

Project Title: AREVA Kiggavik Project Aquatic Baseline Program

Researcher's Name
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Project Location: The project is located 310 km northwest of Rankin Inlet and 480 km north of the Manitoba border. Baker Lake is the nearest community, located, approximately 80 km east of the project. The field crew utilized the AREVA Resources Canada Inc. (AREVA) exploration camp located north of Pointer Lake.

Annual Summary Report:

AREVA is proposing to construct and operate a uranium mine located in the Kivalliq region of Nunavut, southwest of the Thelon River. The Kiggavik Project is at the surface exploration phase. The project consists of two large groups of mining leases and mineral claims subdivided into Kiggavik to the north and Sissons to the south.

Golder Associates Ltd. (Golder) was to collect aquatic baseline information to assist in the design of the Project and to gather information that can be used for an environmental assessment and future monitoring. This is a continuation of the studies carried out in 2007 and 2008.

The 2009 baseline program included water and sediment sampling; benthic invertebrate community, periphyton, phytoplankton, and zooplankton collection; habitat and lake bathymetry mapping; spawning surveys for Arctic grayling; fish community and health surveys; collection of fish tissue for chemical analysis; and assessments of potential stream crossings along proposed road alignments.

Four sampling sessions were completed in 2009. The following provides a brief summary of each sampling session.

Winter Baseline Program – Under-ice limnology profiles were recorded in Qinguq Bay and Mushroom, Judge Sissons, Siamese, L2, Long, and Audra lakes in early May 2009. Lakes that were less than two meters deep were generally frozen to the bottom (i.e., Sik Sik, Rock and Willow lakes).

Spring Baseline Program – The spring program included only streams in late June 2009. Stream sampling included water collection and Arctic grayling spawning survey. Non-lethal fish capture methods included: angling, backpack electrofishing, and fyke netting. External health assessments, length and weight data, and non-lethal ageing structure were collected from fish captured. Passive Integrated Transponder (PIT) tags were applied to two Arctic grayling and ten lake trout prior to release. Eggs were recovered in Pointer/Rock, Rock/Willow, Lunch/Andrew, and Andrew/Shack streams, confirming spawning locations in these streams. Fish species captured during the 2009 spring program included Arctic grayling ($n = 21$), lake cisco ($n = 1$), lake trout ($n = 10$), ninespine stickleback ($n = 9$), round whitefish ($n = 3$), and slimy sculpin ($n = 6$). Water samples were also collected for water chemistry analysis.

Summer Baseline Program - The summer program included water collection in lakes, lake bathymetry survey of four lakes (Sik Sik, Andrew, Mushroom and north portion of Judge Sissons lakes) and detailed habitat surveys of two lakes (Sik Sik and Andrew lakes) and one stream (tributary of Northeast Inflow of Pointer Lake) in late July.

Summer Road Program – Fish habitat assessment and fish sampling (presence/absence) occurred at crossings identified along the Kiggavik northern and winter roads in late July. Non lethal capture methods used at crossings included angling and backpack electrofishing. External health assessments, length and weight data, and non-lethal ageing structure were collected from fish captured. Fish species captured during the 2009 summer road program included: Arctic grayling ($n = 76$), burbot ($n = 1$), lake trout ($n = 1$), longnose sucker ($n = 4$), ninespine stickleback ($n = 87$), round whitefish ($n = 4$), and slimy sculpin ($n = 75$). Though Arctic char were historically reported in the Thelon River (crossing NC01), none were observed or captured during the 2009 surveys. No fish were captured or observed in water courses that were less than a metre in width. Ninespine stickleback and slimy sculpin were present in streams greater than 1 m wide (e.g., crossing NC12). Fish species present in streams crossed by the proposed winter road were limited to two small-bodied fish (i.e., ninespine stickleback and sculpin).

Fall Baseline Program – The fall program included stream and lake components. Stream sampling included collecting water, benthic invertebrate, and periphyton samples. Fish sampling was also done. Lake sampling included collecting macrophytes, sediment, water, phytoplankton, and zooplankton, and benthic invertebrate samples. Fish community surveys and fish tissue collection were also undertaken. Macrophytes, sediment, water, and fish samples were collected for chemistry analysis. The fall program in the lakes included lethal and non-lethal fish capture methods, including: angling and short duration gill nets. External health assessments, length and weight data, and lethal and non-lethal ageing structures (if applicable) were collected from all fish captured. Fish species captured during the 2009 fall baseline program included Arctic grayling ($n = 46$), burbot ($n = 1$), lake cisco ($n = 36$), and lake trout ($n = 17$). Five Arctic grayling, five lake trout, and five lake cisco were submitted for chemical analysis. No Arctic char were observed or captured at sites sampled in the Aniquug River.

