



November 8, 2017

Mr. Andrew Nakashuk
Chairperson
Nunavut Planning Commission
P.O. Box 1797
Iqaluit, Nunavut X0A 0H0

Re: Dunnedin Ventures Inc. Kahuna Property – NPC Amendment Application #148166

NIRB File #15EN028
KIA Land Use Licence KVL315B01
KIA Land Use Licence KVRW16F01
INAC Land Use Permit N2015C0019
NWB Water Licence 2BE-KDP1722

Dear Mr. Nakashuk,

Please find attached Project Amendment documents for Dunnedin Venture Inc.'s Kahuna Property.

Dunnedin Ventures Inc. Kahuna Property is located between the communities of Rankin Inlet (Kangiqtiniq) and Chesterfield Inlet (Igluigaarjuk) in the Kivalliq Region of Nunavut. The property comprises 145 mineral claims encompassing 166,463 hectares and extends north, south, east and west between Latitudes 62°58' and 63°19' North and Longitudes 90°44' and 92°13' West.

Exploration activities on the Kahuna Property are authorized by INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01, KIA Land Use Licence KVRW16F01 and NWB Water Licence 2BE-KDP1722.

These project amendment documents are being submitted to NPC and NIRB and then distributed to INAC, KIA and NWB as appropriate, to authorize a temporary field camp and a fuel cache on Crown Lands under INAC Land Use Permit N2015C0019, and to authorize domestic water use for the temporary field camp under NWB Water Licence 2BE-KDP1722. The temporary camp will be used to support planned 2018 exploration activities that are currently authorized by Dunnedin's existing permits and licenses.

The planned 2018 exploration program will consist of rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, diamond drilling and reverse circulation drilling.

The property has increased since 2015 from 29 mineral claims covering 33,810.8 Ha, to 145 mineral claims encompassing 166,463 hectares in 2017. A total of 82 mineral claims have surface rights covering 87,570 hectares that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15.

Rankin Inlet was used as a base of operations for the summer 2017 program. To mitigate daily helicopter transits to and from Rankin Inlet, and for safety reasons associated with winter work conditions, Dunnedin

is seeking authorization for a temporary field camp located centrally on the Kahuna Property and proximal to high priority exploration targets.

Members of the Chesterfield Inlet HTO provided assistance and recommendations for the site selected by Dunnedin for the proposed field camp location. More than 10 different sites were investigated. A large, flat topped esker feature was recommended as the best the location. The site is on Crown Lands approximately 40 kilometres northeast from Rankin Inlet and 50 kilometres southwest from Chesterfield Inlet at 575,975mE and 6,990,875mN in Zone 15, UTM NAD83. The new camp will operate seasonally from March through September and will accommodate up to 20 people. The camp will include: 1 kitchen tent, 1 office tent, 1 dry tent, 1 utility tent, 1 core logging tent, 7 supplementary sleep tents, a Pacto latrine facility, a small generator shed, an incinerator and 2 arctic grade containment fuel berms. Structures will consist of a combination of WeatherPort vinyl tents, canvas prospectors' tents and small plywood sheds. The field camp will be fully closed and dismantled completely once exploration activities cease. The site will then be reclaimed and restored to its original state.

Dunnedin's existing permits and licenses include authorization for 3 fuel caches that together contain an aggregate of 75 drums (205L each) of jet fuel and 120 drums of diesel fuel. Dunnedin requests an increase in the amount of fuel to be cached on the Kahuna Property to support the field camp, the proposed 2018 winter drill program and the summer 2018 exploration program. A main fuel cache will be established on the east side of the new field camp facilities at 576065mE 6990845mN UTM Zone 15, UTM NAD83. Fuel to be cached on the site will include: 150 drums (205L each) of diesel fuel, 150 drums of jet fuel, 10 drums of gasoline and 20 cylinders (100 lbs. each) of propane.

There are no other changes to the project as it is currently permitted and licenced.

If you have any further questions or require any additional information, please do not hesitate to contact me at (604) 646-4529, or by email, aberry@dunnedinventures.com

Regards,



Andrew Berry
VP Operations
Dunnedin Ventures Inc.

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*Documents are listed in the same order as they are found in the hard copy.

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Kahuna Property Work Plan, includes:

Property Location Map

Land Tenure Map

2018 Exploration Target Areas Map

Section 2

Executive Summary-English

Executive Summary-Inuktitut

Appendix A - INAC Land Use Permit Amendment Application

Appendix B - NWB Water Licence Amendment Application

Appendix C - Spill Prevention and Response Plan

Appendix D - Fuel Management Plan

Appendix E - Environmental and Wildlife Management Plan

Appendix F – Abandonment and Restoration Plan

Appendix G - Emergency Response Plan

Appendix H - Waste Management Plan



Kahuna Property
2018 Work Plan
Dunnedin Ventures Inc.

Submitted: November 8, 2017

Prepared By: Andrew Berry, VP Operations
Dunnedin Ventures Inc.
Suite 1020-800 West Pender Street
Vancouver, BC, V6C 2V6

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1 Introduction

Dunnedin Ventures Inc. (Dunnedin) Kahuna Property is located between the communities of Rankin Inlet (Kangiqtiniq) and Chesterfield Inlet (Igluigaarjuk) in the Kivalliq Region of Nunavut. The property hosts known gold and diamond occurrences and comprises 145 mineral claims encompassing 166,463 hectares (Figure 1).

The exploration program planned and proposed for 2018 will consist of rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, diamond drilling, reverse circulation drilling and bulk sampling.

Exploration activities on the Kahuna Property are authorized by INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01, KIA Land Use Licence KVR16F01 and NWB Water Licence 2BE-KDP1722.

An amendment application has been submitted to NPC and NIRB to authorize a temporary field camp and fuel cache on Crown Lands under INAC Land Use Permit N2015C0019, and authorize domestic water use for the temporary camp under NWB Water Licence 2BE-KDP1722. The temporary camp will be used to support exploration activities authorized by Dunnedin’s existing permits and licences .

2 Property Description and Location

The Kahuna Property comprises 145 mineral claims encompassing 166,463 hectares of land located on NTS map sheets 0550/02, 0550/03, 0550/04, 0550/05, 0550/06, 0550/07, 055J/13, 055J/14, 055N/01 and 055N08 (Table 1, Figure 2). The southern boundary of the property adjoins the north boundary of subsurface Inuit Owned Land (IOL) parcel RI-01, approximately 25 kilometres northeast of Rankin Inlet. The northeast corner of the property is located approximately 10 kilometres southeast of Chesterfield Inlet. The northwest corner of the property is located approximately 75 kilometres west of Chesterfield Inlet. The property has increased since 2015 from 29 mineral claims covering 33,810.8 Ha, to 109 mineral claims covering 124,138.6 Ha. An additional 36 mineral claims staked in September 2017 and covering 42,324 Ha are pending approval from the Mining Recorders Office. The Property extends north, south, east and west between Latitudes 62°58’ and 63°19’ North and Longitudes 90°44’ and 92°13’ West (UTM coordinates: 6,983,000mN to 7,023,000mN and 539,000mE to 614,000mE, NAD83, Zone 15). A total of 82 mineral claims have surface rights covering 87,570 Ha that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15.

TABLE 1: DUNNEDIN VENTURE INC.'S LAND TENURE

Claim Name	Claim Number	Area (Ha)	Issue Date	Anniversary Date	Current Owner	Status
KH 1	F93355	1250	12/08/2014	12/08/2019	Thompson (50%) Posescu (50%)	ACTIVE
KH 2	F93356	1250	12/08/2014	12/08/2019	Thompson (50%) Posescu (50%)	ACTIVE
KH 3	F93357	1250	12/08/2014	12/08/2017	Thompson (50%) Posescu (50%)	ACTIVE
KH 4	F95587	1250	12/08/2014	12/08/2018	Thompson (50%) Posescu (50%)	ACTIVE
KH 5	F95588	1250	12/08/2014	12/08/2018	Thompson (50%) Posescu (50%)	ACTIVE
KH 6	F95589	1250	12/08/2014	12/08/2017	Thompson (50%) Posescu (50%)	ACTIVE
KH 7	F95582	1149.5	12/08/2014	12/08/2024	Thompson (50%) Posescu (50%)	ACTIVE
KH 8	F95583	1250	12/08/2014	12/08/2017	Thompson (50%) Posescu (50%)	ACTIVE
KH 9	F95584	1250	12/08/2014	12/08/2024	Thompson (50%) Posescu (50%)	ACTIVE
KH 10	F95585	1153.1	12/08/2014	12/08/2021	Thompson (50%) Posescu (50%)	ACTIVE

Claim Name	Claim Number	Area (Ha)	Issue Date	Anniversary Date	Current Owner	Status
KH 11	F95586	750.8	12/08/2014	01/08/2018	Thompson (50%) Posescu (50%)	ACTIVE
KH 12	F94927	1250	03/03/2015	03/03/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 13	F94928	1250	03/03/2015	03/03/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 14	F94929	1250	03/03/2015	03/03/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 15	F94930	1250	03/03/2015	03/03/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 16	F95182	1250	03/03/2015	03/03/2025	Dunedin Ventures Inc. (100%)	ACTIVE
KH 17	F95183	1250	03/03/2015	03/03/2025	Dunedin Ventures Inc. (100%)	ACTIVE
KH 18	F95184	1250	03/03/2015	03/03/2025	Dunedin Ventures Inc. (100%)	ACTIVE
KH 19	F95185	1250	03/03/2015	03/03/2019	Dunedin Ventures Inc. (100%)	ACTIVE
KH 20	F95186	1250	03/03/2015	03/03/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 21	F95187	1195.9	03/03/2015	03/03/2025	Dunedin Ventures Inc. (100%)	ACTIVE
KH 22	F95188	1127.3	03/03/2015	03/03/2025	Dunedin Ventures Inc. (100%)	ACTIVE
KH 23	F95189	1250	03/03/2015	03/03/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 24	F95190	1250	03/03/2015	03/03/2021	Dunedin Ventures Inc. (100%)	ACTIVE
KH 25	F95191	1250	03/03/2015	03/03/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 26	F95192	1250	03/03/2015	03/03/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 27	F95193	694.9	03/03/2015	03/03/2019	Dunedin Ventures Inc. (100%)	ACTIVE
KH 28	F95194	1184.8	03/03/2015	03/03/2019	Dunedin Ventures Inc. (100%)	ACTIVE
KH 29	F95195	304.5	03/03/2015	03/03/2025	Dunedin Ventures Inc. (100%)	ACTIVE
KH 30	F80214	1230.4	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 31	F80219	1246.6	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 32	F80220	1245.5	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 33	K90296	1245.4	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 34	K90297	878.1	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 35	K90298	867.3	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 36	K90299	1201.1	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 37	K90300	1077.3	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 38	K90301	1122.9	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 39	K90302	1164.9	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 40	K90303	1232.4	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 41	K90304	1250	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 42	K90305	1250	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 43	K90306	1250	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 44	K90307	1250	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 45	K90308	1250	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 46	K90309	1240.6	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 47	K90310	1250	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 48	F92423	918.4	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 49	F92424	1249.8	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 50	F92425	1045.2	30/08/2016	30/08/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 51	K90378	1045.2	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 52	K90379	1045.2	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 53	K90380	1045.2	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 54	K90381	1045.2	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 55	K90382	1045.2	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 56	K90383	1045.2	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 57	K90384	1045.2	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 58	K90385	1045.2	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE

Claim Name	Claim Number	Area (Ha)	Issue Date	Anniversary Date	Current Owner	Status
KH 59	K90386	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 60	K90387	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 61	K90388	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 62	K90389	1156.9	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 63	K90390	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 64	K90391	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 65	K90392	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 66	K90393	1155.6	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 67	K90394	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 68	F93676	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 69	F93678	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 70	F93679	1184.7	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 71	F93681	1012.1	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 72	F93682	1017.7	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 73	F93683	1023.4	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 74	F93684	1029.1	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 75	F93680	823.1	14/12/2016	14/12/2026	Dunedin Ventures Inc. (100%)	ACTIVE
KH 76	F93685	1080.9	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 77	K90345	1076.9	14/12/2016	14/12/2019	Dunedin Ventures Inc. (100%)	ACTIVE
KH 78	K90346	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 79	K90347	1000	14/12/2016	14/12/2019	Dunedin Ventures Inc. (100%)	ACTIVE
KH 80	K90348	533.1	14/12/2016	14/12/2020	Dunedin Ventures Inc. (100%)	ACTIVE
KH 81	K90349	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 82	K90350	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 83	K90351	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 84	K90352	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 85	K90353	1000	14/12/2016	14/12/2019	Dunedin Ventures Inc. (100%)	ACTIVE
KH 86	K90354	490.4	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 87	K90355	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 88	K90356	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 89	K90357	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 90	K90358	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 91	K90359	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 92	K90360	1156.9	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 93	K90361	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 94	K90362	1000	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 95	K90363	447.7	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 96	K90364	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 97	K90365	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 98	K90366	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 99	K90367	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 100	K90368	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 101	K90369	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 102	K90370	1156.9	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 103	K90371	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 104	K90372	1250	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 105	K90373	1000	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE
KH 106	K90374	405.1	14/12/2016	14/12/2018	Dunedin Ventures Inc. (100%)	ACTIVE

Claim Name	Claim Number	Area (Ha)	Issue Date	Anniversary Date	Current Owner	Status
KH 107	K90375	1250	14/12/2016	14/12/2018	Dunnedin Ventures Inc. (100%)	ACTIVE
KH 108	K90376	1250	14/12/2016	14/12/2018	Dunnedin Ventures Inc. (100%)	ACTIVE
KH 109	K90377	1249.8	14/12/2016	14/12/2018	Dunnedin Ventures Inc. (100%)	ACTIVE
KH 110	K91810	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 111	K91811	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 112	K91812	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 113	K91813	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 114	K91814	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 115	K91815	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 116	K91816	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 117	K91817	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 118	K91818	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 119	K91819	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 120	K91820	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 121	K91821	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 122	K91822	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 123	K91823	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 124	K91824	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 125	K91825	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 126	K91826	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 127	K91827	996	Filed	Pending	Andrew Berry (100%)	STAKED
KH 128	K91828	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 129	K91829	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 130	K91830	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 131	K91831	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 132	K91832	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 133	K91833	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 134	K91834	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 135	K91835	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 136	K91836	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 137	K91837	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 138	K91838	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 139	K91839	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 140	K91840	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 141	K91841	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 142	K91842	1115	Filed	Pending	Andrew Berry (100%)	STAKED
KH 143	K91743	1250	Filed	Pending	Andrew Berry (100%)	STAKED
KH 144	K91744	121	Filed	Pending	Andrew Berry (100%)	STAKED
KH 145	K91745	92	Filed	Pending	Andrew Berry (100%)	STAKED
Total Area (Ha)		166462.60				

