

## Kitkatla Remediation Program

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In December of 2006 Quantum Remediation, a Division of Quantum Murray LP, was awarded a contract through the Gitxaala First Nations (GFN) to conduct a remedial excavation and water treatment program in Kitkatla First Nation village, on Dolphin Island, BC. Quantum Remediation retained the prime contractor role and worked in conjunction with SLR Consulting Ltd. (formerly Seacor Environmental Inc.) to address a large diesel plume - which spread throughout the muskeg surrounding the village centre piece, St. Peters Church. The project included two phases of the work.

The first phase included the bulk excavation, transportation, and disposal of approximately 20,000 cubic meters of impacted materials. The excavated materials were then segregated into four separate waste streams - which corresponded to the BC Contaminated Site regulations, hazardous waste quality, waste quality, commercial quality (greater than residential standards) and residential quality (below residential standards).

Kitkatla is located on Dolphin Island and therefore all impacted soils greater than residential standards were required to be shipped off the island using tug and barge. In order to ensure full barge loads, the soils were stockpiled in temporary holding cells before they were loaded onto barges. The impacted soils were then sent to and disposed of in several permitted facilities located in Prince Rupert and the Lower Mainland, BC.

All backfill materials were shipped to Kitkatla from Stewart, BC near Hyder Alaska along the Portland Canal. A total of 17,600 tonnes of riverbed gravel was loaded, transported, and placed at the Kitkatla village site. Along with the remedial excavation, there was an extensive dewatering and water treatment program which included the treatment of approximately 20 millions liters of diesel impacted water from a main sump installed adjacent to St. Peters Church. The water treatment included flocculation, settlement, sand and carbon filtration.

After the first phase of work was completed, there still was a significant diesel plume surrounding and underneath St. Peters Church, which was built in the early 1900's. Several remedial options were explored including underpinning the church and slot cutting around the perimeter. Due to the nature of the muskeg

and the unknown status of the church foundation, Quantum proposed to relocate the church onto a newly built foundation allowing for the safe removal of the impacted muskeg.

Quantum Remediation assembled the project team, which consisted of geotechnical and structural engineering along with a house moving company and a forming contractor/builder. After weeks of planning, the project team formally presented a proposal to the GFN in January of 2008. With input from the Nation people, final plans were agreed to and the second phase of the project was initiated.

The project team firstly prepared the ground for the new church location. This area was excavated to bedrock and re-compacted in order to meet the geotechnical engineer specification. Upon completion, the forming contractor took exact measurements of the church exterior including the abutments and started to lay out the new basement foundation. It was imperative that this step be performed accurately, as the original structure was not exactly square and that each abutment had to line up with its foundation perfectly. The concrete forms were then poured in place and allowed to set all within a few weeks time. This work was conducted in the middle of a typical cold and rainy north coastal BC winter.

The house movers were then mobilized to the site to take on the next phase of work, the relocation of St. Peters Church. Using conventional moving equipment, which consisted of a series of I-beams, hydraulic jacks, wood blocks and skates, the church was then carefully removed from its original crawl space foundation and slowly moved and angled to sit on the newly built basement foundation. This phase of work was completed within four days. Once the old church piles were exposed, the concrete was observed to crumble when handled. According to the structural engineer, these piles would have only lasted another ten years. Before the move, the GFN people conducted a ceremony to mark the occasion and literally all of the village people lined the roadway to witness the move first hand.

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The final steps of the project included: the installation of underground utilities for adequate site drainage; remediation of diesel impacted muskeg including transportation and disposal to permitted facilities; the careful relocation of the original foundation piles for future use by the GFN, and the installation of an hydronic heating system, concrete slab, pony walls, wheelchair ramp, and staircase.

The hydronic heating system was decided upon by the GFN to increase heat efficiencies and reduce operational costs while ensuring the GFN people have a comfortable gathering place in the centre of the village.

Quantum maintained a safe work site and was very professional in its dealing with the various stake holders during project negotiations and site works. The work was completed on budget, on schedule, and to the satisfaction of the various stakeholders.

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David Isopo is a remediation specialist and project manager with Quantum Remediation, Prairies Division. David has been in the remediation industry since 2002. David has worked on numerous of remediation projects throughout British Columbia and Alberta - for industry, government, and aboriginal stakeholders. David has specialized in the remediation of soil and water with a focus on light and heavy end hydrocarbons, hazardous chlorinated hydrocarbons, and heavy metals.