Fall Road Program – Fish habitat assessment and fish sampling (presence/absence) occurred at crossings identified along the proposed Kiggavik southern alignment. Due to time constraints only habitat assessments were completed on streams crossed by the proposed road sections east of the Thelon River. Backpack electrofishing was the only fish capture method used at southern road crossings. The majority of the watercourses crossed along the eastern and southern road alignments had either no defined or no visible channel. Fish populations were similar to those found along other proposed road alignments. Fish species captured during the 2009 fall road crossing program included Arctic grayling ($n = 5$), burbot ($n = 1$), ninespine stickleback ($n = 401$), and slimy sculpin ($n = 12$). Fish were captured or observed in streams with average channel width greater than 2.8 m (crossing S3).

A summary of fish captured are provided in Attachment A.

Attachment A Fish Captured During the 2009 Baseline Survey

Waterbody	Coordinates		Arctic grayling	Lake trout	Lake cisco	Round whitefish	Burbot	Longnose sucker	Slimy sculpin	Ninespine stickleback	Invertebrates (kg)
	Latitude	Longitude									
Unnamed Lake (Andrew Lake)	64°19'51" N	97°54'35" W	33	0	1	0	1	0	0	0	<1
Aniguq River	64°14' N	96°38' W	18	12	0	0	0	0	0	0	<1
Judge Sissons Lake	64°17' N	97°36' W	5	5	0	0	0	0	0	0	<1
Unnamed Lake (Pointer Lake)	64°23'58" N	97°37'08" W	0	0	35	0	0	0	0	0	-
Unnamed Lake (Willow Lake)	64°21'53" N	97°37'21" W	-	-	-	-	-	-	-	-	<1
Unnamed Watershed and Outflow (Willow Lake)	64°21' - 64°27'N	97°36' - 97°40'W	11	10	1	3	1	0	6	9	<1
W1	64°27'00" N	97°35'54" W	0	0	0	0	0	0	0	1	-
W2	64°27'06" N	97°35'09" W	0	0	0	0	0	0	1	2	-
W3	64°27'20" N	97°32'15" W	0	0	0	0	0	0	0	1	-
W4	64°12'56" N	96°34'00" W	-	-	-	-	-	-	-	-	-
W5b	64°13'25" N	96°30'23" W	0	0	0	0	0	0	0	0	-
W6b	64°12'29" N	96°24'42" W	0	0	0	0	0	0	0	0	-
L1	64°27'38" N	97°23'23" W	-	-	-	-	-	-	-	-	-
L2	64°27'02" N	97°12'30" W	-	-	-	-	-	-	-	-	-
L3	64°20'15" N	96°55'14" W	-	-	-	-	-	-	-	-	-
L4	64°13'44" N	96°14'27" W	-	-	-	-	-	-	-	-	-
NC00.5	64°21'04" N	96°11'21" W	-	-	-	-	-	-	-	-	-
NC01b	64°24'35" N	96°34'22" W	4	1	0	0	0	0	1	0	-
NC02	64°24'36" N	96°25'30" W	-	-	-	-	-	-	-	-	-
NC03	64°25'16" N	96°26'55" W	0	0	0	0	0	0	0	0	-
NC04	64°25'31" N	96°27'48" W	-	-	-	-	-	-	-	-	-
NC05	64°26'19" N	96°31'15" W	-	-	-	-	-	-	-	-	-
NC06	64°27'32" N	96°36'24" W	-	-	-	-	-	-	-	-	-