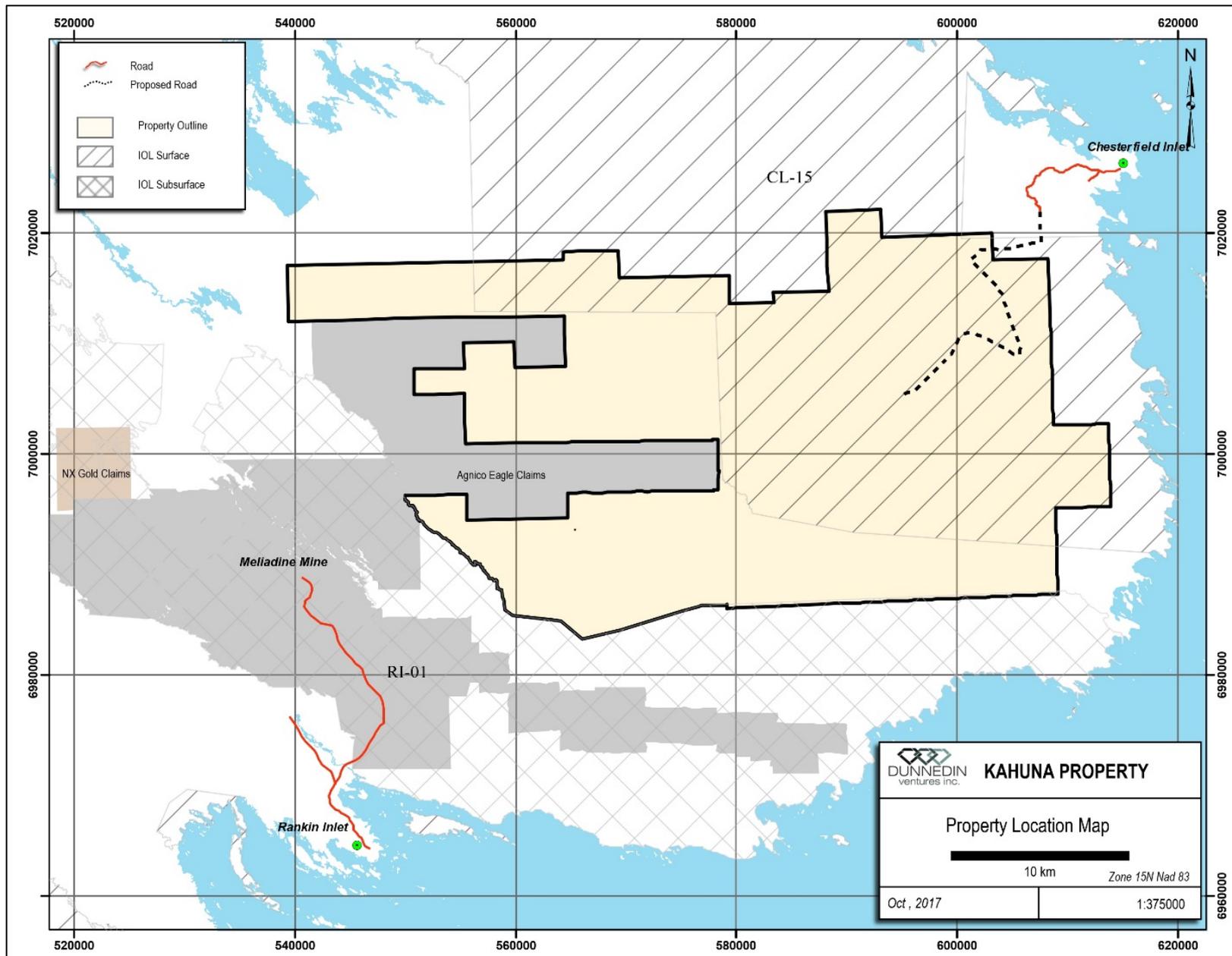


FIGURE 1: KAHUNA PROPERTY LOCATION MAP

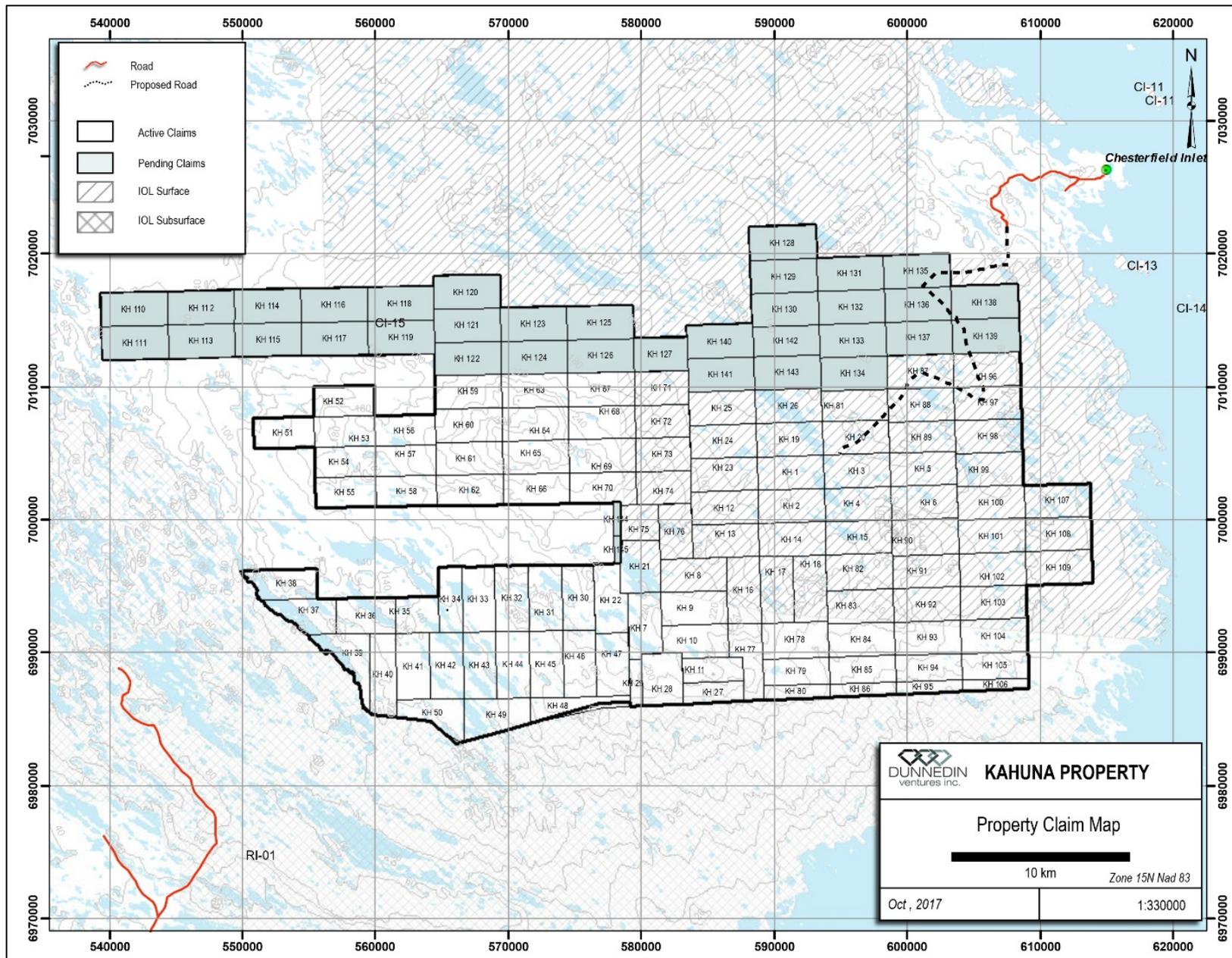


FIGURE 2: KAHUNA PROPERTY LAND TENURE

3 Permitting

The details of Dunnedin’s permits and licences are shown below in Table 2.

TABLE 2: DUNNEDIN VENTURES INC. 2017 PERMITS & LICENCES

Licence #	Type of Land Use	Issued By	NIRB File #	Expiry Date	Notes
N2015C0019	Class A. Mining (Exploration)	INAC	15EN028	16-Jul-19	Extension granted on May 1, 2017 to extend the anniversary date from 2017 to 2019
KVL315B01	Staking & Prospecting, Exploration, Drilling, Bulk Sampling	KIA	15EN028	1-Nov-19	Replaced KVL115B02.
KVRW16F01	Right of Way	KIA	15EN028	1-Apr-18	Overland Winter Trail
KVL115B02	Staking & Prospecting	KIA	15EN028	31-May-16	Expired licence. Replaced by KVL315B01
2BE-KDP1722	Type "B", mineral exploration, drilling	NWB	15EN028	30-May-22	

Mineral exploration activities authorized by these permits and licences include: prospecting and staking, rock, till and soil sampling, geological mapping, ground geophysical surveying, bulk sampling, diamond drilling and reverse circulation drilling. Fuel caches (up to 75 jet fuel and 120 diesel drums) are permitted at the PST, Notch and Kahuna kimberlite occurrences. A permitted overland winter trail to these occurrences follows a pre-existing route between Rankin Inlet and Chesterfield Inlet.

4 Contact Information

Dunnedin Ventures Inc.
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 FIELD CAMP TBD

5 Work to Date

5.1 2015 Program

Dunnedin completed its first work program on the Kahuna Property in 2015. Between July 15 and August 13, 2015, a field crew conducted regional till sampling, ground truthing of kimberlite targets and mini bulk sampling. The helicopter-supported exploration program was based out of Rankin Inlet and utilized a field crew of four to six personnel. A total of 122 regional till samples were collected and the Kauna, Notch, PST and KEM/Killiq kimberlite exposures were examined. Mini bulk samples were collected by hand tools from the Notch showing (2,420.5 kg) and the PST showing (2,506.0 kg), with character samples collected from the Kahuna kimberlite (324.2 kg) and the KEM kimberlite (100 kg). Wildlife monitors were employed from Rankin Inlet to provide wildlife movement advice and to ensure the safety of the field crews.

5.2 2016 Program

The 2016 exploration program was conducted over ten days in August and consisted of the collection of approximately 1100 till samples. Field crews were based out of Rankin Inlet and transported to sample sites daily via helicopter. Wildlife monitors were employed from Chesterfield Inlet to provide wildlife movement advice and to ensure the safety of field crews.

5.3 2017 Program

Exploration work in 2017 included soil and till sampling, rock sampling, prospecting, geological mapping and the collection of airphoto's using drones (Figure 3). Work began with the mobilization of a four-man crew to Rankin Inlet on June 15, 2017. The helicopter-supported program ran from June 15 to September 30, 2017 and was based out of Rankin Inlet. Wildlife monitors from Chesterfield Inlet collected wildlife observations and ensured the safety of field crews.

The 2017 prospecting and geological mapping program targeted areas of interest identified during the 2015 and 2016 field seasons and followed up on geophysical anomalies. The program ran for ten weeks between June 15 and September 30, 2017. A total of 602 rock samples were collected in approximately 310 line kilometres of prospecting traverses on the Kahuna Property. Airphotos, using a light weight drone, were collected concurrently with the prospecting program and covered approximately 110 square kilometres.

The 2017 property-wide till sampling program was conducted over 31 days between August 9 and September 17, 2017 and included the collection on 3456 samples. Additionally, two soil sampling grids were placed over areas with surface geochemical anomalies and geophysical conductors to test the efficacy of the sample method on the property. A two day soil sampling exercise collected 80 soil samples.

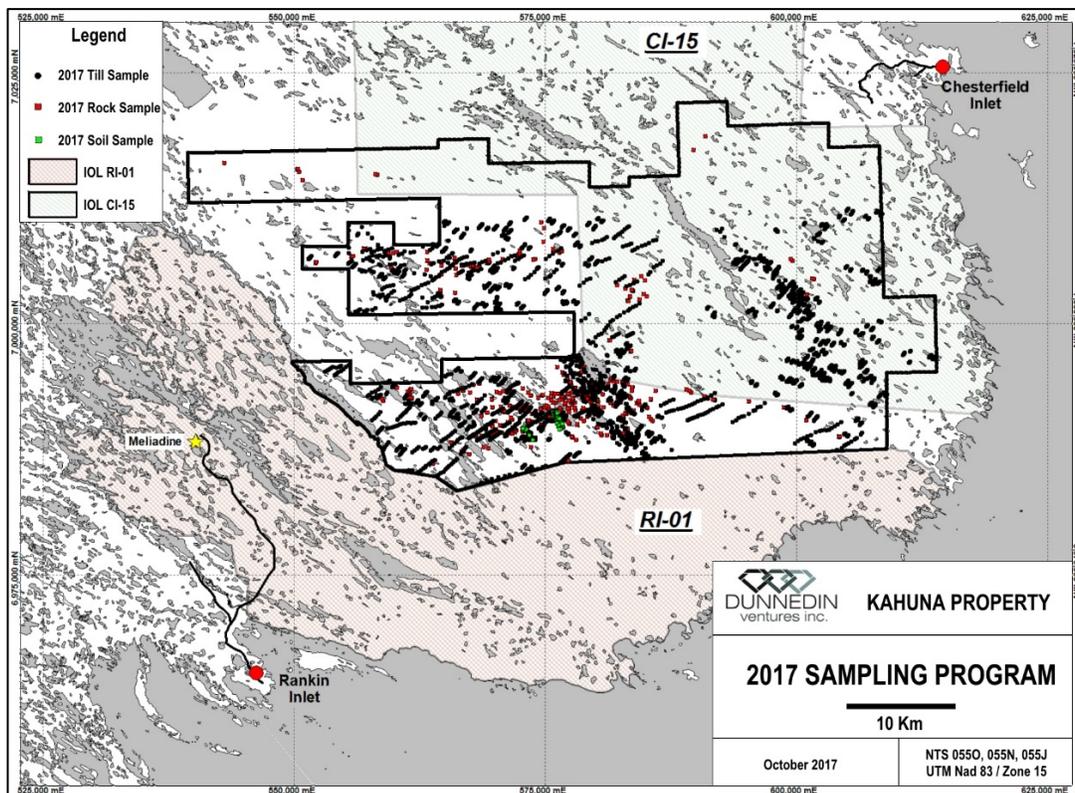


FIGURE 3: 2017 SAMPLING PROGRAM

6 2018 Exploration Program

The 2018 field program will include rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, kimberlite test pit sampling and kimberlite bulk sampling, diamond drilling and reverse circulation drilling. The program will start in mid to late February with an overland haul of equipment and supply's on Dunnedin's permitted overland winter trail from Rankin Inlet to the property using Caterpillar Challengers and cargo sleds. Equipment and supplies for Dunnedin's new field camp and the 2018 diamond drilling program will be staged on Crown Lands at the site of the proposed new camp location approximately 40 kilometres northeast of Rankin Inlet and 50 kilometres southwest of Chesterfield Inlet. Camp construction will commence in late February upon arrival of the camp supplies. The drill program will operate from mid-March to mid-May. Ground based prospecting and sampling activities will follow in mid-June once the land is free from snow and the property surface is fully accessible. As results warrant, and in compliance with Caribou Protection measures included in Dunnedin's work permits and licences, a helicopter supported summer drilling program may also be undertaken. Summer exploration activities will be helicopter supported and based out of the new field camp.

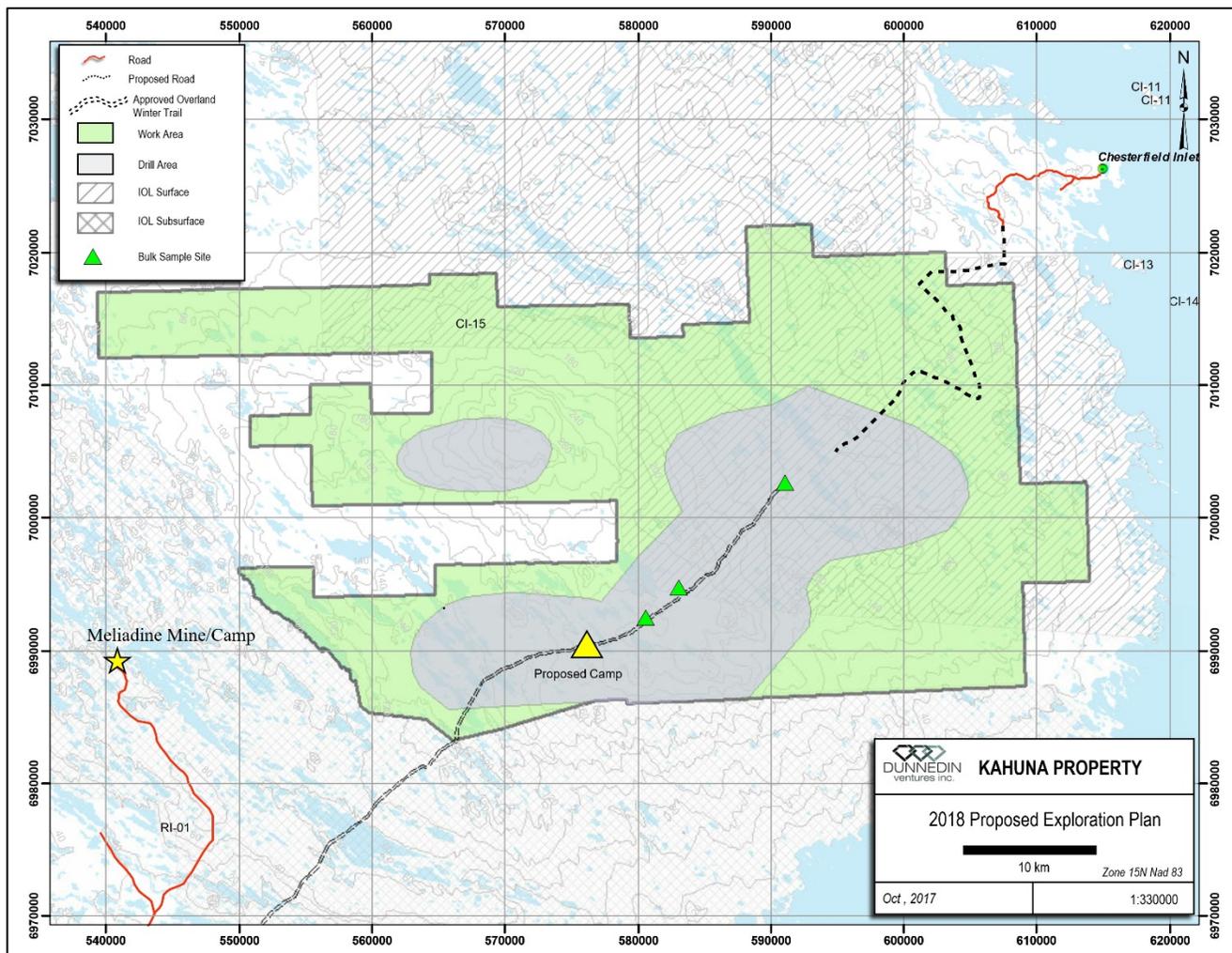


FIGURE 4: 2018 PROPOSED EXPLORATION PLAN

6.1 Amendments

Exploration activities on the Kahuna Property are currently permitted under INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01, KIA Land Use Licence KVR16F01 and NWB Water Licence 2BE-KDP1722.

This 2018 Work Plan accompanies an amendment application submitted to NPC and NIRB and distributed to INAC, KIA and NWB to:

- Notify regulators that the Kahuna property has increased from 29 mineral claims covering 33,810.8 hectares in 2015 to 145 mineral claims encompassing 166,463 hectares in 2017, and
- Authorize a temporary field camp and an associated field camp fuel cache on Crown Lands under INAC Land Use Permit N2015C0019, and
- Authorize domestic water use not exceeding three (3) cubic metres per day for the temporary field camp under NWB Water Licence 2BE-KDP1722.

The new field camp will be used to support approved exploration activities as specified in Dunnedin's existing permits and licences.

6.1.1 Property Size

The property comprises 145 mineral claims encompassing 166,463 hectares. The property has increased since 2015 from 29 mineral claims covering 33,810.8 Ha, to 109 mineral claims covering 124,138.6 Ha in 2016. An additional 36 mineral claims staked in September 2017 and covering 42,324 Ha have been submitted to the Mining Records Office and are currently pending final approval. A total of 82 mineral claims have surface rights covering 87,570 Ha that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15. Refer to Figure 2 above for land tenure.

6.1.2 Temporary Field Camp

Rankin Inlet was used as a base of operations for the summer 2017 program. To mitigate daily helicopter transits to and from Rankin Inlet, and for safety reasons associated with winter work conditions, Dunnedin is seeking authorization for a temporary field camp located centrally on the Kahuna Property and proximal to high priority exploration targets. The camp will operate seasonally from March through September.

More than 10 different locations were investigated as potential sites for the new field camp. Members of the Chesterfield Inlet HTO provided assistance and recommendations for the final site selection. The recommended location for Dunnedin's temporary field camp is on Crown Lands approximately 40 kilometres northeast from Rankin Inlet and 50 kilometres southwest from Chesterfield Inlet at 575,975mE and 6,990,875mN in Zone 15, UTM NAD83 (Figure 5).

The recommended temporary field camp location was selected based on the following criteria:

- Flat, sandy esker provides an excellent camp site surface.
- Large area sufficient to support all camp facilities including; camp tents, fuel berms, helicopter landing pad, core storage, equipment and inventory staging.
- Excellent gravel substrate for construction and drainage of a grey water sump
- Smooth flat sandy surface is ideal for fuel berm emplacement
- Proximal deep lake will provide reliable water source during frozen winter conditions.
- A minimum of 31 metres from the high water mark of any nearby water bodies or drainage courses.

- Site is on Dunnedin's permitted and licenced overland winter trail from Rankin Inlet.
- Location is free of any archaeological sites.
- Location is removed from existing heritage sites
- Located an acceptable distance from the Josephine River.
- Away from well travelled caribou trails,
- The site avoids High Intensity Inuit Harvest Areas identified by KIA
- The site is away from existing quad trails and hunting cabins

Dunnedin's temporary field camp will accommodate up to 20 people and will be comprised of:

- 1 - Kitchen Tent
- 1 - Office Tent
- 1 - Dry Tent
- 1 - Core Logging Tent
- 1 - Utility Tent
- 1 - Toilet Facility (Pactos)
- 7 - Crew Accommodations (1 tent will house the First Aid Attendant and First Aid Equipment)
- 1 - Generator Shack
- 1 - Portable Fuel-Fired Incinerator
- 2 – 5m x 20m Arctic Grade Containment Berms

Figure 6 below, shows the proposed camp layout. Structures will consist of a combination of WeatherPort vinyl tents, canvas prospectors' tents and small plywood structures. All fuel storage and usage areas will be located at least 31 metres from any water body or drainage course.

At the end of the 2018 field season, the WeatherPort vinyl tents and plywood structures will be left standing and ready for use for Dunnedin's 2019 field program. All canvas tent covers will be removed from tent frames during the fall and winter shut down period. The camp will be fully closed and dismantled upon completion of all exploration activities. The site will then be reclaimed and restored to its original state.

