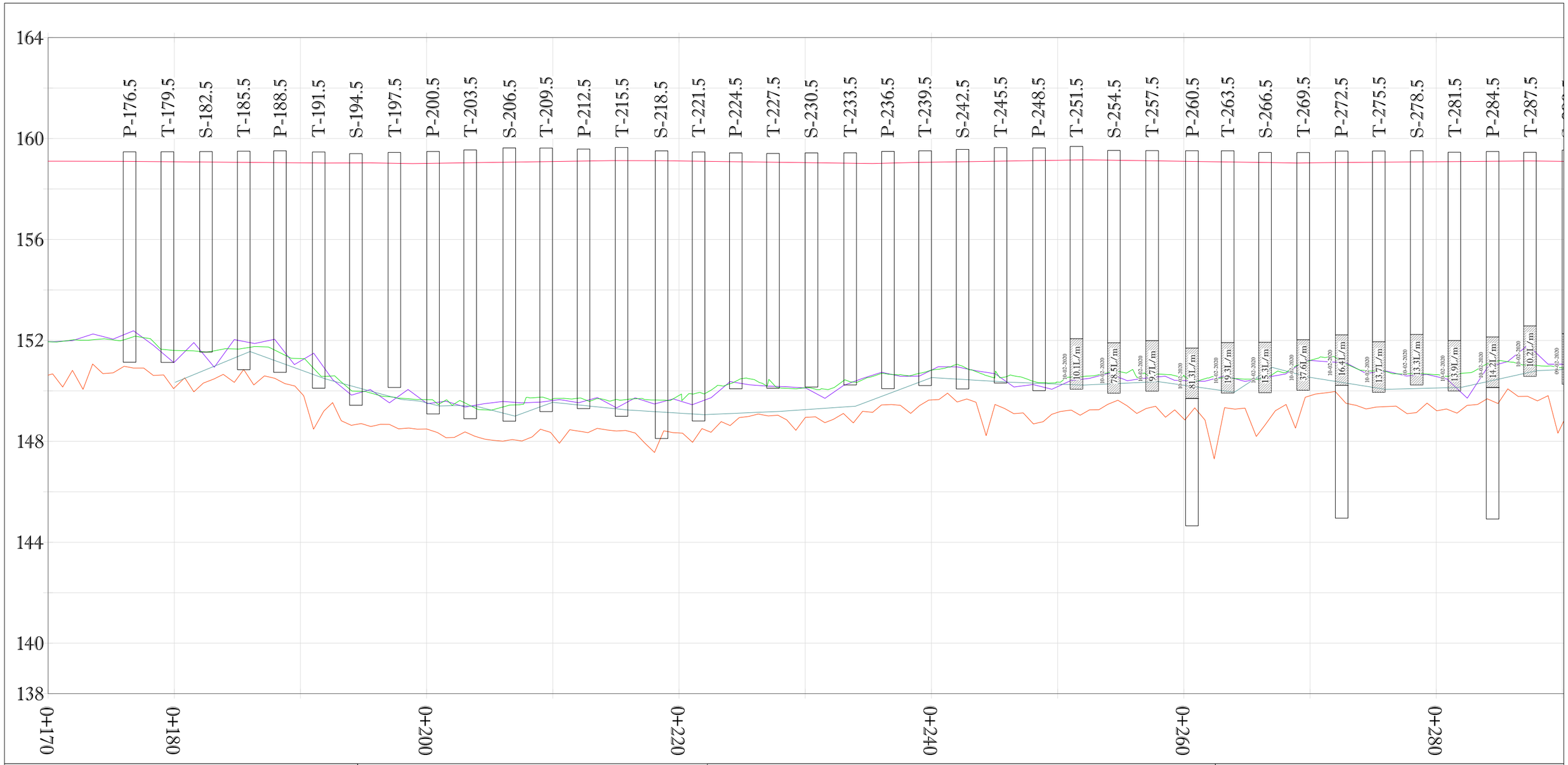
1. WTN curve is in m_3/h while WTS is in elevation. AEM is working on update to have everything in m3/h to avoid confusion
2. Currently all pit inflow go to Quarry 1.
3. Because it is winter time now, it's assumed that the only outflow of WTS and inflow WTN is the seepage. When no other pumping occurs AEM convert the elevatin to m_3 based on a storage capacity curve. No direct measurement of the seepage rate is available.

A2: KGC As-Built Profile Progress

Please note that the following items are SNC's comments on the As-Built Profile progress:

- For those boreholes which were injected in two stages of 1.5 m and 3.5 m stage length, 1.5 m stage needs to be included in the as built.
- The latest water level inside each casing measured before grouting should be presented.
- Color coding should be based on the total volume injected during the initial and all re-grouting over the stage length.

INJECTION DOWNSTREAM PHASE 2 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



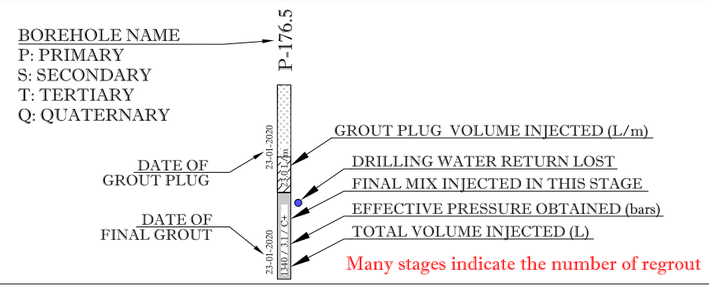
0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved



Many stages indicate the number of regrout

- TOP DIKE AS-BUILT EL. 159.0
- MEASURED WATER LEVEL
- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET
- GROUTING COMMUNICATION

PREPARED BY : MIKAËL LÉVESQUE
DATE : 14-02-2020
CON-FD-236-1

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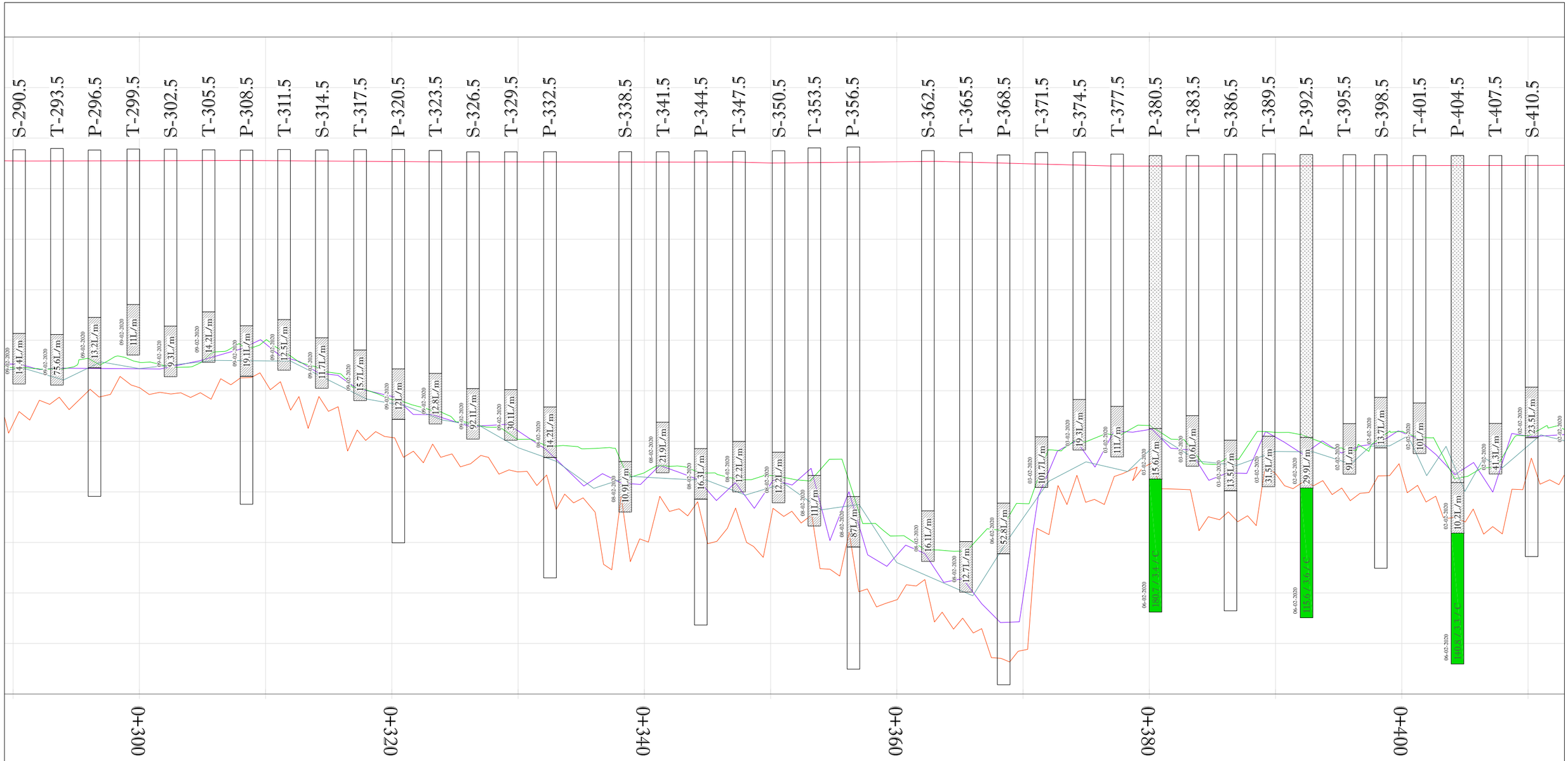
INJECTION DOWNSTREAM PHASE 2 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved

BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY

P-176.5
GROUT PLUG VOLUME INJECTED (L/m)
DRILLING WATER RETURN LOST
FINAL MIX INJECTED IN THIS STAGE
EFFECTIVE PRESSURE OBTAINED (bars)
TOTAL VOLUME INJECTED (L)
DATE OF GROUT PLUG
DATE OF FINAL GROUT

Many stages indicate the number of regrout

- TOP DIKE AS-BUILT EL. 159.0
- MEASURED WATER LEVEL
- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET
- GROUTING COMMUNICATION

PREPARED BY : MIKAËL LÉVESQUE
DATE : 14-02-2020
CON-FD-236-2

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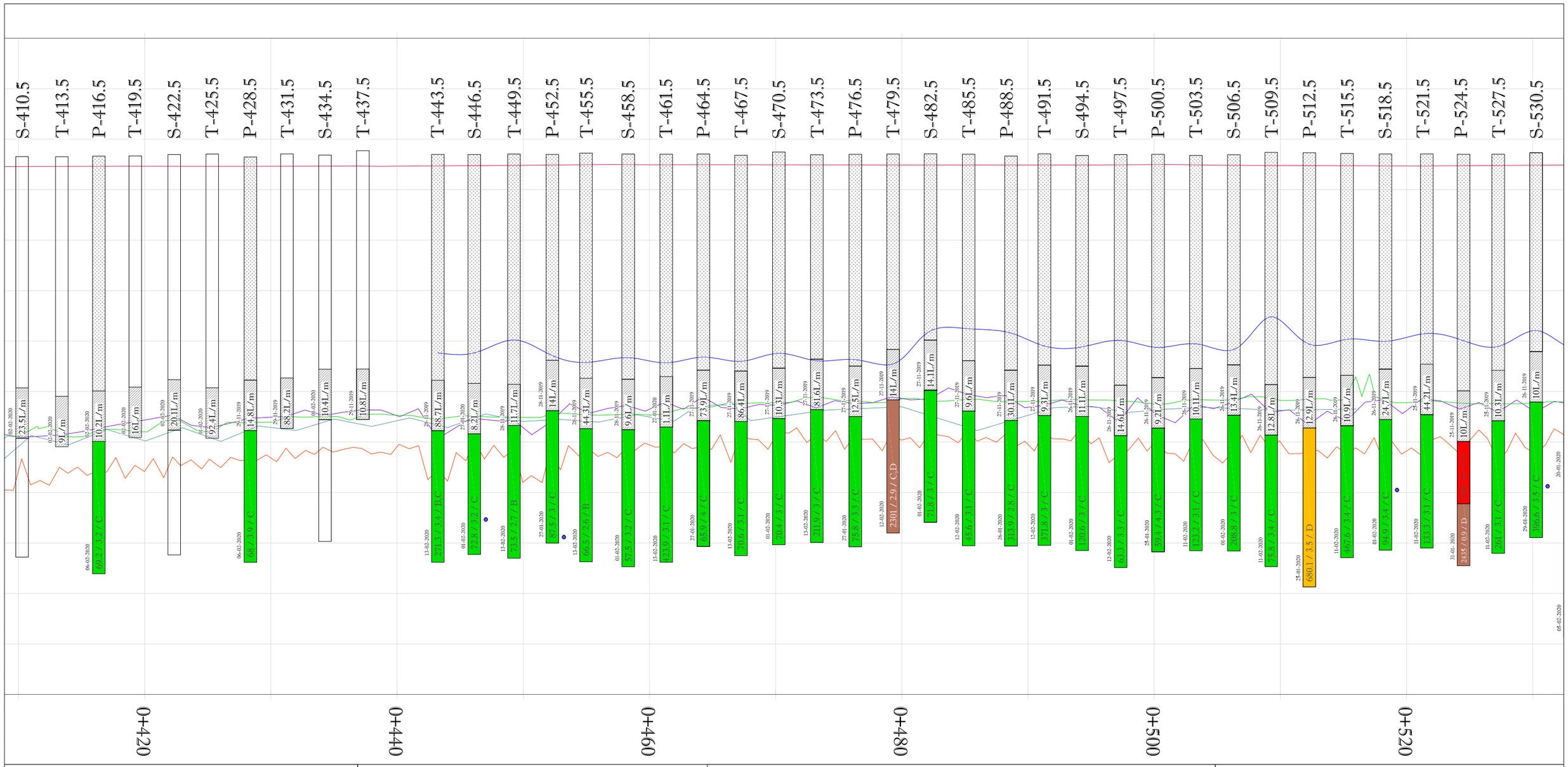
INJECTION DOWNSTREAM PHASE 2 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

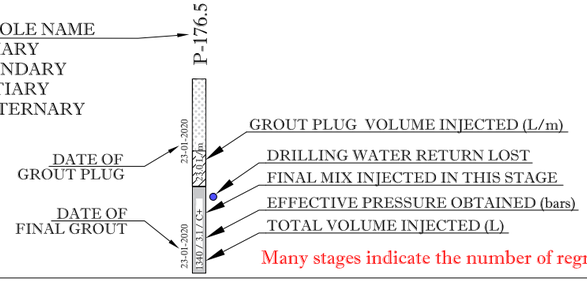
SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved

BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY



Many stages indicate the number of regrout

- TOP DIKE AS-BUILT EL. 159.0
- MEASURED WATER LEVEL
- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET
- GROUTING COMMUNICATION