NC07	64°27'32" N	96°36'24" W	-	-	-	-	-	-	-	-	-
NC08	64°27'36" N	96°40'36" W	-	-	-	-	-	-	-	-	-
NC09	64°27'51" N	96°42'41" W	1	0	0	0	0	4	0	13	-
NC10b	64°27'51" N	96°43'05" W	0	0	0	0	0	0	0	5	-
NC11	64°27'52" N	96°46'07" W	-	-	-	-	-	-	-	-	-
NC11.5	64°27'15" N	96°53'43" W	0	0	0	0	0	0	0	0	-
NC12	64°27'16" N	96°54'05" W	0	0	0	0	0	0	1	46	-
NC13	64°26'55" N	96°56'01" W	16	0	0	4	0	0	19	5	-
NC14	64°30'56" N	97°08'39" W	-	-	-	-	-	-	-	-	-
NC14.5	64°30'30" N	97°09'14" W	-	-	-	-	-	-	-	-	-
NC15b	64°30'10" N	97°10'12" W	1	0	0	0	1	0	3	0	-
NC16	64°29'46" N	97°12'05" W	6	0	0	0	0	0	5	12	-
NC17	64°28'14" N	96°14'45" W	0	0	0	0	0	0	0	0	-
NC18	64°28'43" N	97°17'29" W	-	-	-	-	-	-	-	-	-
NC19	64°29'56" N	97°26'31" W	-	-	-	-	-	-	-	-	-
NC20	64°29'48" N	97°29'21" W	-	-	-	-	-	-	-	-	-
NC21	64°29'41" N	97°29'31" W	-	-	-	-	-	-	-	-	-
NC22	64°29'38" N	97°29'34" W	-	-	-	-	-	-	-	-	-
NC22.5	64°29'30" N	97°29'49" W	26	0	0	0	0	0	4	1	-
NC23	64°29'43" N	97°31'57" W	0	0	0	0	0	0	0	0	-
NC24	64°27'15" N	97°38'48" W	0	0	0	0	0	0	0	0	-
NC25	64°26'56" N	97°39'28" W	-	-	-	-	-	-	-	-	-
NC26	64°26'20" N	97°41'36" W	14	0	0	0	0	0	43	2	-
NC27	64°25'35" N	97°42'30" W	0	0	0	0	0	0	0	1	-
NC28	64°24'51" N	97°43'15" W	-	-	-	-	-	-	-	-	-
NC29	64°25'35" N	97°42'30" W	1	0	0	0	0	0	3	0	-
NC30	64°21'56" N	97°47'20" W	7	0	0	0	0	0	0	0	-
NC30.5	64°21'03" N	97°51'20" W	-	-	-	-	-	-	-	-	-
NC31	64°20'59" N	97°52'32" W	1	0	0	0	0	0	0	0	-
S1	64°7'38" N	96°0'34" W	-	-	-	-	-	-	-	-	-
S2	64°8'9" N	96°7'15" W	-	-	-	-	-	-	-	-	-
S3b	64°8'16" N	96°8'11" W	4	0	0	0	0	0	1	20	-
S4	64°10'6" N	96°14'23" W	-	-	-	-	-	-	-	-	-
S5b	64°10'38" N	96°16'3" W	0	0	0	0	1	0	0	9	-
S6	64°11'6" N	6°96'17" W	-	-	-	-	-	-	-	-	-
S7	64°18'2" N	96°38'9" W	-	-	-	-	-	-	-	-	-
S8	64°18'31" N	96°40'16" W	-	-	-	-	-	-	-	-	-
S9	64°19'2" N	96°41'25" W	-	-	-	-	-	-	-	-	-
S10	64°19'31" N	96°43'34" W	-	-	-	-	-	-	-	-	-
S11b	64°20'42" N	96°49'3" W	0	0	0	0	0	0	0	327	-
S12	64°21'49" N	96°53'22" W	-	-	-	-	-	-	-	-	-
S13b	64°22'28" N	96°56'53" W	1	0	0	0	0	0	11	7	-
S14	64°22'46" N	96°58'43" W	1	0	0	0	0	0	0	38	-
S15	64°23'40" N	97°2'51" W	-	-	-	-	-	-	-	-	-
S16	64°24'35" N	97°5'56" W	-	-	-	-	-	-	-	-	-
S17b	64°25'59" N	97°11'7" W	-	-	-	-	-	-	-	-	-
S18	64°27'34" N	97°15'49" W	-	-	-	-	-	-	-	-	-

Italicized and bolded values indicate fish that were observed (i.e., not captured).

n = number; - = not applicable.

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[illegible]

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