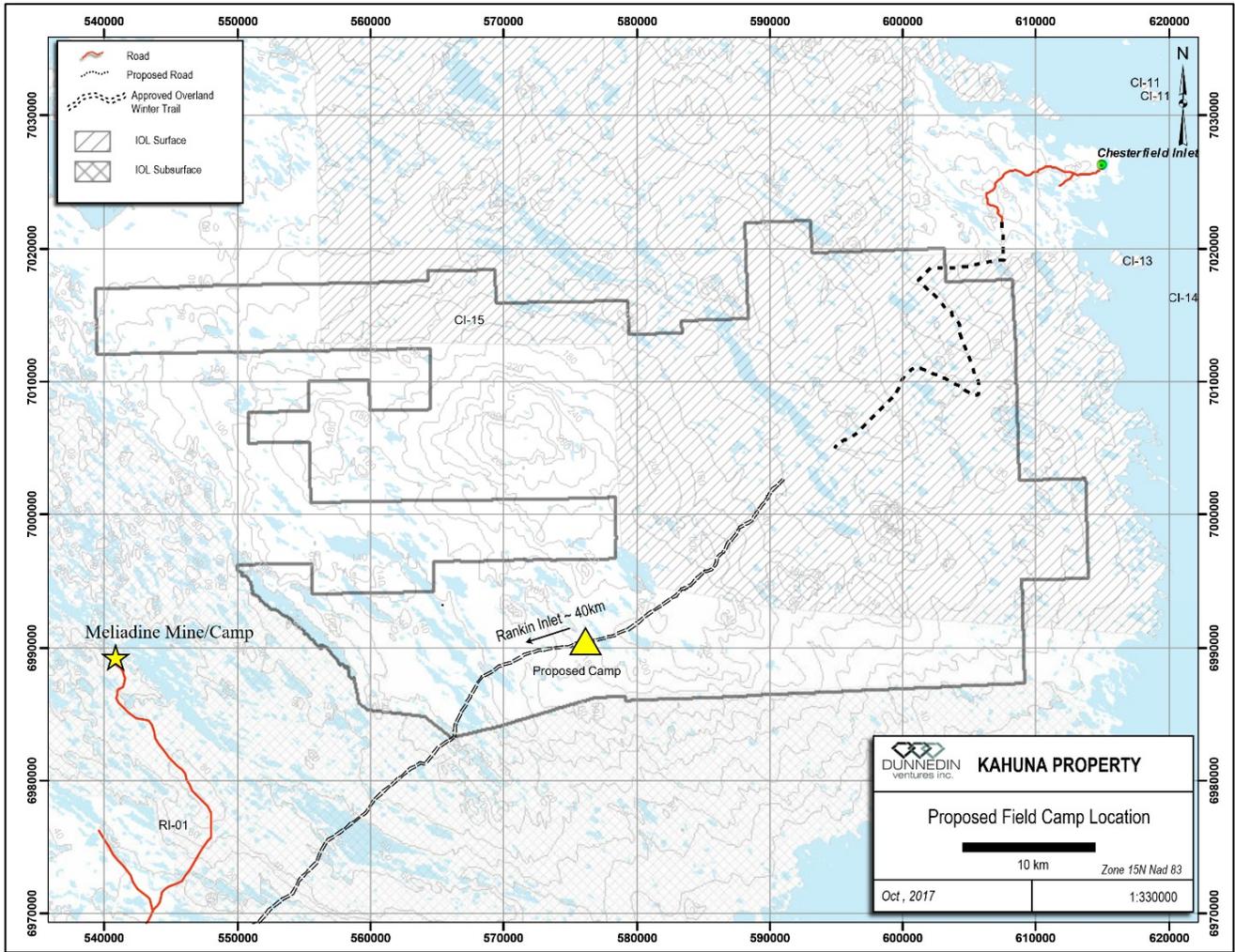


FIGURE 5: PROPOSED FIELD CAMP LOCATION

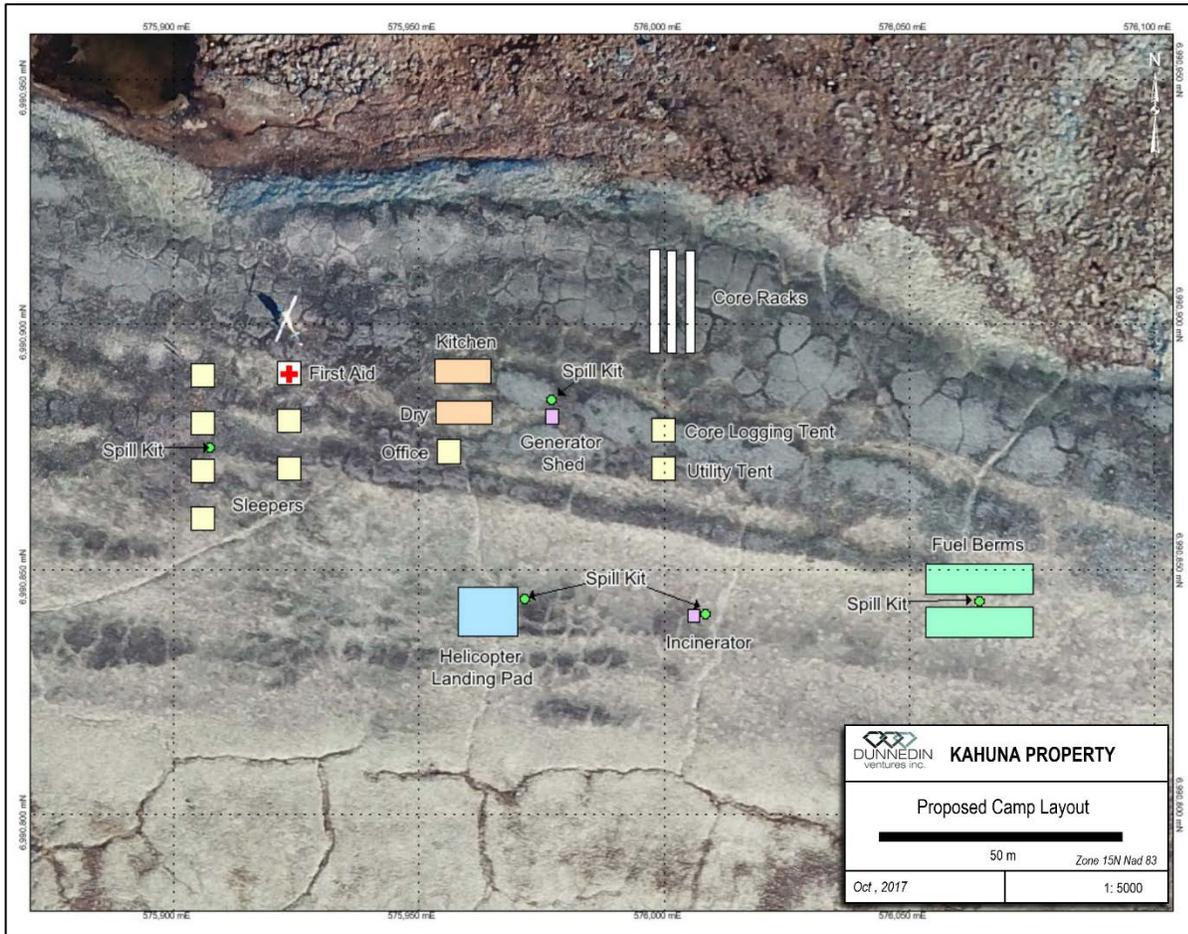


FIGURE 6: PROPOSED CAMP LAYOUT



FIGURE 7: PROPOSED FIELD CAMP ESKER

6.1.2.1 Camp Fuel Cache

Dunnedin's existing permits and licences include authorization for 3 fuel caches that together contain an aggregate of 75 drums (205L each) of jet fuel and 120 drums of diesel fuel. Dunnedin requests an increase in the amount of fuel to be cached on the Kahuna Property to support the field camp, the proposed 2018 winter drill program and the summer 2018 exploration program. The majority of fuel to be cached on the property will be transported via Challenger and cargo sled during winter months on the overland winter trail. Additional fuel may be delivered to site via helicopter during the summer months.

A main fuel cache will be established on the east side of the new field camp facilities at 576065mE 6990845mN UTM Zone 15, UTM NAD83. Fuel to be cached on the site will include:

- 150 – 205 L drums of diesel fuel
- 150 – 205 L drums of jet fuel
- 10 – 205 L drums of gasoline
- 20 – 100 lb cylinders of propane

All fuel drums will to be stored in Arctic grade secondary containment berms equipped with Spilfyter RailMat 3 ply hydrocarbon absorbent fabric and Rain Drain hydrocarbon filters for water drainage. All fuel storage berms, fuel drums, fuel transfer and fuel staging areas will be located a minimum 31 metres from any water body or drainage course. All fuel storage berms, fuel drums, fuel transfer and fuel staging areas will be inspected regularly and will be equipped with easily visible and readily available spill kits.

Empty drums will be drained and stored in a designated area and will be removed from the property regularly to be transported south for recycling or disposal at an authorized facility. Dunnedin will endeavor to consume the majority of the cached fuel by the end of each season. Please refer to the "Fuel Management Plan" and "Spill Prevention and Response Plan" for more information.

Temporary supply caches of less than nine drums will be located at drill sites and bulk sampling sites to maintain operations of diamond drilling equipment and bulk sampling equipment, respectively.

Chemicals and hazardous materials that may be located on the Kahuna Property include limited volumes of motor oil and hydraulic oil, cleaners, batteries, electronics, fluorescent light bulbs/tubes and small quantities of hydrochloric acid. All such materials will be stored in their original containers. Refer to the "Waste Management Plan" for the types, quantities and method of storage.

6.1.2.2 Camp Water and Grey Water Sump

Under Dunnedin's existing NWB Type "B" Water Licence 2BE-KDP1722, the company shall not exceed one hundred (100) cubic metres per day for industrial water purposes. Dunnedin has submitted an amendment request to NWB to add camp water use to Water Licence 2BE-KDP1722. An increase in the volume of daily water is not necessary. The combined camp and diamond drilling water shall not exceed 100 cubic metres per day. Specifically domestic water use for the camp will not exceed three (3) cubic metres per day and industrial water use for diamond drilling purposes will not exceed ninety seven (97) cubic metres per day.

There are two source lakes proximal to the selected camp site that are large enough and deep enough to supply domestic water (<3 cubic metres / day) to the camp on a year round basis. A sufficiently deep lake measuring 450 metres by 300 metres wide is located approximately 400 metres north of the camp location at 576,125mE and 6,991,300mN Zone 15, UTM NAD83. As an alternative a larger source lake measuring 3000 metres by 500 metres wide is located approximately 900 metres northeast of the camp location at 576,775mE and 6,991,250mN in Zone 15, UTM NAD83. Small lakes, ponds or streams will not be used for water intake.

A portable gasoline powered supply pump will be used for intake water. A 5 metre long source hose will be placed to minimize disturbance to the shoreline/riparian zones and substrate. Aquatic life will be protected. Waterlines will be screened in accordance with the “Freshwater Intake End-of-Pipe Screen Guideline” prepared by the Department of Fisheries and Oceans. Water will be stored in two 250 gallon water tanks in the camp dry facility. Plumbing from these tanks will be distributed to the kitchen in the dry tent for washing. During non freezing conditions, a hose line will run from the water pump to the camp. During freezing conditions water will be pumped to a water tank mounted on a qammitik and will be hauled to camp by snow mobile. The supply pump will be staged on secondary containment structure, of sufficient height and depth to contain at least 110 percent of the volume of the largest fuel reservoir.

The pump will be operational for periods of approximately 15 minutes on a once per day basis during the course of the exploration program to pump water to the camp water storage tanks. When not in use, the pump will be placed a minimum of 31 metres from the ordinary high water mark of the water body. The operating capacity of the pump is approximately 9480 gallons per hour.

Waste water from the camp will be discharged to a grey water sump. The grey water sump will be excavated into the underlying gravel substrate behind the camp kitchen and dry facilities. The waste water sump will be located at least 31 metres away from any water body or water drainage. A grease trap and screens will be installed on kitchen drains to ensure food grease and solids do not enter the waste water sump. The discharge pipe will be buried and inaccessible to wildlife. No contamination of the water supply is predicted.

Camp water consumption will be kept to the minimum required for domestic camp operations. Water will only be used for hygiene and food preparation purposes.

Neither the water use or grey water disposal sumps at the field camp will not affect water bodies or water courses.

6.1.2.3 Camp Sewage

The camp toilet facilities will house three or four Pacto toilet and will be located at least 31 metres away from any water body or drainage course. Pacto wastes will be incinerated as generated. Refer to the “Waste Management Plan” for additional information.

6.1.2.4 Camp Incinerator

The proposed camp for the Kahuna Property will utilize a portable, dual chamber, forced-air incinerator for the disposal of combustible solid wastes. Incineration ash will be stored in sealed 45 gallon metal drums and will be removed from site regularly to be shipped to an authorized waste disposal facility. Refer to the “Waste Management Plan” for additional information.

6.2 Permitted Work

Mineral exploration activities authorized by INAC Land Use Permit N2015C0019, KIA Land Use License KVL315B01, KIA Land Use Licence KVR16F01 and NWB Water Licence 2BE-KDP1722 include: prospecting and staking, rock, till and soil sampling, geological mapping, ground geophysical surveying, diamond drilling, reverse circulation drilling and bulk sampling. A permitted overland winter trail to the property follows a pre-existing right of way between Rankin Inlet and Chesterfield Inlet.

The following sections 6.2.1 through 6.2.7 elaborate on the company’s plans for authorized exploration activities to undertaken as part of Dunedin’s 2018 exploration program.

6.2.1 Equipment

Equipment currently permitted for use on the Kahuna Property is included in Table 3 below.

TABLE 3: EQUIPMENT LIST

Type	Size	Purpose
Helicopter - 1	A Star, Long Ranger (or similar)	Transportation - crews & equipment
Core Drill heli-portable - 1	Boyles 17A or equivalent	Drill testing
Snow Machine - 4	Small to mid-size	Transportation
Water Pump - 2	Gasoline powered	Water supply for drill & field camp
Excavator - 1	Cat 314C Excavator or equivalent	Extract Bulk Sample
Air Track Drill/RC Drill - 1		Drill blast holes/bulk sampling
Caterpillar Challenger 65s - 2 to 4	100 HP, with steel sleds	Mobilize/Demobilize drill, fuel, equipment & bulk sample
Generators -2	20Kw and 12 Kw	Power generation

6.2.2 Prospecting, Rock Sampling and Geological Mapping

As part of the 2018 exploration program, Dunnedin has proposed a prospecting and geological mapping program that will include the collection of up to 2,000 rock samples. Crews will be based out of the new camp site and will be transported to the prospecting area daily via helicopter. Prospecting will include mapping and sampling of geological outcrops and glacial float occurrences for the presence of kimberlite rock or other economic mineralization including precious metals. In areas of kimberlite occurrences shallow pits or excavations using hand tools may be required to determine the provenience or nature of the kimberlite exposure. Rock samples of interest are collected in plastic bags, assigned a unique sample number, their GPS coordinates recorded and notes are taken to describe the general characteristics of the rock. Prospecting, rock sampling and geological mapping will be undertaken variously across the entire property as shown on Figure 4 as ongoing results from work warrant.

As part of the 2017 program, low level, high resolution airphotos were collected concurrently with the prospecting program using a light weight hand operated drone. The collection of these airphotos will be continued in 2018 to help guide the prospecting program.

As geological mapping generates greater understanding on the controls for kimberlite occurrences and economic mineralization on the Kahuna Property, the acquisition of additional mineral title may be warranted. In the event that such information is generated additional claim staking may be undertaken in 2018.

6.2.3 Till Sampling

The 2018 till sampling program will be undertaken during the summer months and will include the collection of approximately 2,000 samples. Crews will be based out of the new camp site and will transported to the sampling area daily via helicopter. Where and when possible samples will be oriented on sample lines and crews will walk between individual sample sites. Till sampling will be undertaken at various sample density across the entire property as shown on Figure 4 as on going results from work warrant.

Two-man crews will sample pre-determined sites based on proximity to known mineralization, geophysical signatures and geology. Approximately 20 kilograms of glacial till comprised of sand, silt, gravel and clay will be collected at each site. The till sample material is either pre-screened or placed directly into a sample bag.

Notes and sample location are recorded and a unique sample number is assigned to the sample site. The hole created from the collection of sample material is refilled and recontoured.

6.2.4 Ground Geophysical Surveys

Dunedin plans to conduct detailed ground geophysical surveying in 2018 to assist in the delineation of high priority geological targets. Possible survey methods to be utilized include ground magnetic, ground electromagnetic and ground gravity surveying. Up to 1000 line kilometers of surveying is proposed. Ground geophysical surveys are generally conducted on foot by walking along predetermined grid lines but can also be conducted by crews utilizing snowmobiles during winter months. Geophysical surveying personnel will be based out of the new camp site. During the winter months and when possible surveyors will utilize snowmobiles to access survey grids. During the summer months surveyors will access survey grids via helicopter.

Ground geophysical surveys are passive, low impact and non-invasive and no disturbance to the land surface is anticipated.

6.2.5 Diamond Drilling

Diamond drilling on the Kahuna Property is permitted under the authorizations of INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01 and NWB Water Licence 2BE-KDP1722.

Dunedin's 2018 diamond drill program will investigate geological anomaly's that are characteristic of undiscovered kimberlite pipes or kimberlite dykes, extensions to known kimberlite pipes or kimberlite dykes or other economic mineralization. The proposed 2018 exploration program will include up to 5,000 metres of diamond drilling.

Drilling equipment and supplies will be mobilized to site on Dunedin's permitted overland winter trail from Rankin Inlet to the property using Caterpillar Challengers and cargo sleds. One heli-portable diamond drill rig will be used for the program. The drill will be configured such that it can be mounted on skids and when snow conditions allow, can be moved from drill site to drill site via overland haul using a Caterpillar Challenger. The program will commence in early March of 2018 after construction of the new field camp has been completed. Drill operations will continue to May 15. As results warrant, and in compliance with Caribou Protection measures included in Dunedin's work permits and licences, a helicopter supported summer drilling program may also be undertaken.

Drill crews will be based in Dunedin's new field camp. As conditions allow, winter drilling activities will be supported by ground access using Caterpillar Challengers to move the drill rig, by snowmobile and by Bombardier tracked vehicles to facilitate daily crew changes and service runs. For safety, a helicopter will be based on site and will be utilized to service the rig and drill crews when ground access is not feasible. The rig will operate 24 hours per day using two 2-man crews working a 12 hour day shift and a 12 hour night shift respectively. Local water sources, proximal to drill sites, will be used to support drilling operations. When conditions allow, water will be pumped to the drill site via hose line. If and when the distance to the nearest water source is too far to pump water reliably via hose line, then water will be hauled to the drill site via Challenger with water tanks on a cargo sled. Drill target areas for the 2018 program are shown on Figure 4.

Individual drill holes will range in depth from less than 50 metres to a maximum 300 metres. Holes will be drilled at angles ranging from -45 degrees to -90 degrees. The azimuth of the drill hole will be dependant upon the anomaly targeted. Depending on the geological results or the geological intercepts recovered by the drilling,

up to three holes drilled may be drilled from an individual drill site to test the drill target at varying depths for both geological continuity and spatial extent.

A typical drill site occupies less than 0.07 hectares of surface area and comprises a diamond drilling rig in a plywood shack on skids or a timbered floor, with drill rods, supplies and a survival shelter staged adjacent to the drilling rig. Water to support the operation is sourced from the nearest suitable water body using an electric water pump. A coil heater and generator providing power to the pump are staged on a containment platform placed a minimum 31 metres from the high water mark. A hose line from the water pump connects the water source to the drill rig. The water pump operates at flow rate of 97 cubic metres per day.