PREPARED BY : MIKAËL LÉVESQUE
DATE : 14-02-2020
CON-FD-236-3

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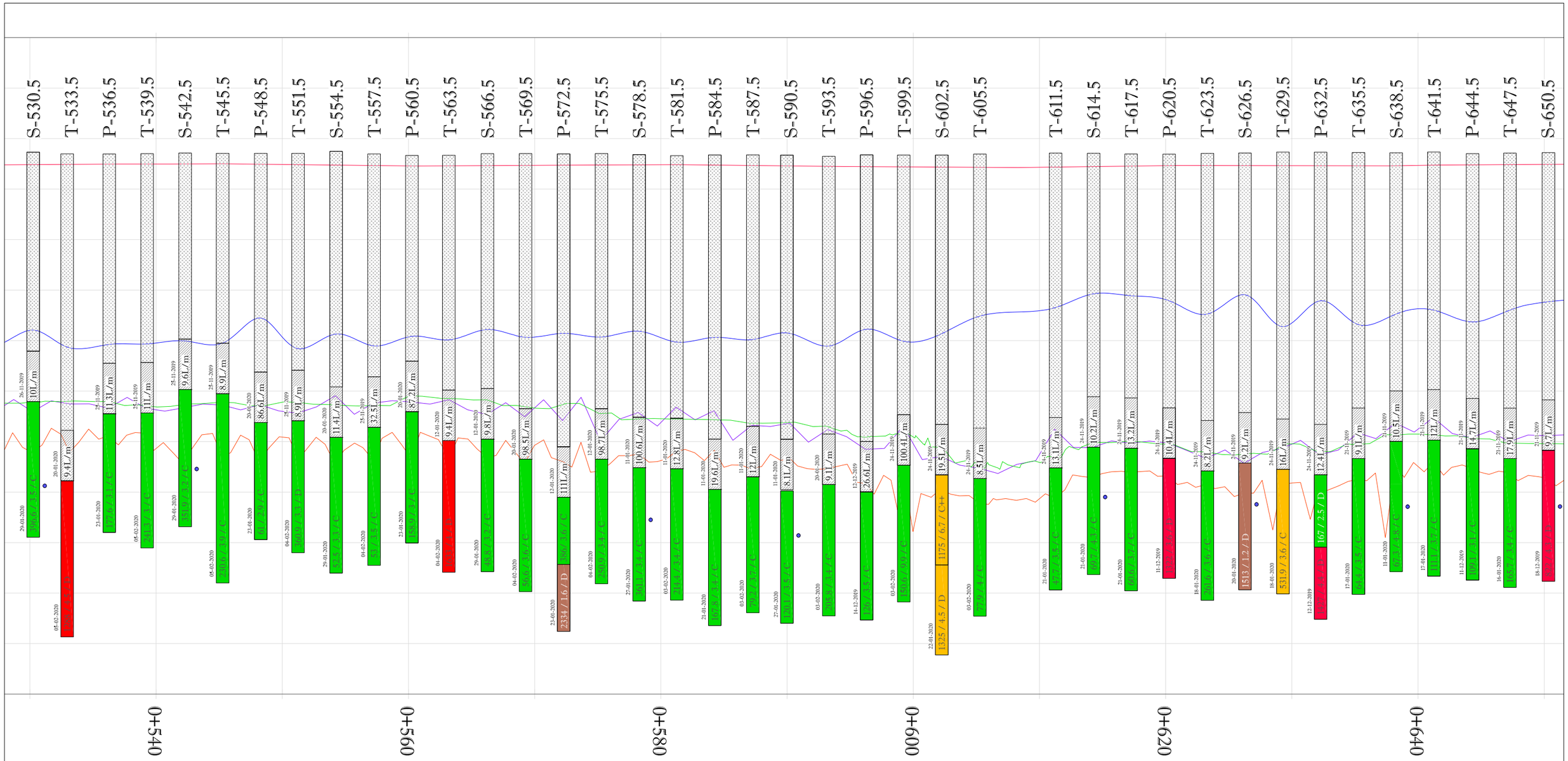
INJECTION DOWNSTREAM PHASE 2 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved

BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY

P-176.5

DATE OF GROUT PLUG

DATE OF FINAL GROUT

GROUT PLUG VOLUME INJECTED (L/m)
DRILLING WATER RETURN LOST
FINAL MIX INJECTED IN THIS STAGE
EFFECTIVE PRESSURE OBTAINED (bars)
TOTAL VOLUME INJECTED (L)

Many stages indicate the number of regrout

TOP DIKE AS-BUILT EL. 159.0
MEASURED WATER LEVEL
APPROVED BEDROCK SURVEY
BEDROCK ENCOUNTERED BY HENRY DRILLING
BOTTOM OF SECANT PILE ROCK SOCKET
GROUTING COMMUNICATION

PREPARED BY : MIKAËL LÉVESQUE
DATE : 14-02-2020
CON-FD-236-4

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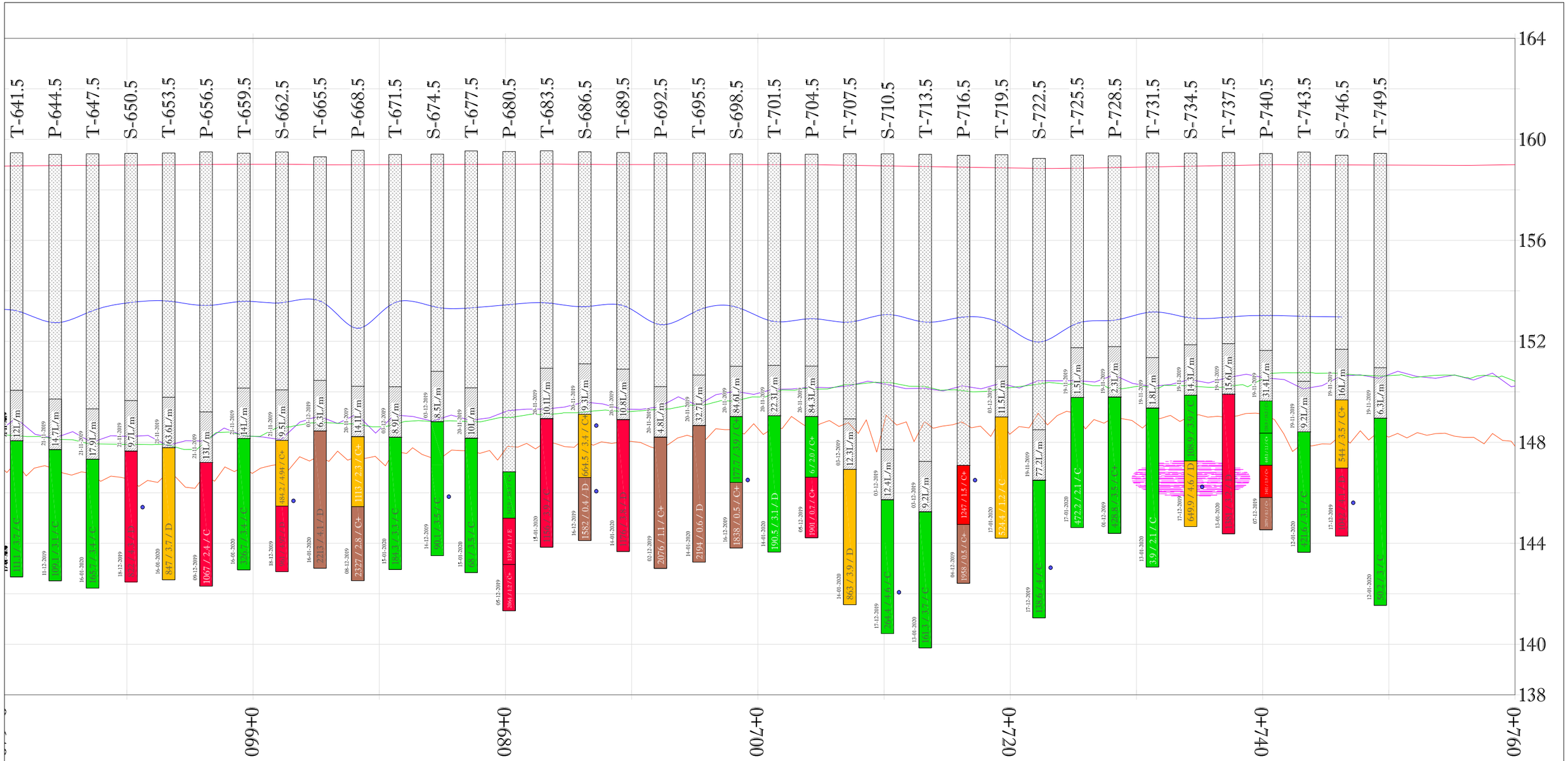
INJECTION DOWNSTREAM PHASE 2 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
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BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY

P-176.5

DATE OF GROUT PLUG

DATE OF FINAL GROUT

GROUT PLUG VOLUME INJECTED (L/m)
DRILLING WATER RETURN LOST
FINAL MIX INJECTED IN THIS STAGE
EFFECTIVE PRESSURE OBTAINED (bars)
TOTAL VOLUME INJECTED (L)

Many stages indicate the number of regrout

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- BOTTOM OF SECANT PILE ROCK SOCKET
- GROUTING COMMUNICATION

PREPARED BY : MIKAËL LÉVESQUE
DATE : 14-02-2020
CON-FD-236-5

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SNC·LAVALIN

WEEKLY REPORT

20200220-WR
Document number

2020/02/14 to 2020/02/20	669034	Muhammad Saleem
Date	Project No.	Prepared by
Whale Tail Dike Remedial Drilling and Grouting Works		Agnico Eagle
Project		Client
SNC-Lavalin INC.	KCG (TCG)	
Consultant	Contractor	

MAIN ACTIVITIES

- This weekly report covers the activities from Feb 14th, 2020 to Feb 20th, 2020.
- No activity on Feb 14th and 15th, 2020 due to generator broke down and no work in the afternoon of Feb 20, 2020 due to blizzard.
- The main activities during this week were casing plug grouting, bedrock drilling and grouting for the downstream blanket.
- AEM, TCG and SNC-Lavalin site personnel had construction meeting in the early morning of each day.
- Due to very low take grout in primary secondary and tertiary holes, AEM and SNC agreed to start with Mix B in low grout take areas.
- T455.5 was the 1st Tertiary hole and P260.5 was the 1st Primary hole started with Mix B.
- Received KCG As Built report as of week of Feb. 13, 2020. No comments has been incorporated from the previous weekly report. AEM wanted to wait for GC comments on last weekly as built profile prior to incorporate SNC comments.
- AEM decided to install the four (4) missing casings (P608.5, P440.5, T359.5 and T335.5) for downstream blanket grouting.
- During construction meeting AEM and SNC agreed to KCG proposal to backfill hole after pressure refusal if grout take is less than 1000 liters and left the hole open to check grout level next day if grout take is more than 1000 liters.
- SNC will provide the location of super primary holes (deeper holes) for U/S Blanket/curtain grouting and location of Quaternary holes if required for D/S Blanket grouting.
- KCG is expected to start casing installation for U/S blanket/curtain grouting and SNC and AEM agreed to install casing for Primary, Secondary and Tertiary holes and casings for Quaternary holes will be decided later.

GROUTING COMMITTEE RECOMMENDATIONS

- Received preliminary comments from grouting committee on Feb 16th 2020 for Feb 1st to 6th weekly report.
- GC requested some clarity on As built profile from KCG about Mix type used, elapsed time between the pressure refusal and packer deflate and grout elevation after refusal.
- It's very hard to check grout elevation right after pressure refusal due to grout too fresh and waiting for grout to set will delay the grouting activities. During construction meeting AEM and SNC agreed to KCG proposal to backfill hole after pressure refusal if grout take is less than 1000 liters and left the hole open to check grout level next day if grout take is more than 1000 liters.

CASING EXTENDED TO BEDROCK

- No casing were extended to bedrock during this week. A total of twenty two (22) casings were extended so far.

CASING PLUG

- Twenty four (24) casing plugs grouted during this week and a total of 185 casings have been plugged so far using Mix C (water cement ratio 0.5, 2% calcium chloride).
- Eight (8) of the casing plugs (S194.5, T209.5, S218.5, S230.5, T233.5, P236.5, T245.5 and P248.5) reached Vmax and rest of the casing plug reached pressure refusal.
- No casing plug was regrouted even if Vmax was reached.

	Casing Pluged				
Hole ID	Date	Grout Type	Grout Taken (L)	Pressure (Bar)	Comments
P-176,5	February 20, 2020	C	38.2	1.38	
T-179,5	February 20, 2020	C	26.8	1.42	
S-182,5	February 20, 2020	C	28.3	1.6	
T-185,5	February 20, 2020	C	25	1.94	
P-188,5	February 20, 2020	C	55.5	1.48	
T-191,5	February 20, 2020	C	16.9	1.98	
S-194,5	February 19, 2020	C	143.1	2.28	Ended at Vmax
P-200,5	February 19, 2020	C	23.2	2.16	
T-203,5	February 19, 2020	C	18	2.47	
S-206,5	February 19, 2020	C	23.1	2.06	
T-209,5	February 19, 2020	C	173.3	0.86	Ended at Vmax
P-212,5	February 19, 2020	C	20.2	1.95	
T-215,5	February 19, 2020	C	20.5	1.51	
S-218,5	February 19, 2020	C	177.2	1.11	Ended at Vmax
T-221,5	February 19, 2020	C	19.6	1.85	
P-224,5	February 19, 2020	C	36.8	1.44	
T-227,5	February 19, 2020	C	27	1.45	
S-230,5	February 19, 2020	C	179.9	0	Ended at Vmax
T-233,5	February 18, 2020	C	150.5	0.34	Ended at Vmax
P-236,5	February 18, 2020	C	153.7	0.47	Ended at Vmax
T-239,5	February 18, 2020	C	25.5	2.12	
S-242,5	February 18, 2020	C	20	1.98	
T-245,5	February 18, 2020	C	151.2	1.34	Ended at Vmax
P-248,5	February 18, 2020	C	158	0.8	Ended at Vmax

- At P200.5 and T191.5, due to slush like muddy material in the hole packer was first placed at the bottom of the hole and then injected 15 liters of grout to displace mud and after that packer raised by 2m and inflated to complete casing plug.
- T197.5 was not plugged due to about 1 m mud in the hole and packer cannot be pushed through the mud. KCG is not interested to clean the hole with drill rig, rather than want to drill the bedrock and then injected by placing packer half in the casing and half in the rock.

BEDROCK DRILLING

- A total of Nineteen (19) holes had been drilled during this week for 5 m stage length between stations 278.5 and 437.5.
- No water loss was observed in all the holes drilled in bedrock this week.
- All holes drilled during this week stayed open to the bottom and no caving observed.
- All holes were drilled in one 5 m long stage without water loss or caving.
- All the holes cleaned after drilling.
- Water level was not measured right after the drilling but measured prior to grouting when water level in the hole stabilized.

	interface driling 5m/1.5m					
Hole ID	Date	Bottom of casing (m)	Final hole depth (m)	water level (m)	Bedrock length (m)	Comments
S-278,5	2020-02-18	9.00	14.3		5.30	water level will be measured befor grouting
S-290,5	2020-02-18	8.95	14.4		5.45	water level will be measured befor grouting
S-302,5	2020-02-18	8.82	14.1		5.28	water level will be measured befor grouting
S-314,5	2020-02-18	9.15	14.5		5.35	water level will be measured befor grouting
S-326,5	2020-02-18	11.02	16.6		5.58	water level will be measured befor grouting
S-338,5	2020-02-18	13.91	19.3		5.39	water level will be measured befor grouting
S-350,5	2020-02-17	13.58	18.5		4.92	water level will be measured befor grouting
S-362,5	2020-02-17	15.90	20.6		4.70	water level will be measured befor grouting
S-374,5	2020-02-17	11.39	16.4		5.01	water level will be measured befor grouting
T-383,5	2020-02-17	11.94	17.3		5.36	water level will be measured befor grouting
T-389,5	2020-02-17	12.82	18.2		5.38	water level will be measured befor grouting
T-395,5	2020-02-17	12.32	17.4	8.9	5.08	
T-401,5	2020-02-17	11.36	16.5	9.6	5.14	
T-407,5	2020-02-17	12.30	17.4	10.8	5.10	
T-413,5	2020-02-17	11.15	16.4	6.2	5.25	
T-419,5	2020-02-17	10.78	15.9	8.2	5.12	
T-425,5	2020-02-17	10.91	16	7.65	5.09	
T-431,5	2020-02-17	10.53	15.8	7.4	5.27	
T-437,5	2020-02-17	10.30	15.8	7	5.50	

BEDROCK GROUTING

- During this week, bedrock grouting was conducted for Primary and Secondary holes between the station 260.5 and 434.5.
- A total of 122 holes have been completed up to date.

