**Appendix 1: List of investigated SSF samples from the Mural Formation.**

Unless otherwise stated, GPS coordinates are available for all samples through contact with the curatorial staff at the Royal BC Museum, Victoria, Canada.

Samples from Mumm Peak locality.

Sample MP-1

Uncertain level in upper half of lower limestone member. Bioclastic, red to pink limestone in reefal facies.

Weight: 0,708 kg

Sample MP-2

Uncertain level from upper part of lower carbonate member. Grey, bioclastic limestone with ooids and oncoids. Fossil shells weather out.

Weight: 0,892 kg

Sample MP-3

Uncertain level from upper part of lower carbonate member. Grey, fossil rich bioclastic limestone with ooids. Thin shale parting between limestone layers.

Weight: 0,950 kg

Sample MP-4

Thin, grey bioclastic limestone layers in bottom part of middle shale member. Lots of shells, including lingulid brachiopods and trilobite sclerites.

Weight: 1,297 kg

Sample MP-5

Lower carbonate member of Mural Formation, 1.9 m above the base the formation. Bioclastic limestone. Collected ca 5 m lateral to a prominent reef body.

Weight: 0,899 kg

Sample MP-6

Lower carbonate member of Mural Formation, 16.8 m above the base the formation. Bedded limestone with many, large archaeocythan fragments. Probably lateral to large reef body (ca 10 m).

Weight: 0,942 kg

Sample MP-7

Lower carbonate member of Mural Formation, 33.8 m above the base the formation. Pink bioclastic limestone. 5-10 cm beds with small shell fragments and only few archaeocyathans. Collected just above dolomitized interval.

Weight: 0,865 kg

Sample MP-8

Lower carbonate member of Mural Formation, 45.9 m above the base the formation. Grey, bioclastic and peloidal limestone with tubular fossils weathering out.

Weight: 0,813 kg

Sample MP-9

Lower carbonate member of Mural Formation, 60.5 m above the base the formation. Grey bioclastic limestone with many shell fragments.

Weight: 0,685 kg

Sample MP-10

Lower carbonate member of Mural Formation, 72,7 m above the base the formation. Grey limestone with large trilobite fragments.

Weight: 0,771 kg

Sample MP-11

Lower carbonate member of Mural Formation, 82.0 m above the base the formation. Grey, fossil rich, thin bedded limestone with thin shale interbeds.

Weight: 1,043 kg

Sample MP-12

Lower carbonate member of Mural Formation, 93.6 m above the base the formation.Grey limestone. Collected close to the top of lower carbonate member. Large fragments of archaeocyathans, trilobites and *Kutorgina perugata*.

Weight: 0,940 kg

Sample MP-13

Limestone sample with brachiopod shells collected from the middle Shale unit, approximately 113 m above base of the formation, coinciding with level of soft part preservation.

Weight: 1,619 kg

No GPS coordinates

Sample MP-14

Grey limestone with black shell material weathering out. Collected from same stratigraphic level as sample MP-11 at 82.0 m above the base the formation.

Weight: 0,651 kg

No GPS coordinates.

Sample MP-15

Limestone sample from lowermost part of middle Shale unit at 103.7 m above base of formation.

Weight: 0,909 kg

No GPS coordinates.

Sample MP-16

Limestone sample from lower part of middle Shale unit at 110.7 m above base of formation.

Weight: 0,690 kg

No GPS coordinates.

Sample MP-17

Limestone sample from lower part of middle Shale unit at 110.1 m above base of formation.

Weight: 1,378

No GPS coordinates.

Samples from Rocky Lake locality.

The basal carbonate of the Mural Formation at the Rocky Lake locality is well exposed in a glacial valley but have not been described in detail before. Only an approximate measurement of the section was performed. The base of the section was taken to be the base of the first bioclastic carbonate bed, immediately overlying a prominent yellow weathering, dolomite cemented sandstone. The basal limestone is thinner than at Mumm Peak, being approximately 60 m thick. The sequence consists bioclastic limestones, at some levels associated with archaeocyathid reefs. A 50 cm thick sandstone layer is present about 13 m above the base of the formation. Towards the top of the basal carbonate unit, ooids and oncoids are common. No GPS coordinates for individual sample horizons.

Sample RL-1

Limestone sample collected from bottom of prominent cliff forming the base of the Middle Shale unit of the Mural Formation. Fragments of *Mickwitzia* and trilobites observed. Approximately 61 m above base of Mural Formation.

Weight: 0,898 kg

Sample RL-2

Bioclastic limestone collected from upper part of lower Carbonate unit, approximately 10 m above the last observed reef body. Fragments of trilobites, archaeocyathids etc. Approximately 55 m above base of Mural Formation.

Weight: 1,035 kg

Sample RL-3

Bioclastic, irregularly bedded (5-10 cm) limestone forming the base of the Mural Formation, overlying yellow weathering, dolomite cemented sandstone. Sample collected 15 cm above the base of the formation. Trilobite and hyolith fragments observed.

Weight: 0,850 kg

Sample RL-4

Bedded (10-20 cm), bioclastic limestone with archaeocythid reefs. Layers with more coarse grains contain archaeocyathid and phosphatized tubes. Sample collected approximately 6 m above base of formation.

Weight: 0,946 kg

Sample RL-5

Grey, bioclastic limestone with stylolites and fossil shells below 0.5 m sandstone bed. Sample collected approximately 1 m below sandstone bed, about 12 m above base of formation.

Weight: 0,996 kg

Sample RL-6

Bioclastic, dark grey limestone with trilobites and other shells above second major level of archaeocyathid reefs. Sample collected about 25 m above base of formation.

Weight: 0,897 kg

Sample RL-7

Bioclastic, echinoderm rich grey limestone collected 1.5 m lateral to reef body. Sample collected approximately 35 m above base of formation.

Weight: 0,908 kg

Sample RL-8

Bioclastic limestone with large trilobite fragments, collected 1.5 m from reef body, at approximately 45 m above base of formation.

Weight: 0,777 kg

Samples from Dezaiko Range area.

Sample DR-1

Fossil rich limestone collected from float in a pass with poorly exposed Mural Formation. Lithologically comparable to limestone units at the top of basal carbonate or in the lower part of middle Shale units.

Weight: 1,697 kg

Sample DR-3

Fossil rich limestone sample collected from locality south of camp site. Lithologically comparable to limestone units at the top of basal carbonate or in the lower part of middle Shale units.

Weight:1,533 kg