During drilling operations, drill cuttings or effluents are flushed from the hole by the circulating water. Occasionally additives to water are used to assist with the operation. Any and all additives used will be biodegradable and have been approved for use under the existing permits and licences. Drill effluents will be pumped from the drill hole to a naturally occurring depression near the drill site to capture drill cuttings, or to a sump excavated for that purpose, or to settling tanks that will allow the cuttings to settle and be contained in bulk bags that can then be transported to a suitable naturally occurring depression. All effluents will be controlled. No effluents or cuttings will be allowed to enter into nearby water bodies or drainage courses.

All drilling equipment used during the drilling operation will be removed from the drill site upon completion of the drilling at that drill site. Drill casing will be removed or cut off below ground level at that time. The project manager or designate will inspect each drill site to ensure that it is properly cleaned up and restored. Photographs will be taken of the site before the drill and ancillary equipment arrive, during the drilling operation and of the site once the drill hole is complete and the drill and support equipment have been removed. The GPS location of the drill hole will be recorded and the drill hole collar will be marked and identified by its hole number and year of completion.

During winter months, when the ground is frozen with sufficient snow cover to protect the underlying till and vegetated ground cover and as conditions allow, drilling equipment will be moved from drill site to drill site overland using Challengers and cargo sleds. If overland conditions do not permit ground travel or when drilling operations are conducted during the summer months, the drill rig and ancillary equipment and supplies will be dismantled into individual components and will be transported by helicopter.

For any lake based drilling, guidelines for drilling on ice will be followed. All drill holes will be plugged and cemented in bedrock below the lake bottom and the drill casing will be removed. No material or residue will be allowed to accumulate on the lake ice surface. Any material that may become frozen into the ice during the drill operations will be chipped out and removed for proper disposal.

The drill rig survival shelter is to be used by the drill crew in the event of unsafe weather conditions, when overland access or helicopter access to the drill rig is not possible. It will contain cots and bedding, food rations, a VHF radio, a satellite phone and first aid supplies.

A core logging tent facility will be installed in the new field camp. Drill core storage racks will be located adjacent to the new camp at 576,000mE and 6,990,900mN Zone 15, UTM NAD83.

6.2.6 Reverse Circulation Drilling

Reverse Circulation (RC) drilling using a single RC drill rig has been proposed as part of the Dunnedin's 2018 exploration program. Up to 1,000 metres of RC drilling is contemplated. The RC drill will be used in the same

drill target areas as proposed for the diamond drilling program. The RC rig will be utilized where diamond drilling does not represent the optimum drilling technique for the target being tested.

RC drill rigs are lightweight and modular in design making them ideal for moving by helicopter in early stage exploration programs. They are relatively insensitive to adverse ground conditions and at down hole depths of less than 200 metres vertically they have high rate of penetration. Additionally RC drilling rigs operate on air pressure only. They do not require water to operate and therefore RC drilling operations do not produce any water borne effluents.

RC drilling is widely utilized to collect representative samples from kimberlite bodies during initial test phases. The drilling technique produces rock chips as opposed to rock cores. These rock chips are then logged by geologists using microscopes to record the geological units intersected by the drill hole. The technique represents a fast and cost effective alternative to coring operations using a diamond drilling.

6.2.7 Bulk Sampling

Dunedin Ventures Inc. is permitted to undertake bulk sampling at the Notch, PST and Kahuna kimberlite showings. The collection of an aggregated 1,500 tonnes of bulk kimberlite (500 tonnes from each occurrence) has been authorized. The scope of the bulk sampling was detailed in the 2017 Project Description and Work Plan submitted to NPC and NIRB in late 2016 and permitted and licenced by INAC, NWB and KIA in 2017.

The bulk sampling program was designed to further assess the diamond grade potential of the diamond bearing kimberlite discoveries made on the property to date and to obtain a preliminary assessment of diamond quality and diamond value, key components in evaluating any diamond deposit.

In the 2017 Project Description and Work Plan, Dunedin proposed to undertake the bulk sampling program during the winter/spring of 2017 while the ground was frozen and covered by snow so as to mitigate any disturbance of surface vegetation and soils. The proposed bulk samples ranged in size from 50 tonnes to 500 tonnes each. Permits and licences were not received with sufficient time to undertake the program as proposed. The program was deferred until a later date. The proposed Bulk Sampling program is not contemplated as part of the 2018 winter program. A revised commencement date has not been determined.

The program proposed the use of a Caterpillar 314C excavator (or comparable piece of equipment) to strip the overburden cover and access the underlying kimberlite. Due to anticipated permafrost or frozen conditions in both the overburden and the kimberlite bodies themselves, the use of an RC / blasthole rig and drilling and blasting was also authorized.

To mitigate disturbance of surface vegetation and soils, the transportation of bulk sampling equipment and fuel from Rankin Inlet to the bulk sample sites, transportation from site to site, transportation of the bulk samples to Rankin Inlet and demobilization of the equipment was to be undertaken using Caterpillar Challengers hauling cargo sleds on Dunedin's permitted overland winter trail. Should it be required, several of the kimberlite sites selected for bulk sampling are removed and distal from any water bodies or drainage courses and could be accessed and sampled during summer months.

Please refer to Dunedin's 2017 Project Description and Work Plan dated October 22, 2016 submitted to NPC and NIRB and distributed to INAC, NWB and KIA for a detailed description of Dunedin's proposed kimberlite bulk sampling program.

EXECUTIVE SUMMARY

Kahuna Property

Dunnedin Ventures Inc. Kahuna Property is located between the communities of Rankin Inlet (Kangiqtiniq) and Chesterfield Inlet (Igluigaarjuk) in the Kivalliq Region of Nunavut. The property comprises 145 mineral claims encompassing 166,463 hectares and extends north, south, east and west between Latitudes 62°58' and 63°19' North and Longitudes 90°44' and 92°13' West. A total of 82 mineral claims have surface rights covering 87,570 Ha that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15.

Exploration activities on the Kahuna Property are currently permitted under INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01, KIA Land Use Licence KVR16F01 and NWB Water Licence 2BE-KDP1722.

Project amendment documents are being submitted to NPC and NIRB and then distributed to INAC, KIA and NWB, to authorize a temporary field camp and a fuel cache on Crown Lands under INAC Land Use Permit N2015C0019, and to authorize domestic water use for the temporary field camp under NWB Water Licence 2BE-KDP1722. The temporary camp will be used to support planned 2018 exploration activities that are currently authorized by Dunnedin's existing permits and licenses.

The planned 2018 exploration program includes rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, diamond drilling and reverse circulation drilling. Work will start in mid-February with an overland haul of equipment and supplies on Dunnedin's permitted overland winter trail from Rankin Inlet to the property using Caterpillar Challengers and cargo sleds. Camp construction will commence in late February upon arrival of the camp supplies. The drill program will operate from March to mid-May. Ground based prospecting and sampling activities will follow in mid-June once the land is free from snow and the property surface is fully accessible.

Members of the Chesterfield Inlet HTO provided assistance and recommendations for the site selected by Dunnedin for the proposed field camp location. More than 10 different sites were investigated. A large, flat topped esker feature was recommended as the best the location. The site is on Crown Lands approximately 40 kilometres northeast from Rankin Inlet and 50 kilometres southwest from Chesterfield Inlet at 575,975mE and 6,990,875mN in Zone 15, UTM NAD83. The new camp will operate seasonally from March through September and will accommodate up to 20 people. The camp will include: 1 kitchen tent, 1 office tent, 1 dry tent, 1 utility tent, 1 core logging tent, 7 supplementary sleep tents, a Pacto latrine facility, a small generator shed, an incinerator and 2 arctic grade containment fuel berms. Structures will consist of a combination of WeatherPort vinyl tents, canvas prospectors' tents and small plywood sheds. The field camp will be fully closed and dismantled completely once exploration activities cease. The site will then be reclaimed and restored to its original state.

Dunnedin's existing permits and licenses include authorization for 3 fuel caches that together contain an aggregate of 75 drums (205L each) of jet fuel and 120 drums of diesel fuel. Dunnedin requests an increase in the amount of fuel to be cached on the Kahuna Property to support the field camp, the proposed 2018 winter drill program and the summer 2018 exploration program. A main fuel cache will be established on the east side of the new field camp facilities at 576065mE 6990845mN UTM Zone 15, UTM NAD83. Fuel to be cached on the site will include: 150 drums (205L each) of diesel fuel, 150 drums of jet fuel, 10 drums of gasoline and 20 cylinders (100 lbs. each) of propane.

Dunnedin Ventures Inc. is committed to conducting its exploration programs in a socially and environmentally responsible manner.



APPLICATION FOR LAND USE PERMIT

Privacy Act Statement

The information you provide in this document is collected under the authority of the Territorial Land Use Regulations for the purpose of responding to your application for land use permit...

For Office Use Only

Table with 6 columns: Application Fee, Land Use Fee, General Receipt Number, Date (YYYYMMDD), Class, Permit Number

To be completed by all applicants [] New Application [X] Amendment

1. Applicant Name and Mailing Address (Full name, no initials)
Dunnedin Ventures Inc
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Vancouver, British Columbia, V6C 2V6
Telephone Number (604) 646-8351
Facsimile Number (604) 646-4526

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Field Supervisor: Andrew Berry
Radio Telephone
Email Address: aberry@dunnedinventures.com
Telephone Number: (604) 646-4529

3. Other Personnel (Subcontractor, Contractors, Company Staff, etc.)
Contractors (i.e. helicopter, diamond drilling, etc.) are yet to be determined.

Total 20

4. Qualifications
Refer to Section 21 of the Territorial Land Use Regulations
Number(s) exploration permit mineral claims (If applicable)
See attached list of mineral claims and map.

5. a) Summary of Operation (Describe purpose, nature and location of all activities)
Refer to Section 22(2)(b) of the Territorial Land Use Regulations (Use last page of form if necessary)
This is an amendment application for N2015C0019. This amendment application is to add a field camp to support permitted activities and increase the number of fuel drums on site...

b) Indicate if a camp is to be set up (Use last page to provide details)
The establishment of a camp is proposed to support exploration activities authorized in N2015C0019. Please see the attached 2018 Work Plan for details.

6. Summary of potential environmental and resource impacts
(Describe the effects of the proposed program on land, water, flora and fauna and related socio-economic areas)
(Use separate pages if necessary)
During all activities, every effort will be made to avoid disturbance to wildlife (see attached Environmental and Wildlife Management Plan). Denning and nest sites will be avoided where identified...

7. Proposed Restoration Plans (Use last page if required)
Please see the attached Abandonment and Restoration Plan.

8. Other rights, licences or permits related to this permit application (Mineral claims, Yukon timber permits, water licences, etc.)
(Use last page if required)

N2015C0019 authorizes exploration activities and expires July 16, 2019. NWB Water Use Licence 2BE-KDP1722, KIA Land Use Licence KVL315B01 and KIA Right of Way Land Use Licence KVRW16F01.

Roads Is this to be a pioneered road?

Has the route been laid out or ground truthed?

9. Proposed Disposal Methods (Use last page if required)

a) Garbage

Combustible garbage will be incinerated

b) Sewage (Sanitary and Grey Water)

Sewage will be incinerated. Grey water will go into a sump.

c) Brush and Trees

Not applicable

d) Overburden (Organic soils, waste material, etc.)

Not applicable

10. Equipment (Includes drills, pumps, etc.) (Use last page if required)

	Type and Number	Size	Proposed Use
1	Helicopter - 1	A Star, Long Ranger (or similar)	Transportation - crews & equipment
2	Water pumps - 2	1 HP	Provide water for camp & drill
3	Generators - 2	12 Kw & 20 Kw	Power generation for camp
4	Snowmobiles - 4	350cc	Transport crew/gear
5	Core drill - 1	heli-portable, Boyles 17A or equivalent	Drill testing
6	Excavator - 1	Cat 314C or equivalent	Extracting bulk samples
7	Air Track Drill/RC Drill - 1	Hornet	Drilling blast holes for bulk sampling
8	Caterpillar Challenger 65s - 2-4	265 HP, with steel sleds	Mobilization/Demob drill, fuel, equipment & bulk samples
9			
10			
11			
12			
13			

11. Fuels

Number of Containers

Capacity of Containers

Diesel

150

205 litre drums

Gasoline

10

205 litre drums

Aviation Fuel

150

205 litre drums

Propane

20

100 lb cylinders

Other

12. Containment Fuel Spill Contingency Plans (Attach separate contingency plan if necessary)

Please see the attached Spill Prevention & Response Plan.

13. Methods of Fuel Transfer (To other tanks, vehicles, etc.)

Manual or electric pumps will be used for the transfer of all fuel products. Drip trays will underlay all areas where refueling or the transfer of fuels is undertaken. Spill kits will be available at all refueling locations. Please see Fuel Management Plan attached.

14. Period of Operation (Includes time to cover all phases of project work applied for, including restoration)

The project will operate from February through the end of September annually.

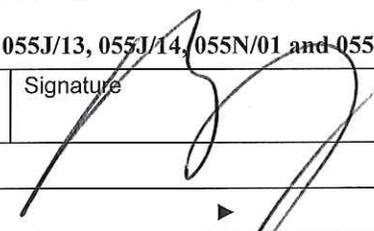
15. Period of Permit (Up to two years, with maximum of one year extension) Two years	Start Date (YYYYMMDD) 2018-02-15	Completion Date (YYYYMMDD) 2020-02-15
--	--	---

16. Location of activities by map co-ordinates (Attach maps and sketches)

	Degrees	Minutes	Seconds		Degrees	Minutes	Seconds
Minimum Latitude ▶	62	58	00	Minimum Longitude ▶	90	44	00
Maximum Latitude ▶	63	19	00	Maximum Longitude ▶	92	13	00

Map Sheet Number

055O/02, 055O/03, 055O/04, 055O/05, 055O/06, 055O/07, 055J/13, 055J/14, 055N/01 and 055N08

17. Applicant (Print Full Name) Andrew Berry	Signature 	Date (YYYYMMDD) 2017 11 07
--	--	--------------------------------------

18. Fees

<input checked="" type="radio"/> Class A - \$150.00 <input type="radio"/> Class B - \$150.00	▶	\$150.00
Land Use Fees: Less than or equal to 2 hectares	▶ \$50.00	\$50.00
For each additional hectare over 2 hectares or portion of a hectare	▶ x \$50.00 =	
Total application and land use fees ▶		\$200.00

For Office Use Only

19. Calculation of area involved (Includes access, staging areas, airstrips, campsites, etc.)

Total Area (Ha)	Less than or equal to 2 hectares	Total (For Fee Calculation)
-----------------	----------------------------------	-----------------------------

20. Application Checklist

- | | |
|--|---|
| <input type="checkbox"/> a) Application Signed and Dated | <input type="checkbox"/> e) Screening Report |
| <input type="checkbox"/> b) Fees Attached | <input type="checkbox"/> f) Timber Permit Applied for - Yukon |
| <input type="checkbox"/> c) Map Included | <input type="checkbox"/> g) Fees Attached |
| <input type="checkbox"/> d) Address and Telephone Number | <input type="checkbox"/> h) Lease Applied for |

Remarks

Accepted by	Date (YYYYMMDD)
-------------	-----------------

21. Additional Information (Attach additional pages if necessary)



Application for Water Licence Amendment

Document Date: April 2013

Application Submission Date: November 8, 2017
Month/Day/Year

P.O. BOX 119
GJOA HAVEN, NUNAVUT
XOB 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369

kNK5 wmoEp5 vtmpq
NUNAVUT IMALIRIYIN KATIMAYIT
NUNAVUT WATER BOARD
OFFICE DES EAUX DU NUNAVUT

DOCUMENT MANAGEMENT

Original Document Date: April 2010

DOCUMENT AMENDMENTS

	Description	Date
(1)	Updated for public distribution as separate document from NWB Guide 7	June 2010
(2)	Updated NWB logos and reformatted table to allow rows to break across page	May 2011
(3)	New NWB logo; request for background information; and change to Block 24	April 2013
(4)		
(5)		
(6)		
(7)		
(8)		
(9)		
(10)		



P.O. Box 119

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FAX: (867) 360-6369

OFFICE DES EAUX DU NUNAVUT

APPLICATION FOR WATER LICENCE AMENDMENT

The applicant is referred to the NWB's Guide 7: *Licensee Requirements Following the Issuance of a Water Licence* for more information about this application form.

Where possible, provide background information regarding the original licence application or attach previously submitted information.

EXISTING LICENCE NO: 2BE-KDP1722

1. LICENSEE CONTACT INFORMATION

Is the licensee the same as that referred to on the existing licence?

Yes No

If No, a licence assignment must be completed and approved by the NWB. **An amendment will only be issued in the name of the current licensee in the absence of assignment of the licence.**

If the licensee is the same, but the name of the licensee has changed, attach a certificate of name change.

Name:

Dunnedin Ventures Inc.
Address: Suite 1020-800 West Pender Street
Vancouver, British Columbia
V6C 2V6

Phone: (604) 646-8351

Fax: (604) 646-4526

e-mail: ctaylor@dunnedinventures.com

2. LICENSEE REPRESENTATIVE CONTACT INFORMATION – If different from Block 1.

Name: Andrew berry

Address: Dunnedin Ventures Inc.
Suite 1020-800 West Pender Street
Vancouver, British Columbia, V6C 2V6

Phone: (604) 646-4529

Fax: (604) 646-4526
e-mail: aberry@dunnedinventures.com

(Attach authorization letter.)

3. NAME OF PROJECT

Has the name of the project changed?

Yes No

If Yes, indicate the name of the project including the name of the location: _____

4. LOCATION OF UNDERTAKING

Does the proposed amendment change the location of the amended undertaking?

Yes No

Provide the project extents and camp locations. Identify proposed changes.

Project Extents

NW: Latitude: (63° 19' 00" N) Longitude: (92° 13' 00" W)

NE: Latitude: (63° 19' 00" N) Longitude: (90° 44' 00" W)

SE: Latitude: (62° 58' 00" N) Longitude: (90° 44' 00" W)

SW: Latitude: (62° 58' 00" N) Longitude: (92° 13' 00" W)

Camp Location(s)

Latitude: (63° 02' 22" N)

Longitude: (91° 29' 52" W)

5. MAP

Does the proposed amendment change the locations of any of the main components of the undertaking?

Yes No

Attach a topographical map, indicating the main components of the undertaking. Identify proposed changes.

NTS Map Sheet No.: _____ Map Name: _____ Map Scale: 1:50,000

NTS Map Sheets: 0550/02, 0550/03, 0550/04, 0550/05, 0550/06, 0550/07, 055J/13, 055J/14, 055N/01 and 055N08

Please see attached figures in the 2018 Work Plan.

6. NATURE OF INTEREST IN THE LAND

Does the proposed amendment change the nature of the interest in the land?

Yes No

If Yes, indicate changes. _____

Check any of the following that are applicable to the proposed undertaking (at least one box under the 'Surface' header must be checked).