1st Stage Grouting

- During this week a total of fifteen (15) holes were grouted between station 260.5 and 434.5.
- All the holes grouted in 5 m stage length.
- All holes reached Pmax.
- Fourteen (14) holes reached refusal at Pmax with Mix C without Celbex.
- One (1) hole reached refusal at Pmax with Mix B.
- All holes backfilled at the end of pressure grouting process.
- Attempted to check grout elevation after pressure refusal but the grout was too fresh and holes backfilled without waiting for grout to set and measure grout elevation.

	Interface grouting for 1.5 m/5 m stage									
Hole ID	Date	Grouting Length (m)	Calcualted Pmax (bar)	Closing Pressure (bar)	Closing Flowrate (l/min)	Volume Injected (L)	Mix	Comments	Depth of grout (m)	Empty Length after grouting (m)
P-260,5	2020-02-18	5.05	2.26	2.44	0.4	262.7	Mix B	Backfilled after refusal		
P-272,5	2020-02-17	5.40	2.99	2.94	0	205.6	Mix C	Backfilled after refusal		
P-284,5	2020-02-17	5.20	3.04	2.97	0.5	101.6	Mix C	Backfilled after refusal		
P-296,5	2020-02-17	5.07	2.73	2.81	1	54.6	Mix C	Backfilled after refusal		
P-308,5	2020-02-17	4.95	2.85	2.8	0.1	85.9	Mix C	Backfilled after refusal		
P-320,5	2020-02-17	4.80	3.09	3.67	1.6	61.2	Mix C	Backfilled after refusal		
P-332,5	2020-02-17	4.80	3	3.14	0.6	38.1	Mix C	Backfilled after refusal		
P-344,5	2020-02-16	4.97	3.3	3.3	0.7	61.2	Mix C	Backfilled after refusal		
P-356,5	2020-02-16	5.00	3.51	3.5	0.3	98.1	Mix C	Backfilled after refusal		
P-368,5	2020-02-16	5.1	3.64	3.71	0.8	75.1	Mix C	Backfilled after refusal		
S-386,5	2020-02-16	5.34	3.04	3.02	0.1	152.5	Mix C	Backfilled after refusal		
S-398,5	2020-02-16	5	2.79	2.75	0.8	89.3	Mix C	Backfilled after refusal		
S-410,5	2020-02-16	4.75	3.07	3.19	0.1	67.9	Mix C	Backfilled after refusal		
S-422,5	2020-02-16	4.93	3.07	3.08	1.1	45.4	Mix C	Backfilled after refusal		
S-434,5	2020-02-16	4.81	2.91	2.91	0	301.6	Mix C	Backfilled after refusal		

GROUT TESTING

- Grout tests were conducted for 1st batch as well as every 5 batches or whenever Mix changes. The Marsh values, specific gravity, bleeding and temperature values were checked for Mixes B and C.

Date	BH#	Grout testing	Time	Specific Gravity	Marsh value (second)	Temperature (°C)	Bleeding (%)	Vicat Test	Remarks
16-02-2020	S434.5	1		1.74	64	37.0	1		Mix C
	S422.5	2		1.73	53	31.0			Mix C
	S410.5	3		1.75	95	25.0			Mix C
	P356.5	4		1.78	72	28.0	1		Mix C
17-02-2020	P332.5	1		1.74	58	30.8	1		Mix C
	P308.1	2		1.76	72	32	1		Mix C
	P284.5	3		1.76	54	22.5	1		Mix C
18-02-2020	P260.5	1		1.68	40	19.0	2		Mix B

- Marsh values for Mix C ranged mostly from 60 to 80s but some lower and higher values also observed.
- Only one test was completed on Mix B and measured Marsh value of 40s.

- The Specific Gravity and Bleed tests for Mix C without Celbex shows very stable numbers with Specific Gravity ranged from 1.73 to 1.78 and Bleed of 1 %.
- The specific gravity for Mix B on one test conducted during this week was 1.68 and bleeding 2%.

- Some fluctuation with Marsh value, possible issue with cement from different bulk bags, also some chunks found in the grout causing fluctuation in pressure and flow rate during grouting.
- KCG was advised to better control the screening and filling of 20 KG buckets.

HOLE DEPTH VERIFICATIONS

- TCG along with GHD measured the depth of hole and water level for every hole prior to start rock grouting.

BOREHOLE INCLINATION CHECK

- KCG will submit RFI to relax the casing deviation from 0.5% to 2.0%

pH AND TURBIDITY RESPONSE

- No pH and Turbidity measures were taken this week.

LIST OF CHANGES ON SPECS, SITE INSTRUCTION, FIELD WORK AND DEVIATION LIST

Whale Tail Dike Remedial Grouting Sepecifications and Design Drawings Changes Tracking

Document	Revision	Date Issued	Subject
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PC	2019-10-03	Technical Specifications for Whale Tail Dike Remedial Drilling and Grouting Works Rev. PC was issued for AEM and Grouting Committee's (GC) review and comments. The document was the main topic of the discussion in the Grouting Committee Meeting No.3 held on Oct. 17th, 2019 in Montreal.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	PD	2019-10-28	As per discussions and recommendations from GC Meeting No.3, Technical and Specifications had been updated to Rev PD. Reference can be made to meeting minutes 669034-0000-30MC-0001 for details of the comments and recommendations to the designs.
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION ROCK GROUTING Document Number: 611913-E531-40EF-0001	PE	2019-11-27	Rev. PD had been updated to Rev PE based on recommendations presented in GC's letter Dated Oct. 25, 2019 and further discussions with AME engineers and site staff to implement the simplified approach and path forward proposed by the GC. Phased approach adopated starting with two rows of Blanket Grouting (Phase I) and based on the results of Blanket Grouting to decide the requirement of deepen the Upstream Blanket holes for Curtain Grouting (Phase II)
TECHNICAL SPECIFICATIONS FOR THE WHALE TAIL DIKE FOUNDATION BLANKET GROUTING Document Number: 669034-0000-40EF-0001	00	2020-01-10	Document Rev. PE had been updated based on comments on received and the discussions and recommendations from GC Meeting No.5 held on December 5, 2019.