Sub-surface

Mineral Lease from Nunavut Tunngavik Incorporated (NTI)
Date (expected date) of issuance: _____ Date of expiry: _____

Mineral ~~Lease~~ Claims from Indian and Northern Affairs Canada (INAC)
Date (expected date) of issuance: Application submitted Date of expiry: Pending

Surface

Crown Land Use Authorization from Indian and Northern Affairs Canada (INAC)
Date (expected date) of issuance: July 15, 2015 Date of expiry: July 16, 2019
*Amendment Application Submitted

Inuit Owned Land (IOL) Authorization from Kitikmeot Inuit Association (KIA)
Date (expected date) of issuance: _____ Date of expiry: _____

IOL Authorization from Kivalliq Inuit Association (KivIA)
Date (expected date) of issuance: July 13, 2017 Date of expiry: November 1, 2019

IOL Authorization from Qikiqtani Inuit Association (QIA)
Date (expected date) of issuance: _____ Date of expiry: _____

Commissioner's Land Use Authorization
Date (expected date) of issuance: _____ Date of expiry: _____

Other _____

Date (expected date) of issuance: _____ Date of expiry: _____

Is the name of the entity(s) holding authorizations the same as that considered in the existing water licence?

Yes No

If No, a licence assignment must be completed and approved by the NWB.

Name of entity(s) holding authorizations:

7. NUNAVUT PLANNING COMMISSION (NPC) DETERMINATION

Indicate the land use planning area in which the existing project is located.

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> North Baffin | <input checked="" type="checkbox"/> Keewatin |
| <input type="checkbox"/> South Baffin | <input type="checkbox"/> Sanikiluaq |
| <input type="checkbox"/> Akunnig | <input type="checkbox"/> West Kitikmeot |

Does the proposed amendment change the land use planning area?

- Yes No

If yes, indicate the land use planning area in which the amended undertaking is located.

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> North Baffin | <input type="checkbox"/> Keewatin |
| <input type="checkbox"/> South Baffin | <input type="checkbox"/> Sanikiluaq |
| <input type="checkbox"/> Akunnig | <input type="checkbox"/> West Kitikmeot |

Was a land use plan conformity determination required from NPC prior to the issuance of the existing water licence?

- Yes No

If Yes, indicate date issued and attach copy. November 9, 2016

Does the proposed amendment change the original NPC conformity determination or the need to obtain one?

*Submitted to NPC and awaiting decision.

- Yes No

If Yes, indicate date issued (or expected) and attach a copy. _____
If No, provide written confirmation from NPC confirming that a land use plan conformity review is not required.

8. NUNAVUT IMPACT REVIEW BOARD (NIRB) DETERMINATION

Was a screening determination required from NIRB prior to the issuance of the existing water licence?

- Yes No

If Yes, indicate date issued and attach copy. February 28, 2017

Does the proposed amendment change the original NIRB screening determination or the need to obtain one?

*Submitted to NIRB and awaiting decision.

- Yes No

If Yes, indicate date issued (or expected) and attach a copy. _____
If No, provide written confirmation from NIRB confirming that a screening determination is not required.

9. DESCRIPTION OF UNDERTAKING

Does the proposed amendment change the description of the undertaking?

Yes No

List and attach plans and drawings or project proposal. Identify proposed changes.

This amendment request is to authorize field camp water use not exceeding three (3) cubic metres (NWB Water Licence 2BE-KDP1722). The proposed field camp will be used to support approved exploration activities as specified in Dunnedin's existing permits and licences.

List of Documents

Water Licence Amendment Application
Executive Summary – English and Inuktitut
2018 Work Plan – includes: location map, land tenure map, exploration targets
Abandonment and Restoration Plan
Environmental and Wildlife Management Plan
Spill Prevention and Response Plan

10. OPTIONS

Does the proposed amendment change any of the alternative methods and locations that were considered to carry out the project?

Yes No

Provide a brief explanation of the alternative methods or locations that were considered to carry out the project. Identify proposed changes.

More than 10 different locations were investigated as potential sites for the new field camp. Members of the Chesterfield Inlet HTO provided assistance and recommendations for the final site selection. The recommended location is on Crown Lands 40 kilometres northeast from Rankin Inlet and 50 kilometres southwest from Chesterfield Inlet at 575,975mE and 6,990,875mN in Zone 15, UTM NAD83.

The recommended camp location was selected based on the following criteria:

- Flat, sandy esker provides an excellent camp site surface.
- Large area sufficient to support all camp facilities including; camp tents, fuel berms, helicopter landing pad, core storage, equipment and inventory staging.
- Excellent gravel substrate for construction and drainage of a grey water sump
- Smooth flat sandy surface is ideal for fuel berm emplacement
- Proximal deep lake will provide reliable water source during frozen winter conditions.
- A minimum of 31 metres from the high water mark of any nearby water bodies or drainage courses.
- Site is on Dunnedin's permitted and licenced overland winter trail from Rankin Inlet.
- Location is free of any archaeological sites.
- Location is removed from existing heritage sites
- Located an acceptable distance from the Josephine River.
- Away from well-travelled caribou trails,
- The site avoids High Intensity Inuit Harvest Areas identified by KIA
- The site is away from existing quad trails and hunting cabins

11. CLASSIFICATION OF PRIMARY UNDERTAKING

Indicate the primary classification of undertaking for the existing licence by checking one of the following boxes:

- | | |
|--|--|
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Agricultural |
| <input checked="" type="checkbox"/> Mining and Milling (includes exploration/drilling/exploration camps) | |
| <input type="checkbox"/> Conservation | <input type="checkbox"/> Recreational |
| <input type="checkbox"/> Municipal (includes camps/lodges) | <input type="checkbox"/> Miscellaneous (describe below): |
| <input type="checkbox"/> Power | _____ |

Does the proposed amendment change the classification of primary undertaking?

- Yes No

If Yes, indicate the primary undertaking of the amendment: _____

Information in accordance with applicable Supplemental Information Guidelines (SIG) must be updated and submitted with an Application for Amendment. Indicate which SIG(s) are applicable to your application.

- Hydrostatic Testing
- Tannery
- Tourist / Remote Camp
- Landfarm & On-Site Storage of Hydrocarbon Contaminated Soil
- Onshore Oil and Gas Exploration Drilling
- Mineral Exploration / Remote Camp
- Advanced Exploration
- Mine Development
- Municipal
- General Water Works
- Power

12. WATER USE

Indicate, using the boxes below, the types of water use(s) approved in the existing licence.

- | | |
|---|---|
| <input type="checkbox"/> To obtain water for camp/ municipal purposes | <input type="checkbox"/> To divert a watercourse |
| <input type="checkbox"/> To obtain water for industrial purposes | <input type="checkbox"/> To modify the bed or bank of a watercourse |
| <input type="checkbox"/> To cross a watercourse | <input type="checkbox"/> Flood control |
| <input type="checkbox"/> To alter the flow of, or store water | |
| <input checked="" type="checkbox"/> Other: ___Diamond Drilling_____ | |

Does the proposed amendment change the type(s) of water use(s)?

- Yes No

If Yes, indicate using the boxes below, the proposed change(s) to the type(s) of water use(s) noting any water use(s) that are to be added, continued, or removed.

- | | |
|--|---|
| <input checked="" type="checkbox"/> To obtain water for camp/ municipal purposes | <input type="checkbox"/> To divert a watercourse |
| <input type="checkbox"/> To obtain water for industrial purposes | <input type="checkbox"/> To modify the bed or bank of a watercourse |
| <input type="checkbox"/> To cross a watercourse | <input type="checkbox"/> Flood control |
| <input type="checkbox"/> To alter the flow of, or store water | |
| <input checked="" type="checkbox"/> Other: ___Diamond Drilling_____ | |

13. QUANTITY OF WATER INVOLVED

Proposed changes are italicized

Does the proposed amendment change the source of water? Yes No

Indicate the water source(s). Identify proposed changes:

Camp water will be drawn from an unnamed lake proximal to the camp location at 63° 2' 42" N 91° 29' 42" or 63° 2' 30" N 91° 28' 23". Numerous unnamed water sources within the boundary of the Kahuna Property could be utilized as a water source for drilling. The level of the water in the reservoir will NOT be drawn down. Refer to the 2018 Work Plan for the camp location map.

(show location(s) on map)

Does the proposed amendment change the quality of the water source and/or its available capacity?

Yes No

Describe the quality of the water source(s) and the available capacity(s). Identify any changes: water quality will be pristine. Care will be taken to ensure that water is drawn from bodies with sufficient capacity in order to avoid impact on lake levels or flow.

Does the proposed amendment change the overall quantity of water to be used?

Yes No

Provide the overall estimated quantity to be used. Identify proposed changes: Diamond drilling 97 m³/day, Proposed Camp 3m³/day

Does the proposed amendment change the quantity of water to be used from each source?

Yes No

Provide the estimated quantity(s) of water to be used from each source. Identify proposed changes: For drilling activities, water usage is 97m³/day. Camp water usage will be less than 3m³/day. Dunnedin's current permit is for up to 100m³/day.

Does the proposed amendment change the quantity of water to be used for each purpose?

Yes No

Provide the estimated quantities to be used for each purpose (camp, drilling, etc.). Identify proposed changes: For drilling activities, water usage is 97m³/day. Camp water usage will be less than 3m³/day.

Does the proposed amendment change the method(s) of extraction? Yes No

Describe the method(s) of extraction. Identify proposed changes: The drill pumps use a 1" diameter suction hose on a diesel pump with a fine screen on the foot valve. For drilling, a fiberglass window screen with a nominal opening size of less than 1/16" opening is generally wrapped around the foot valve to prevent the intake of silt and sand into the pump. In addition, it is common practice to place the foot valve of the intake hose in a perforated 20 litre pail which further protects against harmful materials and fish being entrained into the water intake hose. For camp use, a portable gasoline-powered water pump will be used to pump water to a camp storage tank. The pump will be operational for

approximately 15 minutes per day. When operating the pump will be staged on a containment platform adjacent to the water source. When not operating the pump will be staged within secondary containment no less than 31m from the high water mark of the water source. Waterlines will be properly placed and screened in accordance with the "Freshwater Intake End-of-Pipe Screen Guideline" (DFO).

Does the proposed amendment change the quantity(s) of water returned to source(s)?

Yes No

Estimated quantity(s) of water returned to source(s). Identify proposed changes: 0 m³/day

Does the proposed amendment change the quality(s) of water returned to source(s)?

Yes No

Describe the quality(s) of water(s) returned to source(s). Identify any changes: Water will not be directly returned to its source, but directed into a sump for slow infiltration into the soil. The sump will be located at least 31 metres away from the high water mark of any water body. A grease trap and screens will be installed on kitchen drains to ensure grease and food solids do not enter the waste water sump. The discharge pipe into the sump will be inaccessible to wildlife.

14. WASTE

Check the appropriate box(s) to indicate the types of waste(s) approved in the existing licence.

- | | |
|---|--|
| <input type="checkbox"/> Sewage | <input checked="" type="checkbox"/> Waste oil |
| <input type="checkbox"/> Solid Waste | <input type="checkbox"/> Greywater |
| <input type="checkbox"/> Hazardous | <input checked="" type="checkbox"/> Sludges (Drill cuttings) |
| <input checked="" type="checkbox"/> Bulky Items/Scrap Metal | <input type="checkbox"/> Contaminated soil and/or water |
| <input type="checkbox"/> Animal Waste | |
| <input type="checkbox"/> Other (describe): _____ | |

Does the proposed amendment change the type(s) of waste(s) to be generated or deposited?

Yes No

If Yes, indicate using the boxes below, the proposed change(s) to the type(s) of waste(s) to be generated and/or deposited noting the addition, removal or continued generation and/or disposal of waste(s).

- | | |
|---|--|
| <input checked="" type="checkbox"/> Sewage | <input checked="" type="checkbox"/> Waste oil |
| <input checked="" type="checkbox"/> Solid Waste | <input checked="" type="checkbox"/> Greywater |
| <input checked="" type="checkbox"/> Hazardous | <input checked="" type="checkbox"/> Sludges (drill cuttings) |
| <input checked="" type="checkbox"/> Bulky Items/Scrap Metal | <input type="checkbox"/> Contaminated soil and/or water |
| <input type="checkbox"/> Animal Waste | |
| <input type="checkbox"/> Other (describe): _____ | |

Refer to the "Waste Management Plan" attached for complete list of waste types and waste management procedures.

15. QUANTITY AND QUALITY OF WASTE INVOLVED

Does the proposed amendment change the quantity(s) of the types of wastes involved?

Yes No

Does the proposed amendment change the composition(s) of the types of wastes involved?

Yes No

Does the proposed amendment change the method(s) of treatment for the types of waste involved?

Yes No

Does the proposed amendment change the method(s) of disposal for the types of waste involved?

Yes No

If Yes to any of the above, describe the proposed changes: The proposed field camp will include; solid waste, grey water, hazardous wastes and sewage.

For each type of waste indicated in Block 14, describe its composition, quantity in cubic meters/day, method of treatment and method of disposal.

Type of Waste	Composition	Quantity Generated	Treatment Method	Disposal Method
Sludges	Drill cuttings	Minimal	Containment in sump or low lying depression	Sump will be buried upon final reclamation
<i>Solid Waste</i>	<i>Combustibles Non-combustibles/plastics</i>	<i>~ 0.1 m³/day</i>	<i>Containment</i>	<i>205L ash drums & bulk bag of plastics shipped off site to authorized facility</i>
Waste Oil	Oils from drill equipment, generators, helicopters	~ 0.001 m ³ /day	Containment	205L drums & shipped off site to authorized facility
<i>Grey water</i>	<i>Shower/sink water</i>	<i><3m³/day</i>	<i>Weeping bed</i>	<i>Weeping bed</i>
<i>Hazardous</i>	<i>Solvents, batteries, sorbents, light bulbs</i>	<i>Minimal</i>	<i>Collect in original container</i>	<i>Shipped off site to authorized facility</i>
<i>Sewage</i>	<i>Human Waste</i>	<i>~ 0.05 m³/day (<20 people for 6 months)</i>	<i>Lime-treated pit infilled or bags incinerated.</i>	<i>Latrine pit or Pacto toilet bags incinerated and ash collected for proper disposal.</i>
Empty Drums	Fuel drums: diesel, jet fuel, propane, gasoline	Up to 10 drums/day	Drained, air dried	Shipped off site to the supplier or accredited recycling facility
Bulky Items	Scrap metal, mechanical equipment, electronics	Unknown	Collected in designated area	Shipped off site for proper disposal

16. OTHER AUTHORIZATIONS

Does the proposed amendment change the need for other authorizations in addition to the sub-surface and surface land use authorizations provided in Block 6?

Yes No

If Yes, indicate any additional authorizations required, which authorizations are no longer required, and which authorizations continue to be required.

For each provide the following:

Authorization: _____

Administering Agency: _____

Project Activity: _____

Date (expected date) of issuance: _____ Date of expiry: _____

17. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES

Does the proposed amendment change the predicted environmental impacts of the undertaking or the mitigation measures?

Yes No

Describe direct, indirect, and cumulative impacts related to water and waste. Identify any changes.

Early stage grassroots exploration programs are low-impact and occur over a short period of time. The effects of these programs are expected to be minor and mitigable.

Changes in flow, quantity and the quality of groundwater and surface water will not be impacted by the exploration program. The proposed camp requires <3m³/day and will operate seasonally. Water will be sourced from water bodies with sufficient capacity to accommodate the proposed usage quantity without impact to lake level or flow rates.

Waterlines for domestic use will be placed to minimize disturbance to the shoreline/riparian zones and substrate. Water and aquatic life is protected. Waterlines will be screened in accordance with the "Freshwater Intake End-of-Pipe Screen Guideline" prepared by the Department of Fisheries and Oceans. A copy of this guideline document is kept at the head office in Vancouver and at the camp field office.

Mitigation measures are in place to minimize the environmental impacts of potential spills. All spills will be treated as per the "Spill Prevention and Response Plan". Approved mitigations and SOPs for water use and waste water management will be applied at Dunnedin Ventures Inc.'s Kahuna Property.

No wastes will enter any water bodies or drainage courses. This includes discharge from the camp grey water sump. The grey water sump will be located at least 31 meters from the high water mark of a water body and will be inspected regularly. Digging of the grey water sump may alter the permafrost layer; however, upon final closure the sump will be backfilled and restored to the pre-existing natural contours of the land. Water use for the domestic camp water will be recorded daily.

The Kahuna Property is not expected to impact fish or fish habitats.

A water quality monitoring program will be established to generate baseline water quality data in areas of active exploration. Sample sites will be chosen on representative water bodies that focus on exploration targets and camp infrastructure locations.

In addition to the mitigation measures outlined above, the exploration program will not have an effect on the following environmental topics: Geologic structures, vegetation species composition and abundance, non-

native species introduction, benthic invertebrates or plankton.

With the mitigation measures and SOPs in place there are no significant impacts or cumulative effects anticipated as a result of Dunnedin's water use and waste water management at the Kahuna Property. Refer to the "Waste Management Plan", "Fuel Management Plan" and "Abandonment and Restoration Plan" for additional information.

Predicted environmental and wildlife impacts and proposed mitigation measures are outlined in detail in the "Environmental and Wildlife Management Plan" attached at the end of this document.

18. WATER RIGHTS OF EXISTING AND OTHER WATER USERS

Was compensation paid and/or an agreement(s) for compensation been entered into with any existing or other users of water during consideration of the existing licence?

Yes No

If Yes, provide the names, addresses and the nature of water use by those persons or properties.

Does the proposed amendment adversely affect any known persons or property including those that hold licences for water use in precedence to the application, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders, and holders of other rights of a similar nature?

Yes No

If Yes, provide the names, addresses and the nature of water use of those persons or properties.

Advise the Board if compensation has been paid and/or an agreement(s) for compensation has been reached with any existing or other water users with respect to the proposed amendment.

No existing water licence holders are known. No significant adverse effects of water use are anticipated. Work will be conducted in a socially and environmentally responsible manner to ensure that no impact to local water bodies occurs and that water quality is not compromised.

19. INUIT WATER RIGHTS

Was compensation paid/ or an agreement(s) for compensation been entered into with any Designated Inuit Organization (DIO) during consideration of the existing licence?

Yes No

If Yes, which DIO(s): Kivalliq Inuit Association (KIA)

Does the proposed amendment substantially affect the quality, quantity or flow of waters flowing through Inuit Owned Land (IOL)?

Yes No

The project will not affect the rights of the Inuit or the quality, quantity and flow of water flowing through Inuit Owned Land parcel CI-15 or RI-01.

If Yes, advise the Board if negotiations have commenced or an agreement to pay compensation for any loss or damage has been reached with one or more DIO(s) with respect to the proposed amendment.

20. CONSULTATION - Provide a summary of any consultation meetings including when the meetings were held, where and with whom. Include a list of concerns expressed and measures to address concerns.

Please refer to the attached Community Consultation Log.

21. SECURITY INFORMATION

Does the proposed amendment change the financial security assessment?

Yes No

Does the proposed amendment change the estimate of the total financial security for final reclamation?

Yes No

Provide an estimate of the total financial security for final reclamation equal to the total outstanding reclamation liability for land and water combined sufficient to cover the highest liability over the life of the undertaking. Estimates of reclamation costs must be based on the cost of having the necessary reclamation work done by a third party contractor if the operator defaults. The estimate must also include contingency factors appropriate to the particular work to be undertaken. Identify any changes in the financial security assessment resulting from the proposed amendment.

Where applicable, the financial security assessment should be prepared in a manner consistent with the principals respecting mine site reclamation and implementation found in the *Mine Site Reclamation Policy for Nunavut*, Indian and Northern Affairs Canada, 2002.