Whale Tail Dike Remedial Grouting Site Instructions Changes Tracking

Document	Revision	Date Issued	Subject
SITE INSTRUCTIONS FOR DRILLING AND BLANKET GROUTING (Document Number: 669034-0000-40CA-0001 Rev. 00)	Rev 00	2019-11-19	A technical memo - Site Instructions for Drilling and Blanket Grouting Rev PB was issued on November 19, 2019. The objective of this document is to provide key instructions to the drilling and grouting of the Blanket Holes at the WTD foundation to allow work to start timely before Design Drawings and Specifications are ready and approved. The Site Instructions were prepared based on discussions and comments on Technical Specs Rev PD, Grouting Committee's Letter dated October 25, 2019 and in alignment with the objective of 40 to 50% seepage deduction with simplfied and phased project approach. This document may require update based on the progress and results of the field work.
	Rev 01	2020-01-08	The Site Instructions Rev 00 was updated to Rev 01 to incorporate: (1) modification of the Mix C+ by reducing the Calcium Chloride dosage (2)conditions for drilling and grouting the hole in two stages

Whale Tail Dike Remedial Grouting Fieldwork Instructions Changes Tracking

Document	Date Issued	Subject	Notes
Fieldwork Instruction No.1 (Email)	2019-12-03	Subject: 669034 - Rock Grouting on Grout Mix Change Procedures	This Fieldwork Instruction provide by email dated Dec. 03, 2019 on Subject: **Grout mix change procedures during the Blanket Hole Grouting and Regrouting** (prior to Open Throat Pump is available) based on the on site trial mix results and ground response on grout take and grouting pressure.
Fieldwork Instruction No.2 (FWI 001 Rev 00)	2019-12-07	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 00	This Fieldwork instruction applies to Grouting and Re-grouting of Primary Holes with the application of Celbex using Open Throat Pump as recommended by Grouting Committee (Meeting No. 5 on December 05 2019) that had been drilled per 5 m Stage. The site instruction will be updated as per the progress of the site construction.
Fieldwork Instruction No.3 (FWI 001 Rev. 01)	2019-12-09	FIELDWORK INSTRUCTION SHEET FWI-001 Document Number: 669034-2000-60NV-0001 Rev. 01	The fieldwork instruction No.2 was updated to introduce Mix D

DEVIATION LIST FOR REMEDIAL GROUTING AT WHALE TAIL DIKE

Deviation #	Date Received	Date Responded	Status	Subject	Location/Address	Notes
001	2019-11-10		AEM will manage the situation	QC did not use centerlizer to monitor inclination	multiple locations	Daily Report - Contractor informed that they will use inclino meter without centerlizer as they did last winter but AEM will look if they can findout centerlizer for 4.6" casing.
002	2019-11-14		waiting for apparatus and	QC did not have Vicat apparatus and did not know how to use filtration	during Trial mix	Vicat apparatus received and fist vicat test performed on Dec 5, 2029
003	2019-12-06			inclination check in bedrock holes are not been checked. AEM said inclination check is not necessary in the rock hole during daily construction meeting on Dec 6, 2019 and captured on weekly		As per specs. "Deviation from vertical in the bedrock section of the hole shall not exceed 2% of drilled length."
004	2020-01-13			Drilling of tertiary holes prior to grouted secondary holes	T611.5, T617.5, T623.5, T629.5	Tertiary holes drilled while secondary holes S614.5 and S626.5 were not been grouted yet. As per spec. Tertiary holes shall be drilled in rock after secondary holes has been grouted and grout reached its final set
005	2020-01-12			Continuous drilling and grouting of tertiary holes	WTD Tertiary holes	Consective tertiary holes has been drilled and grouted (6 m distance). As per spec. minimum distance between two drilled holes in bedrock is
006	2020-02-13	2020-02-13	accepted	Use of Mix B in Tertiary Holes	WTD Tertiary holes	AEM and SNC agreed with the KCG proposal of using Mix B in Tertiary holes.

SAFE AND SAFETY REMARKS

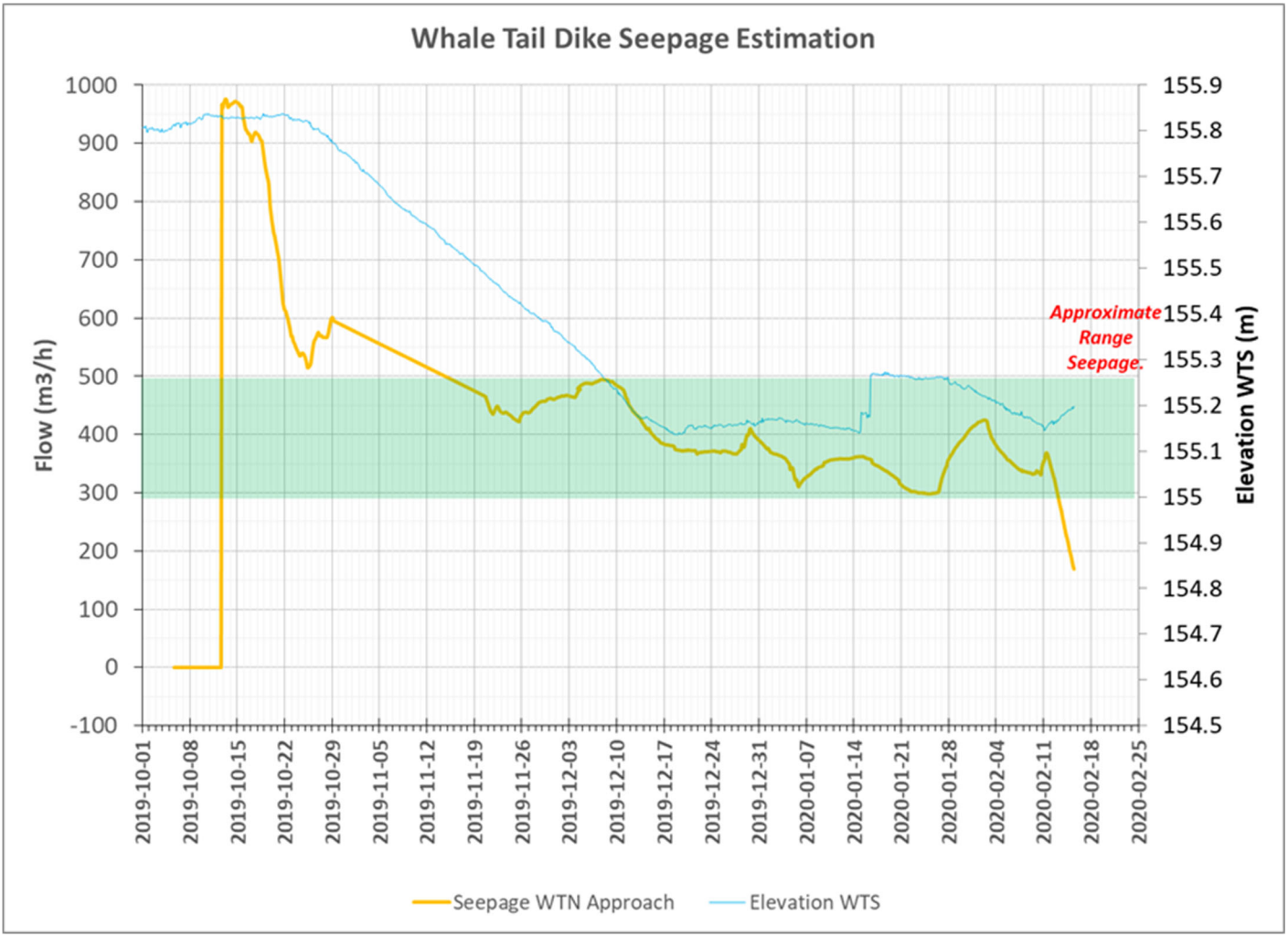
- Extreme cold weather conditions wear proper winter clothing.

Issued by :	*Muhammad Saleem*	**24-02-2020**
	Signature	Date
Verified by :	*Tom Xue*	**24-02-2020**
	Signature	Date

APPENDICES

A1: Seepage Report
A2: KGC As-Built Profile Progress

A1: Seepage Report



Notes:

1. WTN curve is in m_3/h while WTS is in elevation. AEM is working on update to have everything in m3/h to avoid confusion
2. Currently all pit inflow go to Quarry 1.
3. Because it is winter time now, it's assumed that the only outflow of WTS and inflow WTN is the seepage. When no other pumping occurs AEM convert the elevatin to m_3 based on a storage capacity curve. No direct measurement of the seepage rate is available.

A2: KGC As-Built Profile Progress

Please note that KCG has incorporated some of the preliminary comments from grouting committee received on Feb 16th 2020 for Feb 1st to 6th weekly report but still there are some GC and SNC comments pending to be incorporated in next report.

GC comments to be incorporated:

- Table for grout mixes to be added to the legend.