Upon final abandonment and restoration, the temporary field camp will be dismantled and fully reclaimed. The cost to reclaim the temporary field camp by a third-party contractor is estimated to be \$50,000 which includes a \$5,000 contingency.

22. FINANCIAL INFORMATION

Is the statement of financial security the same as that considered in the existing water licence?

Yes No

Provide an updated statement of financial security.

If the applicant is a business entity please answer the questions below:

Is the list of the officers of the company the same as those considered in the existing water licence?

Yes No

Provide a list of the officers of the company.

Is the Certificate of Incorporation or evidence of registration of the company name the same?

Yes No

Attach a copy of the Certificate of Incorporation or evidence of registration of the company name.

23. STUDIES UNDERTAKEN TO DATE

List and attach updated studies, reports, research etc.

No studies have been performed on the Kahuna Property. There has been no water usage to date.

Provide a compliance assessment and status report including a response to any inspector's reports. The licensee must contact the NWB for licence specific direction in completing the assessment and report.

N/A

If in non-compliance, a licence may not be issued until compliance is achieved. If in non-compliance, attach plans/reports for consideration. Application will not be processed if significant issues of non-compliance exist.

N/A

24. PROPOSED TIME SCHEDULE

When are proposed amendments scheduled to be undertaken: February 15, 2018.

Does the proposed amendment change the time schedule considered in the existing licence for any phase of development?

Yes No

Indicate the start and completion dates for each applicable phase of development (construction, operation, closure, and post closure). Identify proposed changes.

Construction

Proposed Start Date: mid-February 2018 Proposed Completion Date: March 2018
(month/year) (month/year)

Operation

Proposed Start Date: March 2018 Proposed Completion Date: September 2018
(month/year) (month/year)

Closure

Proposed Start Date: TBD Proposed Completion Date: Unknown
(month/year) (month/year)

Post - Closure

Proposed Start Date: Unknown Proposed Completion Date: Unknown
(month/year) (month/year)

For each applicable phase of development indicate which season(s) activities occur.

Construction

Winter Spring Summer Fall All season

Operation

Winter Spring Summer Fall All season

Closure

Winter Spring Summer Fall All season

Post - Closure TBD

Winter Spring Summer Fall All season

25. PROPOSED TERM OF LICENCE

On what date does the existing licence expire? May 30, 2022

Is the Licensee applying for a combined renewal and amendment of the existing licence?

Yes No

If Yes, indicate the proposed term of the renewal (maximum of 25 years): _____

Requested date of renewal issuance: _____ Requested Expiry Date: _____
(month/year) (month/year)

(The requested date of renewal issuance must be at least three (3) months from the date of application for a type B water licence and at least one (1) year from the date of application for a type A water licence, to allow for processing of the water licence application. These timeframes are approximate and do not account for the time to complete any pre-licensing land use planning or development impact requirements, time for the applicant to prepare and submit a water licence application in accordance with any project specific guidelines issued by the NWB, or the time for the applicant to respond to requests for additional information. See the NWB's *Guide 5: Processing Water Licence Applications* for more information)

26. ANNUAL REPORTING

Will the proposed amendment change the content of annual reports or the annual report template?

Yes No

If Yes, provide details regarding the content of annual reports and a proposed outline or template of the annual report.

27. CHECKLIST

The following must be included with the application for Amendment for the water licensing process to begin.

Completed Application for Water Licence Amendment form.

Yes No If no, date expected _____

Information addressing Supplement Information Guideline (SIG), where applicable (see Block 11)

Yes No If no, date expected _____

Compliance Assessment / Status Report (see Block 23).

Yes No If no, date expected _____

Indication of Renewal Requirement (see Block 26)

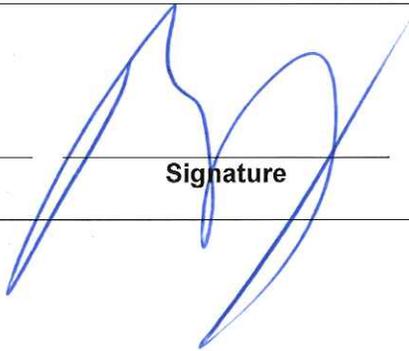
Yes No If no, date expected _____

English Summary of Amendment Application.

Yes No If no, date expected _____

Inuktitut and/or Inuinnaqtun Summary of Amendment Application.

<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	If no, date expected _____
Application fee of \$30.00 CDN (Payee Receiver General for Canada).		
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	If no, date expected _____
Water Use Fee Deposit of \$30.00 CDN (Payee Receiver General for Canada). The actual water use fee will be calculated by the NWB based upon the amount of water authorized for use in accordance with the Regulations at the time of issuance of the licence.		
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	If no, date expected _____

28. SIGNATURE			
Andrew Berry	VP Operations		NOV 07 / 17
Name (Print)	Title (Print)	Signature	Date



SPILL PREVENTION AND RESPONSE PLAN

Kahuna Property
Dunedin Ventures Inc.

Original Version Submitted: November 2015
Revised Version Submitted: November 8, 2017

Prepared By: Andrew Berry, VP Operations
Dunedin Ventures Inc.
Suite 1020-800 West Pender Street
Vancouver, BC, V6C 2V6

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Appendices

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Appendix B: Nunavut Spill Report Form and Guide

Appendix C: Material Safety Data Sheets (MSDS)

1 Introduction

This Spill Prevention and Response Plan (SPRP) was submitted in 2015 and updated as of November 8, 2017 and has been specifically prepared for the Kahuna Property. The property is located between the communities of Rankin Inlet (Kangiqtiniq) and Chesterfield Inlet (Igluigaarjuk) in the Kivalliq Region of Nunavut (Appendix A). A copy of this plan will be kept in the office at site and at the head office in Vancouver. Copies of this plan may be obtained from Dunnedin Ventures Inc. (Dunnedin).

Exploration activities on the Kahuna Property are currently permitted under INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01, KIA Land Use Licence KVR16F01 and NWB Water Licence 2BE-KDP1722. Activities permitted include: rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, diamond drilling, reverse circulation drilling and bulk sampling.

1.1 Corporate Details

Dunnedin Ventures Inc.
Suite 1020-800 West Pender Street
Vancouver, British Columbia, V6C 2V6
Tel: (604) 646-8351
Fax: (604) 646-4526
www.dunnedinventures.com

1.2 Purpose and Scope

Dunnedin Ventures Inc. has prepared this SPRP for drilling, bulk sampling, exploration activities and field camp operations being undertaken on the Kahuna Property. The purpose of this document is to provide a plan of action in the event of a hazardous spill and to mitigate, to the fullest extent possible, the risk of environmental contamination from the accidental release of deleterious materials by providing clear procedures for their storage and handling as well as clear plans of action in the case of such a release. This plan demonstrates that Dunnedin Ventures Inc. has appropriate response procedures and measures in place to effectively contain and recover spills in an efficient manner.

Dunnedin Ventures Inc. will take every reasonable precaution towards ensuring the protection and conservation of the natural environment, the safety and health of Dunnedin Ventures Inc. employees and contractors and protecting the community at large from harmful effects of its materials and operations.

1.3 Project Description

The Kahuna Property comprises 145 mineral claims encompassing 166,463 hectares of land located on NTS map sheets 055O/02, 055O/03, 055O/04, 055O/05, 055O/06, 055O/07, 055J/13, 055J/14, 055N/01 and 055N08 (Appendix A). The southern boundary of the property adjoins the north boundary of subsurface Inuit Owned Land (IOL) parcel RI-01, approximately 25 kilometres northeast of Rankin Inlet. The northeast corner of the property is located approximately 10 kilometres southeast of Chesterfield Inlet. The northwest corner of the property is located approximately 75 kilometres west of Chesterfield Inlet. The Property extends north, south, east and west between Latitudes 62°58' and 63°19' North and Longitudes 90°44' and 92°13' West (UTM coordinates: 6,983,000mN to 7,023,000mN and 539,000mE to

614,000mE, NAD83, Zone 15). A total of 82 mineral claims have surface rights covering 87,570 Ha that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15.

Exploration activities on the Kahuna Project are currently permitted under INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01, KIA Land Use Licence KVR16F01 and NWB Water Licence 2BE-KDP1722.

An amendment application has been submitted to NPC and NIRB to authorize a temporary field camp and fuel cache on Crown Lands under INAC Land Use Permit N2015C0019, and authorize domestic water use for the temporary camp under NWB Water Licence 2BE-KDP1722. The temporary camp will be used to support exploration activities authorized by Dunnedin's permits and licences.

1.4 Facilities

1.4.1 Field Camp

To mitigate daily helicopter transits to and from Rankin Inlet, and for safety reasons associated with winter work conditions, Dunnedin is seeking authorization for a temporary field camp located centrally on the Kahuna Property and proximal to high priority exploration targets. The camp will operate seasonally from March through September.

More than 10 different locations were investigated as potential sites for the new field camp. Members of the Chesterfield Inlet HTO provided assistance and recommendations for the final site selection. The recommended location for Dunnedin's temporary field camp is on Crown Lands approximately 40 kilometres northeast from Rankin Inlet and 50 kilometres southwest from Chesterfield Inlet at 575,975mE and 6,990,875mN in Zone 15, UTM NAD83.

Dunnedin's temporary field camp will accommodate up to 20 people and will be comprised of:

- 1 - Kitchen Tent
- 1 - Office Tent
- 1 - Dry Tent
- 1 - Core Logging Tent
- 1 - Utility Tent
- 1 - Toilet Facility (Pactos)
- 7 - Crew Accommodations (1 tent will house the First Aid Attendant and First Aid Equipment)
- 1 - Generator Shack
- 1 - Portable Fuel-Fired Incinerator
- 2 – 5m x 20m Arctic Grade Containment Berms

Structures will consist of a combination of WeatherPort vinyl tents, canvas prospectors' tents and small plywood structures. All fuel storage and usage areas will be located at least 31 metres from any water body or drainage course.

At the end of the 2018 field season, the WeatherPort vinyl tents and plywood structures will be left standing and ready for use for Dunnedin's 2019 field program. All canvas tent covers will be removed from tent frames during the fall and winter shut down period. The camp will be fully closed and dismantled

upon completion of all exploration activities. The site will then be reclaimed and restored to its original state.

1.4.2 Fuel Storage

Dunnedins' existing permits and licences include authorization for 3 fuel caches that together contain an aggregate of 75 drums (205L each) of jet fuel and 120 drums of diesel fuel. Dunnedin requests an increase in the amount of fuel to be cached on the Kahuna Property to support the field camp, the proposed 2018 winter drill program and the summer 2018 exploration program. The majority of fuel to be cached on the property will be transported via Challenger and cargo sled during winter months on the overland winter. Additional fuel may be delivered to site via helicopter during the summer months.

A main fuel cache will be established on the east side of the new field camp facilities at 576065mE 6990845mN UTM Zone 15, UTM NAD83. Fuel to be cached on the site will include:

- 150 – 205 L drums of diesel fuel
- 150 – 205 L drums of jet fuel
- 10 – 205 L drums of gasoline
- 20 – 100 lb cylinders of propane

All fuel drums will to be stored in Arctic grade secondary containment berms equipped with Spilfyter RailMat 3 ply hydrocarbon absorbent fabric and Rain Drain hydrocarbon filters for water drainage. All fuel storage berms, fuel drums, fuel transfer and fuel staging areas will be will be located a minimum 31 metres from any water body or drainage course. All fuel storage berms, fuel drums, fuel transfer and fuel staging areas will be inspected regularly and will be equipped with easily visible and readily available spill kits.

Empty drums will drained and stored in a designated area and will be removed from the property regularly to be transported south for recycling or disposal at an authorized facility. Dunnedin will endeavor to consume the majority of the cached fuel by the end of each season. Please refer to the "Fuel Management Plan" and "Spill Prevention and Response Plan" for more information.

Temporary supply caches of less than nine drums will be located at drill sites and bulk sampling sites to maintain operations of diamond drilling equipment and bulk sampling equipment, respectively.

Chemicals and hazardous materials that may be located on the Kahuna Property include limited volumes of motor oil and hydraulic oil, cleaners, batteries, electronics, fluorescent light bulbs/tubes and small quantities of hydrochloric acid. All such materials will be stored in their original containers. Refer to the "Waste Management Plan" for the types, quantities and method of storage.

Material Safety Data Sheets (MSDS) for these and other petroleum based products used during the bulk sampling and drilling programs are located in Appendix C.

Fuel caches will be located in natural low-lying depression more than 100 metres from the normal high water mark of any body of water. Temporary fuel caches will be contained in a portable fuel containment berm. Fuel cache inspections will occur on a regular basis for leaks, damaged or punctured drums.

Empty fuel drums will be backhauled to Rankin Inlet by Challenger and sled during the winter months and by helicopter during summer operations. The government of Nunavut Department of Environment monitors the movement of hazardous waste, including waste fuel. This is done through a tracking document known as a Waste Manifest. The Waste Manifest must and will accompany all shipments.

All fuels for exploration purposes, i.e. Jet B, gasoline and diesel are stored in 205 litre (45 gal) metal drums. Propane is stored in standard 100lb propane tanks. A spill kit will be located at each fuel cache.

1.5 Equipment

Equipment that will be used on the Kahuna Property is included in Table 1 below.

TABLE 1: EQUIPMENT LIST

Type	Size	Purpose
Helicopter - 1	A Star, Long Ranger (or similar)	Transportation - crews & equipment
Core Drill heli-portable - 1	Boyles 17A or equivalent	Drill testing
Snow Machine - 4	Small to mid-size	Transportation
Water Pump - 2	Gasoline powered	Water supply for drill & field camp
Excavator - 1	Cat 314C Excavator or equivalent	Extract Bulk Sample
Air Track Drill/RC Drill - 1		Drill blast holes/bulk sampling
Caterpillar Challenger 65s - 2 to 4	100 HP, with steel sleds	Mobilize/Demobilize drill, fuel, equipment & bulk sample
Generators -2	20Kw and 12 Kw	Power generation

2 Predicted Environmental Impacts

All hazardous materials pose a threat to the environment if spilled. The following list outlines potential environmental impacts of hazardous materials stored on site:

- Gasoline may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Gasoline volatilizes quickly and can be explosive and a fire hazard in the event of a spill.
- Diesel may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Diesel volatilizes comparatively slowly but represents a fire hazard in the event of a spill.
- Jet fuel may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Jet fuel volatilizes relatively quickly and represents a fire hazard in the event of a spill.
- Propane may be harmful to wildlife and the surrounding environment, and it has the potential to accumulate in the environment. Propane is highly volatile. In the event of a spill it represents an extreme explosive hazard.

- Oils and greases may be harmful to wildlife and aquatic life. They are not readily biodegradable, their volatility is low and they have the potential for bioaccumulation in the environment.

3 Preventative Measures

The following actions are a proactive approach to environmental stewardship. These actions minimize the potential for spills during fuel handling, transfer and storage.

1. Use fuel transfer hoses with cam lock mechanisms.
2. Carefully monitor fuel content in the receiving container during fuel transfer. Always have fuel absorbent pads on hand while transferring fuel.
3. Clean up drips and minor spills as they happen.
4. Regularly inspect drums, tanks and hoses for leaks or potential to leak and for proper storage.
5. Create fuel caches in natural depressions that are located a minimum of 31 metres from the normal high water mark of any water body nearby.
6. Train personnel, especially those who will be operators, in proper fuel handling and spill response procedures.

3.1 Petroleum and Chemical Product Storage

Dunnedin Ventures Inc. will establish a main fuel cache at the site of the remote field camp. Temporary supply caches of nine drums or less will be located at drill sites and bulk sampling sites to maintain operations of diamond drilling equipment and bulk sampling equipment, respectively. Fuel caches will be in accordance with CSA approved methods of storage of drummed product. Inspections of the fuel caches will be conducted during each visit. There will be a spill kit at each fuel cache location.

Preventative measures for the storage of petroleum and chemical products include:

Fuel and Chemical Storage

- All fuels and other hazardous materials will be stored in secondary containment (“berms”).
- All secondary containment will be capable of holding 110 percent of the volume of the largest fuel reservoir that is housed within the secondary containment.
- All secondary containment will be of sufficient height and depth to hold any potential spill or failure.
- Secondary containment berms will be made of material (Arctic Grade) that is sufficiently durable to withstand Nunavut’s climate and the natural terrain.
- Secondary containment berms will be equipped with hydrocarbon filtration systems (rain drains) to safely remove water that is collected inside the berms.
- Secondary containment berms will be inspected daily during operations.
- Within the secondary containment berms fuel drums will be stored in rows on their sides with bungs facing at the 3:00 and 9:00 position.

- All drums, tanks and hoses will be regularly inspected for leaks.
- Propane cylinders will be stored standing up and away from any potential sources of ignition.
- Drummed fuel used for heating tents will be placed in secondary containment.
- All fuel storage sites will be located a minimum of 31 metres from the normal high-water mark of any water body and will be inspected regularly.
- Spill Kits will be placed and will be easily identifiable with clear signage at each fuel storage site.
- “NO SMOKING” signs will be erected at each fuel storage area.
- Smoking, open flame and any potential sources of ignition are prohibited within 31 metres of any fuel storage site.
- Empty fuel drums will be removed from site regularly.

Hazardous materials that may be located on the Kahuna Diamond Project include small amounts of hydrochloric acid, cleaners, batteries, electronics, fluorescent light bulbs/tubes, motor oil and hydraulic oil. Materials will be stored in their original containers.

A limited inventory of motor oil and hydraulic oil will be located in the utility tent at the temporary field camp. These products typically come in 1 litre or 4 litre jugs and will be stored in a drip tray with a spill kit nearby. Hydrochloric acid is used for core logging in very small amounts (<0.5 litre) and will be kept in a sealed container in the core shack. Cleaners (solvents) will be kept in a designated area in their original containers. Cleaners, batteries and fluorescent light bulbs/tubes will be kept in their original containers.

3.2 Petroleum Product Handling and Transfer

Manual and electric powered pumps, along with the appropriate filtration devices, are used for the transfer of petroleum products.

Cigarette smoking, sparks, open flame and any other potential ignition sources are prohibited from any fuel storage and fuel transfer site at all times. As a general guideline, all equipment is to be turned off during refueling. A spill kit will be stored in areas of storage and refueling.

Preventative mitigation measures include:

Handling and Transfer

- Fuel transfer hoses with cam lock mechanisms to prevent leakage are used.
- Fuel absorbent pads are placed appropriately to protect from drips and spills.
- Personnel will carefully monitor fuel content in the receiving vessel during transfer and always have absorbent pads available while transferring fuel.
- Any drips or leakages are cleaned immediately.
- All operating personnel will be trained in proper fuel handling and spill response procedures.
- Smoking, open flame and any potential sources of ignition are prohibited within 31 metres of any fuel storage site and fuel transfer locations.
- “NO SMOKING” signs will be erected at each fuel transfer area.
- Equipment maintenance and servicing will be conducted in designated areas. Equipment will be underlain by absorbent pads and spill trays for lubricant changes.

- Funnels will be used to reduce the potential for spillage.
- Waste oils and fluids will be collected in sealed 20 litre pails and will be labelled appropriately and stored in secondary containment berms.
- Empty fuel drums will be removed from site regularly.
- All other transfers will be completed within designated areas within in secondary containment. When secondary containment is not practical (e.g. adding hydraulic oil to the helicopter), absorbent pads will be used to protect from drips and spills.