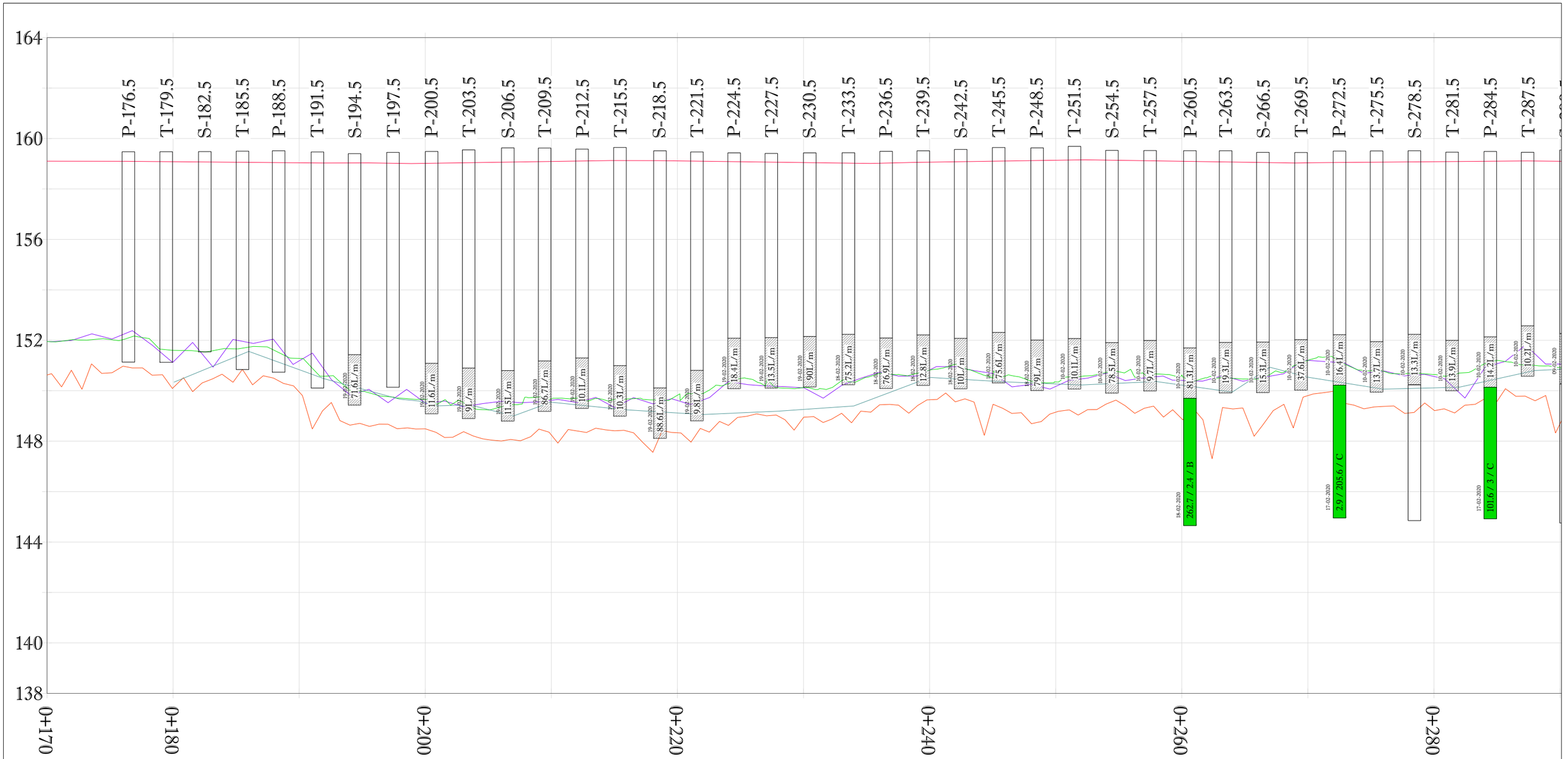
SNC comments:

- The holes those grouted in two short stages of 1.5 m and 3.5 m grout length, 1.5 m stage data should be added in the As-Built profile.
- Plug grout volume injected should be shown in liters instead of l/m.
- At some locations in as-built profile, different mixes injected in the same stage shown separated by comma (,) but at most of the locations only last used mix shown. Different mixes used in the same grouting stage should be shown.

Corrections need to done:

- P740.5 final mix used during 1st and 2nd regrout need to be corrected to Mix D.
- P728.5 total grout volume need to be corrected to 482.8 liters.
- T701.5 mix used need to be corrected to Mix C.
- S698.5 total grout volume need to be corrected to 1605 liters
- T683.5 final mix used need to be corrected to Mix D
- T656.5 final mix used need to be corrected to Mix C+
- P632.5 final mix used during 1st regrout need to be corrected to Mix C
- T551.5 mix used need to be corrected to Mix C.
- P272.5 values are not in order (volume / pressure / mix type) as per legend.

INJECTION DOWNSTREAM PHASE 2 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

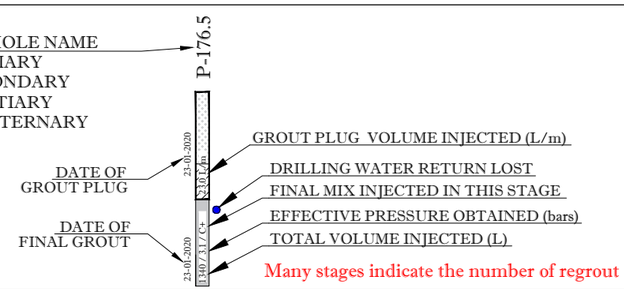
SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved

BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY



Many stages indicate the number of regrout

- TOP DIKE AS-BUILT EL. 159.0
- MEASURED WATER LEVEL
- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET
- GROUTING COMMUNICATION

PREPARED BY : MIKAËL LÉVESQUE
DATE : 20-02-2020
CON-FD-240-1

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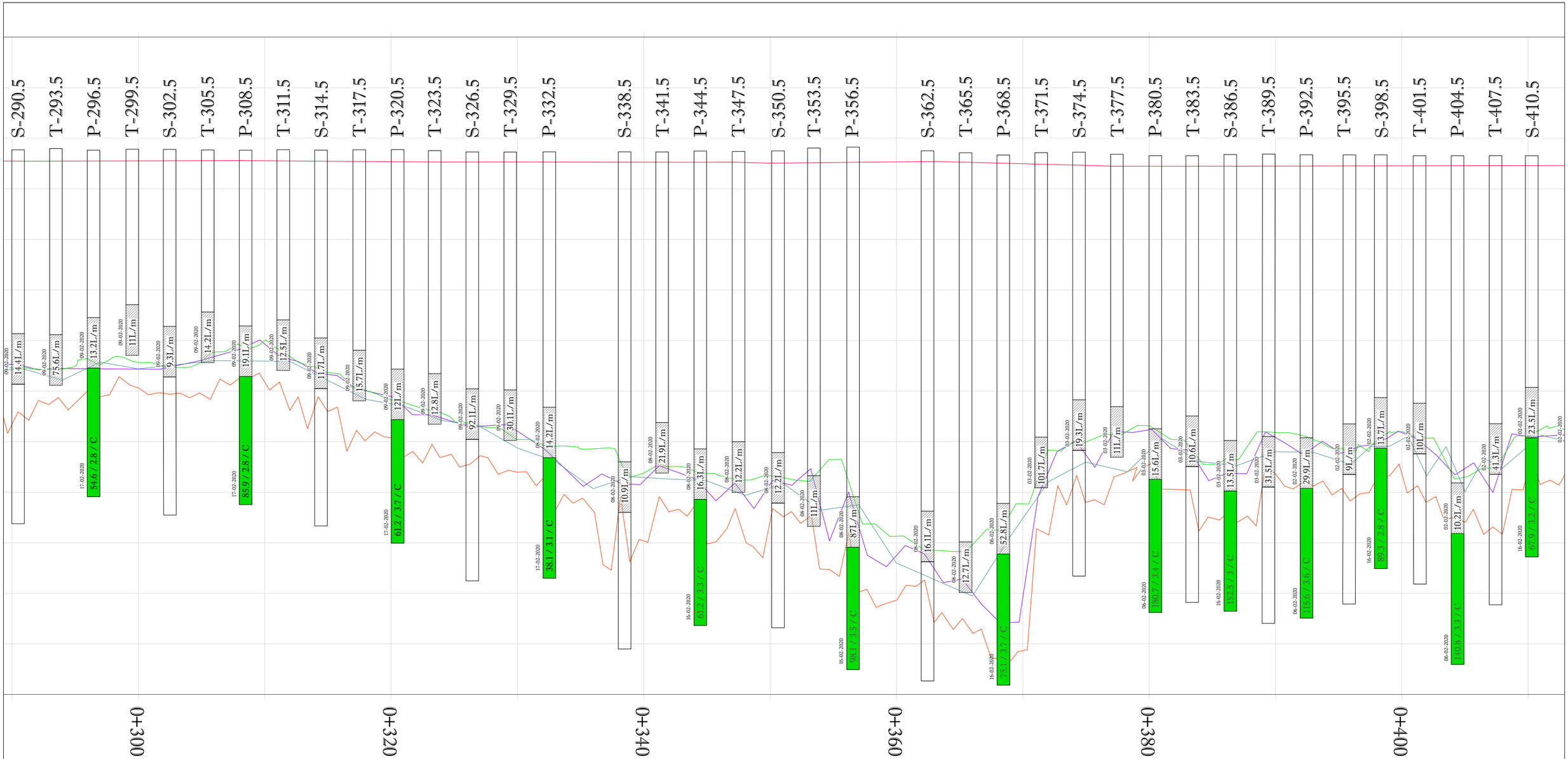
INJECTION DOWNSTREAM PHASE 2 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved

BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY

P-176.5

DATE OF GROUT PLUG
DATE OF FINAL GROUT

GROUT PLUG VOLUME INJECTED (L/m)
DRILLING WATER RETURN LOST
FINAL MIX INJECTED IN THIS STAGE
EFFECTIVE PRESSURE OBTAINED (bars)
TOTAL VOLUME INJECTED (L)

Many stages indicate the number of regrout

- TOP DIKE AS-BUILT EL. 159.0
- MEASURED WATER LEVEL
- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET
- GROUTING COMMUNICATION

PREPARED BY : MIKAËL LÉVESQUE
DATE : 20-02-2020
CON-FD-240-2

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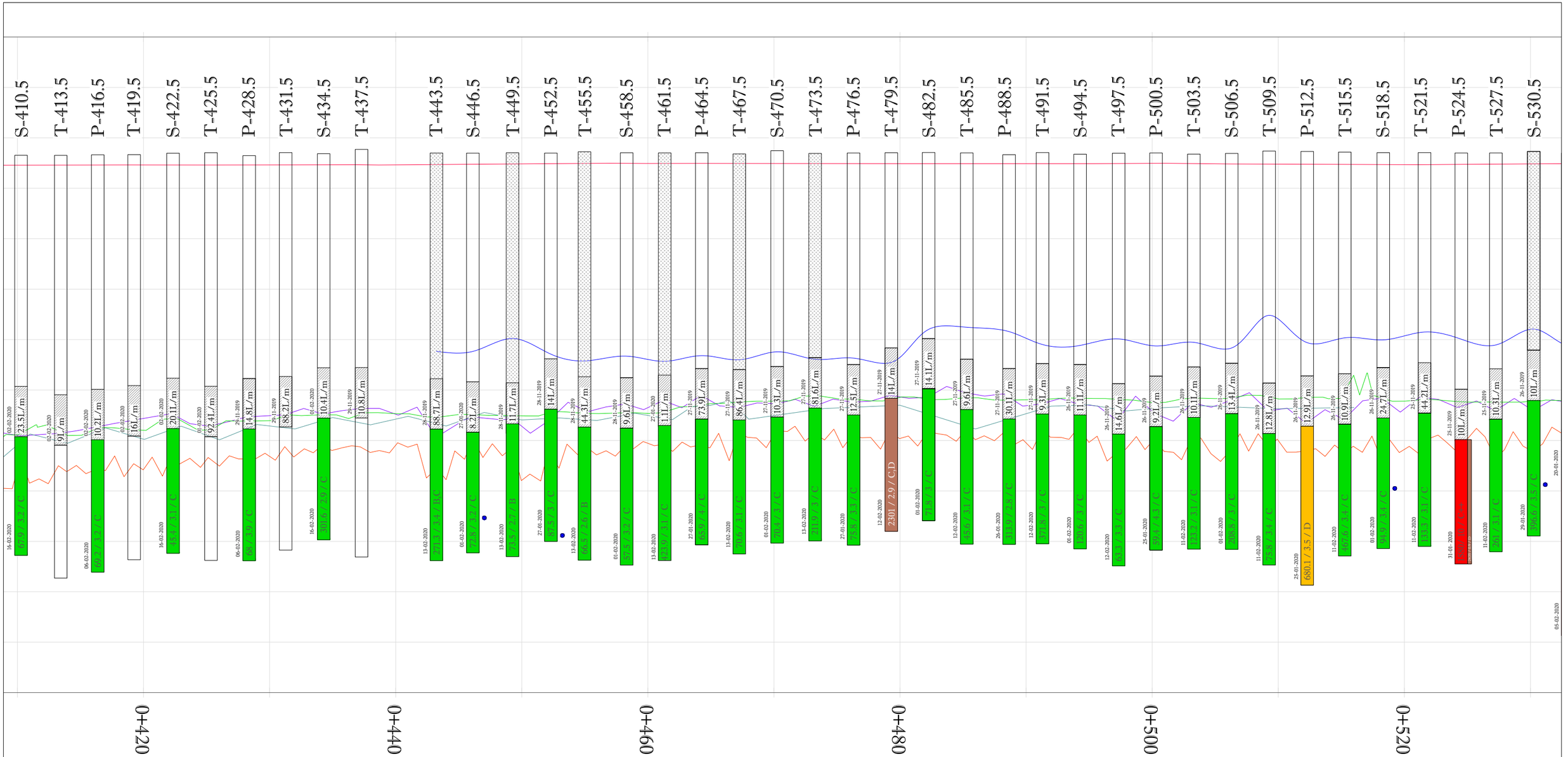
INJECTION DOWNSTREAM PHASE 2 - AS-BUILT
WHALE TAIL DIKE CONSTRUCTION - CONTRACT # 11-811



0 10 20 Meters

SCALE : 1:500 VERTICAL EXAGERATION: 2

KIVALLIQ CONTRACTORS GROUP LTD

		TAKE : L/m
VOL / P	LOW	< 100
VOL / P	M.HIGH	100 < > 200
VOL / P	HIGH	200 < > 400
VOL / P	V.HIGH	> 400

White numbers indicate > 80% of Pmax not achieved
Black numbers indicate > 80% of Pmax achieved

BOREHOLE NAME
P: PRIMARY
S: SECONDARY
T: TERTIARY
Q: QUATERNARY

P-176.5

DATE OF GROUT PLUG
DATE OF FINAL GROUT

GROUT PLUG VOLUME INJECTED (L/m)
DRILLING WATER RETURN LOST
FINAL MIX INJECTED IN THIS STAGE
EFFECTIVE PRESSURE OBTAINED (bars)
TOTAL VOLUME INJECTED (L)

Many stages indicate the number of regrout

- TOP DIKE AS-BUILT EL. 159.0
- MEASURED WATER LEVEL
- APPROVED BEDROCK SURVEY
- BEDROCK ENCOUNTERED BY HENRY DRILLING
- BOTTOM OF SECANT PILE ROCK SOCKET
- GROUTING COMMUNICATION

PREPARED BY : MIKAËL LÉVESQUE
DATE : 20-02-2020
CON-FD-240-3

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