3.3 Petroleum Product Transport

Shipper

- Ensures proper loading, restraint, containment and documentation, which complies with TDG (Transportation of Dangerous Goods) guidelines.
- Ensures that goods are classified and labelled appropriately. Provide placards if required.
- Ensures safety at all times.
- Ensures proper communication with carrier.

Carrier

- Supervises and ensures proper loading, restraint, containment and documentation, which complies with TDG guidelines.
- Ensures correct volumes for transport, attach placards if required.
- Checks and delivers TDG manifest to receiver.
- Ensures safety of all personnel and equipment.

Receiver

- Supervises unloading procedures.
- Complies with TDG guidelines.
- Ensures safety of containment facilities.
- Ensures maintenance of all pumps and loading/unloading equipment on site.
- Provides on-site emergency communications (telephone, radio).
- Completes regular site inspections of storage facilities.
- Records all shipment manifests. Keeps on-site inventory of dangerous goods.
- Maintains safety procedures at all times.

On-Site Coordinator

- Supervises and organizes spill containment equipment and personnel.
- Reports to internal/external parties.
- Ensures proper safety equipment is available.
- Notifies all personnel of current hazards.
- Provides adequate training for safety and material handling.
- Maintains proper safety procedures at all times.
- Must be compliant with all TDG guidelines.

3.4 Spill Equipment

Complete spill kits are kept on hand at all times at the base of operations and where hazardous materials are being stored. Spill kits contain:

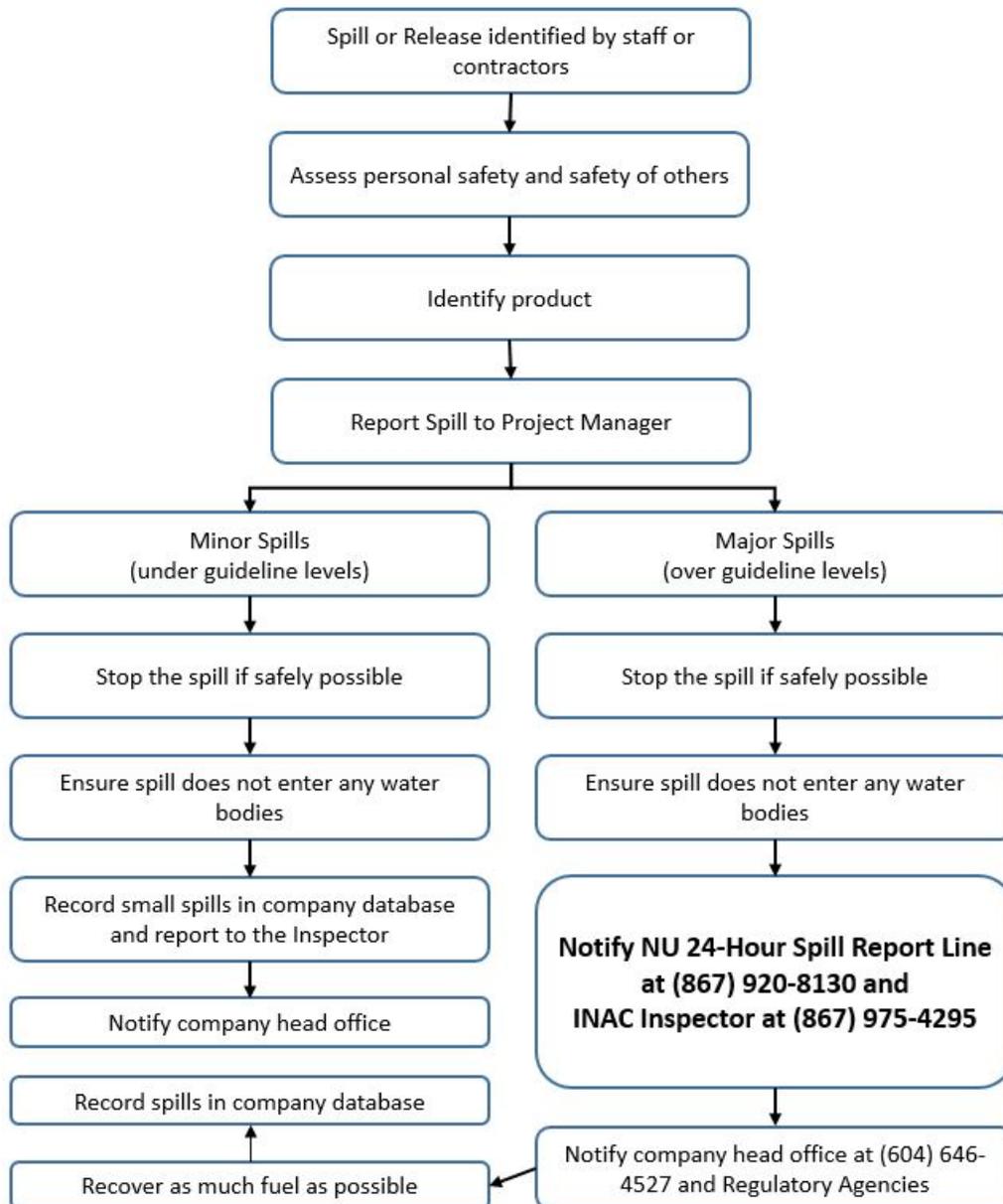
- 1 – 360 litre/79 gallon polyethylene over-pack drum
- 4 – Oil sorbent booms (5" X 10')
- 100 – Oil sorbent sheets (16.5" X 20" X 3/8")
- 1 – Drain cover (36" X 36" X 1/16")
- 1 – Caution tape (3" X 500')
- 1 – 1 lb. plugging compound
- 2 – Pairs Nitrile gloves
- 2 – Pairs Safety goggles
- 2 – Pairs Tyvek coveralls
- 1 – Instruction booklet
- 10 – Printed disposable bags (24" X 48")
- 1 – Shovel

Spill kits are located at all fuel berms, fuel storage, fuel handling and transfer stations, and at drill sites. In the event a damaged or leaking drum is noted, at least one empty fuel drum in good condition will be located at each fuel cache to facilitate a transfer of contents into a secure container. Extra absorbent pads will be kept with the helicopter and in any area where refuelling, transferring and/or handling is done.

4 Response Organization

In the case of any spill or environmental emergency, it is necessary to react in the most immediate, safe and environmentally responsible manner. No spill or incident is so minor that it can be ignored and every spill must be reported. Communications are essential when located in a remote area. A summary of available communication equipment is provided in section 4.4.

The follow flow chart depicts spill response organization, as well as the chain of command for responding to a spill or release.



4.1 Basic Steps – Spill Procedures

The basic steps of the response plan are as follows:

1. Ensure the safety of all persons at all times.
2. Identify and find the spill substance and its source, and, if possible, stop the process or shut off the source.
3. Inform the immediate supervisor or his or her designate at once, so that he/she may take appropriate action. Appropriate action includes the notification of a government official, if required; Spill Report forms are included at the back of this plan.
4. Contain the spill or environmental hazard, as per its nature, and as per the advice of INAC Water Resources Inspector as required.
5. Implement any necessary cleanup or remedial action.

4.2 Basic Steps - Chain of Command

1. Immediately notify the Dunedin Ventures Head office (604) 646-8351 and report to the 24 Hour Spill Line at (867) 920-8130 (Fax: 867-873-6924), INAC Land Use Resource Management Officer (867) 645-2840 and KIA Land Use Inspector (867) 645-5735.
2. A Spill Report Form (Appendix A) is filled out as completely as possible before or after contacting the 24 Hour Spill Line.
3. Notify Bob Singh, Exploration Manager, Dunedin Ventures Inc. (604) 681-0084; Chris Taylor, Chief Executive Officer, Dunedin Ventures Inc. (604) 646-8351.

4.3 Spill Response/Reporting Contact Information

Table 2: Contact List

CONTACT	CONTACT NUMBER (Tel / Cell)
Chris Taylor, CEO, Dunedin Ventures Inc.	(604) 646-8351
Bob Singh, Exploration Manager, Dunedin Ventures Inc.	(604) 681-0084
24 Hour Emergency Spill Line	(867) 920-8130 (phone) (867) 873-6924 (fax)
INAC Land Use Resource Management Officer (Rankin Inlet)	(867) 645-2840
KIA Land Use Inspector (Rankin Inlet)	(867) 645-5735
Helicopter provider	TBD
Rankin Inlet Hospital	(867) 645-8300 (Office Hours) (867) 645-6700 (24 Hours)
Rankin Inlet RCMP; Office Hours / Emergency	(867) 645-1111 (Emergency) (867) 645-0123 (Office Hours)

4.4 Communications

Communications are essential when using isolated camps with aircraft support. Crew members must be taught how to use all of the communication equipment in camp. There are three types of communication that will be used at the Kahuna Property field camp: Infosat digital satellite data / phone link, Iridium satellite phones, hand held VHF radios and Garmin inReach devices. A summary of communication equipment procedures is below.

To use the Infosat satellite phone: (Digital data / phone link - base camp system)

- Dial as for a regular push button telephone.

To use an Iridium satellite phone:

- Press power button to turn unit.
- Unfold antenna and allow it to stand vertically.
- Ascertain 3 to 5 bar signal strength.
- Dial as for a regular push button telephone.
- Press send.

Hand held VHF radio: (personal communication with appropriate frequencies)

- Channels will be established and designated during field operations.
- Press transmit button on side of unit to talk.
- Remove pressure from transmit button to receive.

Garmin inReach devices:

- Important contacts are programmed into the contact list.
- Send messages like you do a text on your mobile phone.
- In the event of an emergency, there is an SOS button on the right side of the device that will initiate emergency response.

5 Spill Response Action Plan

5.1 Potential Spill Hazards

The following is a list of potential spill hazards:

- Drummed products have the potential to leak or rupture. This includes drums of Jet A, Diesel, Gasoline, Waste Fuel, and Waste Oil. Ensure bungs are sealed properly.
- Propane cylinder leaks may occur at the valves. All cylinders are secured at all times. Full fuel cylinders are always stored in the upright position.
- Wheeled vehicles and equipment, aircraft (fixed and rotary wing), diamond drill, reverse circulation drill/air track drill, Caterpillar Challenger, snowmobiles, generators, pumps. Incidents

involving leaking or dripping fuels and oils may occur due to malfunctions, impact damage, and lack of regular maintenance, improper storage, or faulty operation.

Incidents involving leaking or dripping fuels and oils may occur due to malfunctions, impact damage, and lack of regular maintenance, improper storage or faulty operation. Regular inspection and maintenance in accordance with recognized and accepted standard practices at all fuel caches, reduces the risks associated with the categories listed above.

Spill response training is provided to all personnel with particular attention to those personnel who handle fuels and other petroleum products. This training will include a presentation, review of spill kit contents and their use and reporting.

Spill Kits will be located at the field camp and all fuel caches and drill shacks. A description of contents is listed in Section 3.4.

5.2 Initial Action Procedures

1. First steps to take when a spill occurs:

- Ensure your own safety and that of others around you, beginning with those nearest to the scene.
- Control danger to human life, if necessary.
- Identify the source of the spill.
- Notify your supervisor, request assistance if needed.
- Assess whether or not the spill can be readily and safely stopped.
- Contain or stop the spill at the source, if possible, by following these actions.
 - If filling is in progress, STOP AT ONCE.
 - Close or shut off valves.
 - Place plastic sheeting at the foot of the tank, barrel or piece of equipment to prevent seepage into the ground or runoff of fuel.
 - Use absorbent materials (sheets, pads, booms) to absorb and contain the fuel spill.

2. Secondary steps to take:

- Determine status of the spill event.
- If necessary, transfer fuel from a damaged and/or leaking drum or tank into a refuge container.
- Notify the 24 hour Spill Report Line, and receive further instructions from the appropriate contact agencies.
- Complete and fax a copy of the Spill Report Form.
- Notify permitting authorities.
- If possible, resume cleanup and containment.

5.3 Spill Response Actions – Diesel Fuel, jet Fuel, Hydraulic Oil & Lubrication Oil

Take action only if safety permits – stop the source flow if safe to do so and eliminate all ignition sources. **Never smoke** when dealing with these types of spills.

Advice on spill containment and cleanup may be obtained from INAC Resource Management Officer.

Spills on Land

- Build a containment berm using peat, native soil or snow down slope of the seepage or spill.
- Place a tarp at the foot of the berm to allow the fuel to pool for collection and removal. If there is a large volume of spilled product, pump the liquid into empty drums for sealing and disposal.
- Remove the spill by using absorbent pads or excavating the soil or gravel. Petroleum product sheen on vegetation may be controlled by applying a thin dusting of ultra-dry absorbent (e.g. Multi Sorb) to the ground cover. Multi Sorb can also be used to scrub the rock surface.
- Contaminated soil and saturated material will be placed in empty drums and shipped from the site for proper disposal. Contact regulatory agencies for approval before commencing removal of any soil, gravel, or vegetation.

Spills on Water

- Deploy hydrophobic (water repellent) absorbent pads on the water to capture small spills. Hydrophobic pads readily absorb hydrocarbons. Alternatively, an ultra-dry absorbent designed for use on water based spills may be deployed.
- For larger spills, ready several empty drums to act as refuge containers for the spill.
- Use containment booms on the water surface to “fence in” the spill area gradually and to prevent it from spreading.
- Absorbent booms can be deployed to encircle and then absorb any hydrocarbon spillage that may have escaped the containment boom.
- Once a boom has been secured, a skimmer may be brought on site to aid in capture of the hydrocarbons. Once captured, the product should be pumped to the empty fuel drums and prepared for proper disposal.

Spills on Snow and Ice

- Build a containment berm using snow around the spill.
- Remove spill using absorbent pads or particulate sorbent material.
- Shovel or scrape contaminated snow and ice into plastic buckets with lids or empty 205L drums.

Spills on Muskeg

- Do not deploy personnel and equipment on marsh or vegetation.
- Remove pooled oil with sorbent pads and/or skimmer.

- Flush with low pressure water to herd oil to collection point. Burn only in localized areas, e.g., trenches, piles or windrows. Do not burn if root systems can be damaged (low water table). Minimize damage caused by equipment and excavation.

Storage and Transfer

All contaminated water, ice, snow, soil, and clean up supplies will be temporarily stored in closed, labelled containers. All containers will be stored in a well-ventilated area away from incompatible materials.

Disposal

Any contaminated material will be shipped from site to an appropriate and approved facility. The DOE monitors the movement of hazardous wastes from generators, carriers to receivers, through a tracking document (Waste Manifest). A Waste Manifest will accompany all movements. Dunnedin Ventures Inc. is in the process of applying for a waste generator number with the Department of Environment.

Bioremediation

At the advice, discretion and approval of land use inspectors and permitting or licensing authorities' bioremediation, or land farming, may be implemented to treat certain contaminated soils temporarily contained in sealed drums on the property. Bioremediation is performed in biotreatment cells or the upper soil zone. Contaminated soils or sediments are incorporated into non contaminated soils and periodically turned over or tilled to aerate the mixture.

5.4 Spill Response Actions - Propane

CAUTION EXPLOSIVE. Take action only if safety permits – stop the source flow if safe to do so and eliminate all ignition sources. **Never smoke** when dealing with these types of spills.

On Land

Do not attempt to contain the propane release.

On Water

Do not attempt to contain the propane release.

On Ice and Snow

Do not attempt to contain the propane release.

General

It is not possible to contain vapours when released.

Water spray can be used to knock down vapours if there is no chance of ignition. Small fires can be extinguished with dry chemical or CO₂.

Personnel should withdraw immediately from area unless a small leak is stopped immediately after it has been detected.

If tanks are damaged, gas should be allowed to disperse and no recovery attempt should be made.

Personnel should avoid touching release point on containers since frost forms very rapidly.

Keep away from tank ends.

Storage and Transfer

It is not possible to contain vapours when released.

5.5 Spill Response Actions - Chemical Spills

- Assess the hazard of the spilled material. REFER TO THE MSDS SHEETS.
- Assemble the necessary safety equipment before response.
- Apply absorbents to soak up liquids.
- Place plastic sheeting over solid chemicals, such as dusts and powders, to prevent their disbursement by wind or investigation by birds or other mammals.
- Neutralize acids or caustics. Place spilled material and contaminated cleanup supplies in an empty refuge drum and seal for disposal.
- Contact the 24-Hour Spill Line.

5.6 Spill Response Actions - Loss of External Load

The loss of external loads of fuel, oil or chemicals from aircraft may result in the failure of the container that held the product. Immediate response is required.

- Mark the loss target with GPS coordinates and relay to the base of operations immediately. Include the quantity and type of load lost.
- Note whether the load was dropped onto soil, rocks, water or snow and from what height. Determine if the container failed.
- Base of operations will contact the 24-Hour Spill Line.
- Administer appropriate procedure for Spills on Land, Water, Ice or Snow.

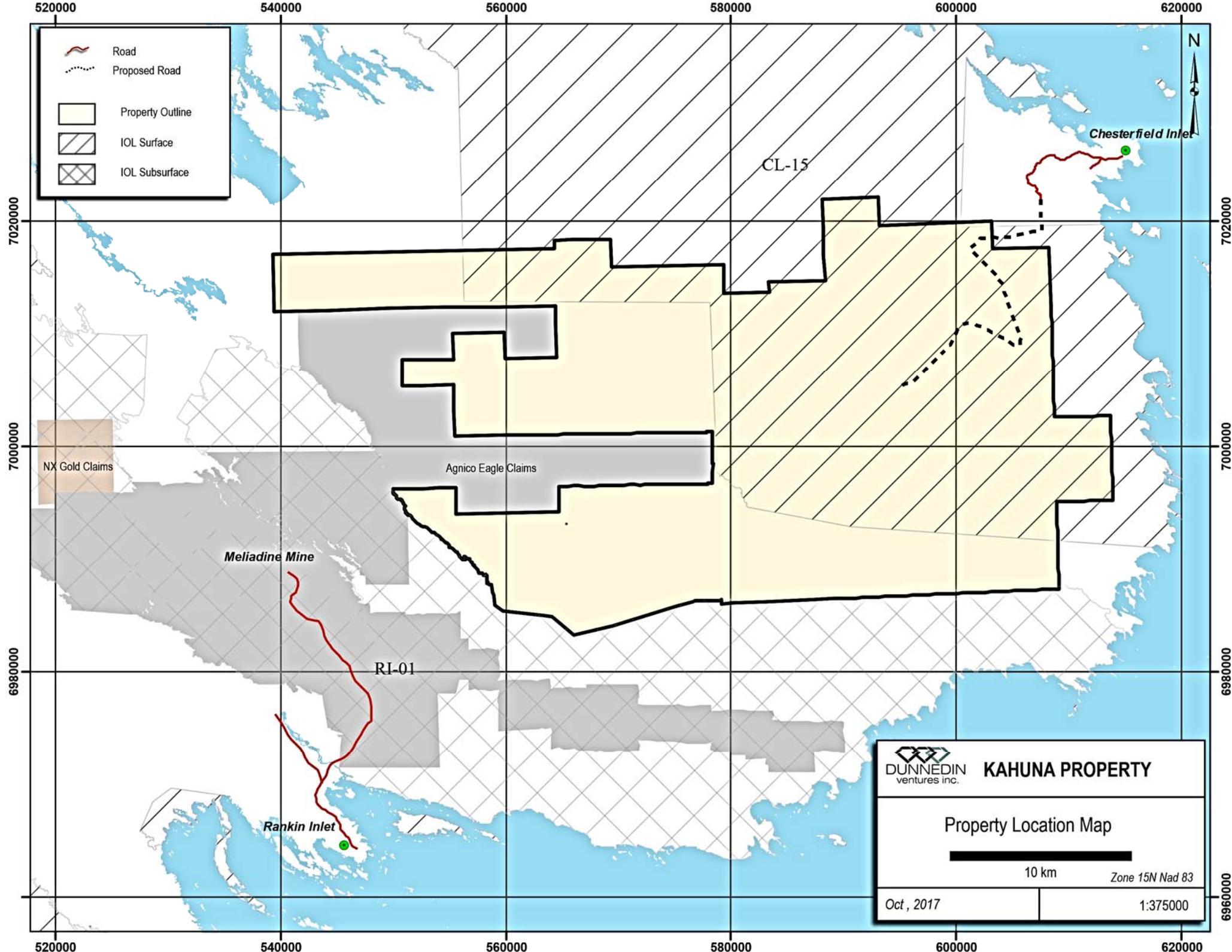
6 Training

All employees and contractors are required to be familiar with the Kahuna Property Spill Prevention and Response Plan, and will also be trained for initial spill response methods.

All employees and contractors of Dunnedin Ventures Inc. will be trained in internal policies, management plans, standard operating procedures and made familiar with the Terms and Conditions of the project's licences and permits. Every person arriving at the Kahuna Property will undergo an orientation session which includes information on health, safety, and environmental responsibilities and stewardship.

APPENDIX A

MAPS



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600000

620000

NX Gold Claims

Meliadine Mine

Agnico Eagle Claims

RI-01

CL-15

Chesterfield Inlet

Rankin Inlet

DUNNEDIN
ventures inc. **KAHUNA PROPERTY**

Property Location Map



10 km

Zone 15N Nad 83

Oct, 2017

1:375000

APPENDIX B
NUNAVUT SPILL REPORT FORM
AND
GUIDE TO COMPLETE THE SPILL REPORT FORM



Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE

TEL: (867) 920-8130

FAX: (867) 873-6924

EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR		REPORT TIME		<input type="checkbox"/> ORIGINAL SPILL REPORT, OR <input type="checkbox"/> UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER _____
	B		OCCURRENCE DATE: MONTH – DAY – YEAR			
C	LAND USE PERMIT NUMBER (IF APPLICABLE)			WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION				REGION <input type="checkbox"/> NWT <input type="checkbox"/> NUNAVUT <input type="checkbox"/> ADJACENT JURISDICTION OR OCEAN	
E	LATITUDE			LONGITUDE		
	DEGREES	MINUTES	SECONDS	DEGREES	MINUTES	SECONDS
F	RESPONSIBLE PARTY OR VESSEL NAME		RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION			
G	ANY CONTRACTOR INVOLVED		CONTRACTOR ADDRESS OR OFFICE LOCATION			
H	PRODUCT SPILLED		QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER		
	SECOND PRODUCT SPILLED (IF APPLICABLE)		QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER		
I	SPILL SOURCE		SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES		
J	FACTORS AFFECTING SPILL OR RECOVERY		DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT		
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS					
L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE	
	M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE
REPORT LINE USE ONLY						
N	RECEIVED AT SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLED	REPORT LINE NUMBER	
		STATION OPERATOR		YELLOWKNIFE, NT	(867) 920-8130	
LEAD AGENCY <input type="checkbox"/> EC <input type="checkbox"/> CCG <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> INAC <input type="checkbox"/> NEB <input type="checkbox"/> TC			SIGNIFICANCE <input type="checkbox"/> MINOR <input type="checkbox"/> MAJOR <input type="checkbox"/> UNKNOWN		FILE STATUS <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED	
AGENCY		CONTACT NAME	CONTACT TIME	REMARKS		
LEAD AGENCY						
FIRST SUPPORT AGENCY						
SECOND SUPPORT AGENCY						
THIRD SUPPORT AGENCY						

Instructions for Completing the NT-NU Spill Report Form

Spills of hazardous substances can be reported by calling the NT-NU Spill Report Line at (867) 920-8130. Collect calls are accepted. As an alternative, the Spill Report form can be filled out and e-mailed as an attachment to spills@gov.nt.ca. Receipt of e-mail transmissions should be verified with a follow-up telephone call to the Spill Line. Completed forms can also be faxed to the Spill Line at (867) 873-6924.

A. Report Date/Time	The actual date and time that the spill was reported to the spill line. If the spill is phoned in, the Spill Line will fill this out. <i>Please do not fill in the Report Number:</i> the spill line will assign a number after the spill. is reported.
B. Occurrence Date/Time	Indicate, to the best of your knowledge, the exact date and time that the spill occurred. Not to be confused with the report date and time (see above).
C. Land Use Permit Number /Water Licence Number	This needs to be filled in only if the activity has been licensed by the Nunavut Water Board or if a Land Use Permit has been issued. Applies primarily to mines and mineral exploration sites.
D. Geographic Place Name	In most cases, this will be the name of the community where the spill occurred. For remote locations, identify the most prominent geographic feature, such as a lake or mountain or the distance and direction from the nearest community
E. Geographic Coordinates	This needs to be filled out if the spill occurred outside of an established community such as at a mine site. The location should be stated in degrees, minutes and seconds of Latitude and Longitude.
F. Responsible Party Or Vessel Name	Identify the person or party who owned or was in control of the substance at the time it was spilled. In the case of a spill from a ship or vessel, include the name of the ship or vessel. Include full address, telephone number and e-mail. Use box K if there is insufficient space. <i>Note that the owner of the spilled substance is ultimately responsible for any spills of that substance, regardless of who may have actually caused the spill.</i>
G. Contractor involved?	Were there any other parties or contractors involved? (e.g. a construction company who is working on behalf of the owner of the spilled substance and who may have contributed to, or directly caused the spill and is responding to the spill).
H. Product Spilled	Identify the product spilled. Most commonly this is gasoline, diesel fuel or sewage. Use the chemical name of the substance and, where possible, identify the product using the four digit UN number (e.g. UN1203 for gasoline; UN1202 for diesel fuel; UN1863 for Jet A & B). Avoid trade names.

I. Spill Source	Identify the source of the spill (e.g. truck, ship, home heating fuel tank) and the cause (e.g. fuel tank overfill, leaking tank, ship ran aground, traffic accident, vandalism, storm). Provide an estimate of the extent of the contaminated area (e.g. 10 m ²)
J. Factors Affecting Spill	Identify any factors which might make it difficult to clean up the spill (e.g. rough terrain, bad weather, remote location, lack of equipment). Do you require advice and assistance with the cleanup? Identify any hazards to persons, property or environment (e.g. a gasoline spill beside a daycare centre would pose a safety hazard to children). Use box K if there is insufficient space.
K. Additional Information	Provide any additional pertinent details about the spill. State what action is being taken to clean up the spill, dispose of spilled material or notify affected parties. Attach additional sheets to the spill report if necessary. Number the pages in the same format found in the lower right hand corner of the spill form (e.g. Page 1 of 2). Number the pages to ensure that recipients can be certain they received all pertinent documents. If only the Spill Report form was filled out, number the form as "Page 1 of 1".
L. Reported to Spill Line by	Include your full name, employer, contact number and the location from which you are reporting the spill. Use box K if there is insufficient space.
M. Alternate Contact	Identify any alternate contacts. This information assists regulatory agencies to obtain additional information if they cannot reach the individual who reported the spill.
N. Report Line Use Only	<i>Leave Blank. This box is for Spill Line use only.</i>

APPENDIX C
MSDS SHEETS

CONTENTS

- Hydraulic Fluid Univis N32
- Hydraulic Fluid Univis N22
- Hydraulic Fluid Univis N68
- Unirex Lotemp Moly Grease
- Epic EP Moly Grease
- Propane
- Portland Cement
- Tool Joint Compound
- Snowmobile Motor Oil
- Drill Rod Grease
- Motor Oil 5W-30, 10W-30, 10W-40, 20W-50
- Jet B Turbine Fuel
- Hypoid Gear Lubricant
- Unleaded Gas
- Diesel Fuel
- Chain oil
- Antifreeze
- Poly-Drill O.B.X.
- Poly Drill 133-X
- Marvelube WR2 Grease
- Fuel System Treatment Fuel Oil



MATERIAL SAFETY DATA SHEET

Date Prepared: November 14, 2003
Supersedes: May 31, 2000
MSDS Number: 08509

1. PRODUCT INFORMATION

Product Identifier: MARVELUBE WR2 GREASE

Application and Use:
Lubricating grease

Product Description:

A grease, a mixture of lubricating oil, soap and additives.

REGULATORY CLASSIFICATION

WHMIS:
Not a controlled product

CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT
All components of this product are either on the Domestic Substances List (DSL) or are exempt.

TDG INFORMATION (RAIL/ROAD):
Not Regulated in Canada.

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr. (519) 339-2145
Technical Info. (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(416) 968-4441

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #
Not applicable		

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
 Specific gravity: not available
 Viscosity: >20.00 cSt at 40 deg C
 Vapour Density: >5
 Boiling Point: not available
 Evaporation rate: <1 (1= n-butylacetate)
 Solubility in water: negligible
 Freezing/Pour Point: 182 deg C DROP
 Odour Threshold: not available
 Vapour Pressure: <1 kPa at 38 deg C
 Density: 0.91 g/cc at 15 deg C
 Appearance/odour: Black paste, petroleum odour.

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

Negligible hazard at normal temperatures (up to 38 deg C).
 Elevated temperatures or mechanical action may form vapours, mists or fumes which may be irritating to the eyes, nose, throat and lungs.
 Avoid breathing vapours or mists.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity.
 Frequent or prolonged contact may irritate the skin.
 High pressure greasing equipment is capable of injecting grease under the skin which may have severe health consequences.

INGESTION:

Low toxicity.

ACUTE TOXICITY DATA:

Based on animal testing data from similar materials and products, the acute toxicity of this product is expected to be:

Oral : LD50 > 5000 mg/kg (Rat)
Dermal : LD50 > 3160 mg/kg (Rabbit)
Inhalation : LC50 > 5000 mg/m3 (Rat)

OCCUPATIONAL EXPOSURE LIMIT:

ACGIH recommends:

For oil mists, 5 mg/m3.

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

In case of adverse exposure to vapours, mists and/or fumes formed at elevated temperature, or by mechanical action, immediately remove the affected victim from exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Flush with large amounts of water. Use soap if available. Remove severely contaminated clothing (including shoes) and launder before reuse. If irritation persists, seek medical attention. Consult a physician immediately if the material is injected under the skin from the misuse of high pressure greasing equipment.

INGESTION:

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon conditions of use.

In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves.

Where only incidental contact is likely, wear safety glasses with side shields. No other special precautions are necessary provided skin/eye

contact is avoided.

Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

ENGINEERING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

HANDLING, STORAGE AND SHIPPING:

Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials. In keeping with good personal hygiene practices, wash hands thoroughly after handling the material.

Empty containers may contain product residue. Do not pressurize cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.

LAND SPILL:

Eliminate source of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard. Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Allow material to solidify and scrape up. Place material in suitable containers for recycle or disposal. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

WATER SPILL:

Remove from surface by skimming or with suitable absorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

7. FIRE AND EXPLOSION HAZARD

Flashpoint and method: 204 deg C COC ASTM D92

Autoignition: 227 deg C Flammable Limits: LEL: NA UEL: NA

GENERAL HAZARDS:

Low Hazard; liquids may burn upon heating to temperatures at or above the flash point.
Toxic gases will form upon combustion.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel.
Shut off fuel to fire.
Use foam, dry chemical or water spray to extinguish fire.
Respiratory and eye protection required for fire fighting personnel.
A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.

HAZARDOUS COMBUSTION PRODUCTS:

Smoke, carbon monoxide, carbon dioxide and traces of oxides of sulphur

8. REACTIVITY DATA

STABILITY:

This product is stable. Hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents

HAZARDOUS DECOMPOSITION:

none

9. NOTES

All components of this product are listed on the U.S. TSCA inventory.

REVISION SUMMARY:

Since 31 May 2000, this MSDS has been revised in Section(s):
3, 7

10. PREPARATION

Date Prepared: November 14, 2003
Prepared by: Lubricants & Specialties

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(800) 268-3183

CAUTION: " The information contained herein relates only to this product or material and may not be valid when used in combination with any other product or material or in any process. If the product is not to be used for a purpose or under conditions which are normal or reasonably foreseeable, this information cannot be relied upon as complete or applicable. For greater certainty, uses other than those described in Section 1 must be reviewed with the supplier. The information contained herein is based on the information available at the indicated date of preparation. This MSDS is for the use of Imperial Oil customers and their employees and agents only. Any further distribution of this MSDS by Imperial Oil customers is prohibited without the written consent of Imperial Oil."



MATERIAL SAFETY DATA SHEET

Date Prepared: May 13, 2003
Supersedes: April 12, 2000
MSDS Number: 08265

1. PRODUCT INFORMATION

Product Identifier: UNIVIS N 68

Application and Use:
Hydraulic fluid

Product Description:

A lubricating oil consisting of a mixture of saturated and unsaturated hydrocarbons derived from paraffinic distillate, and additives.

REGULATORY CLASSIFICATION

WHMIS:
Not a controlled product

CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT
All components of this product are either on the Domestic Substances List (DSL) or are exempt.

TDG INFORMATION (RAIL/ROAD):
Not Regulated in Canada.

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr. (519) 339-2145
Technical Info. (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(416) 968-4441

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #
Not applicable		

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
 Specific gravity: not available
 Viscosity: 68.00 cSt at 40 deg C
 Vapour Density: not available
 Boiling Point: not available
 Evaporation rate: <0.1 (1= n-butylacetate)
 Solubility in water: negligible
 Freezing/Pour Point: -36 deg C ASTM D97
 Odour Threshold: not available
 Vapour Pressure: <0.1 kPa at 20 deg C
 Density: 0.88 g/cc at 15 deg C
 Appearance/odour: Yellow oil, petroleum odour

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

Negligible hazard at normal temperatures (up to 38 deg C).
 Elevated temperatures or mechanical action may form vapours, mists or fumes which may be irritating to the eyes, nose, throat and lungs.
 Avoid breathing vapours or mists.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity.
 Frequent or prolonged contact may irritate the skin.

INGESTION:

Low toxicity.

ACUTE TOXICITY DATA:

Based on animal testing data from similar materials and products,

the acute toxicity of this product is expected to be:
Oral : LD50 > 5000 mg/kg (Rat)
Dermal : LD50 > 3160 mg/kg (Rabbit)
Inhalation : LC50 > 5000 mg/m3 (Rat)

OCCUPATIONAL EXPOSURE LIMIT:

ACGIH recommends:

For oil mists, 5 mg/m3.

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

Vapour pressure of this material is low and as such inhalation under normal conditions is usually not a problem. If overexposed to oil mist, remove from further exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Flush with large amounts of water. Use soap if available. Remove severely contaminated clothing (including shoes) and launder before reuse. If irritation persists, seek medical attention.

INGESTION:

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon conditions of use.

In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves.

Where only incidental contact is likely, wear safety glasses with side shields. No other special precautions are necessary provided skin/eye contact is avoided.

Where concentrations in air may exceed the occupational exposure limits

given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

ENGINEERING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

HANDLING, STORAGE AND SHIPPING:

Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials. In keeping with good personal hygiene practices, wash hands thoroughly after handling the material. Store and load at normal (up to 38 deg C) temperature and at atmospheric pressure. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.

LAND SPILL:

Eliminate source of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard. Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Recover by pumping or by using a suitable absorbant. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

WATER SPILL:

Remove from surface by skimming or with suitable absorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

7. FIRE AND EXPLOSION HAZARD

Flashpoint and method: 190 deg C COC ASTM D92

Autoignition: NA Flammable Limits: LEL: NA UEL: NA

GENERAL HAZARDS:

Low Hazard; liquids may burn upon heating to temperatures at or above the flash point.
Toxic gases will form upon combustion.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel.
Shut off fuel to fire.
Use foam, dry chemical or water spray to extinguish fire.
Respiratory and eye protection required for fire fighting personnel.
A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.

HAZARDOUS COMBUSTION PRODUCTS:

Smoke, carbon monoxide, carbon dioxide and traces of oxides of sulphur

8. REACTIVITY DATA

STABILITY:

This product is stable. Hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents

HAZARDOUS DECOMPOSITION:

none

9. NOTES

All components of this product are listed on the U.S. TSCA inventory.

REVISION SUMMARY:

Since 12 April 2000, this MSDS has been revised in Section(s):
3, 7

10. PREPARATION

Date Prepared: May 13, 2003
Prepared by: Lubricants & Specialties
IMPERIAL OIL

Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(800) 268-3183

CAUTION: " The information contained herein relates only to this product or material and may not be valid when used in combination with any other product or material or in any process. If the product is not to be used for a purpose or under conditions which are normal or reasonably foreseeable, this information cannot be relied upon as complete or applicable. For greater certainty, uses other than those described in Section 1 must be reviewed with the supplier. The information contained herein is based on the information available at the indicated date of preparation. This MSDS is for the use of Imperial Oil customers and their employees and agents only. Any further distribution of this MSDS by Imperial Oil customers is prohibited without the written consent of Imperial Oil."



WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	B-2, D-2A, D-2B		

Section 1. Chemical Product and Company Identification	
Product Name	FUEL SYSTEM TREATMENT
Synonym	Not available
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3
Material Uses	A fuel system treatment that cleans fuel systems to improve performance in gasoline engines.
Code	FST
Validated on	5/12/2004.
In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

Section 2. Composition and Information on Ingredients					
			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
1) Stoddard Solvent	8052-41-3	30-60%	100ppm	Not established	Not established
2) Isopropanol	67-63-0	30-60%	200ppm	400ppm	Not established
3) 1, 2, 4-Trimethylbenzene	95-63-6	0.01-0.1%	Not established	Not established	Not established
4) Xylene (mixed isomers)	1330-20-7	0.01-0.1%	100ppm	150ppm	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.	
Potential Health Effects	Flammable liquid. Exercise caution when handling this material. Contact with this product may cause skin irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. May cause teratogenicity/embryotoxicity. For more information refer to Section 11 of this MSDS.

Section 4. First Aid Measures	
Eye Contact	Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the chemical is removed, while holding the eyelid(s) open. Obtain medical attention immediately.
Skin Contact	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 5 minutes or until the chemical is removed. Remove contaminated clothing, shoes, and leather goods (e.g. watchbands, belts, etc.). If breathing is stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.
Inhalation	If breathing is stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.
Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz.) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. If breathing is stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.
Note to Physician	Not available

Section 5. Fire-fighting Measures	
Flammability	Flammable.
Flash Points	CLOSED CUP: 13°C (55.4°F) (TCC)
Flammable Limits	LOWER: 0.9% UPPER: 12%
Auto-ignition Temperature	Unknown

Fire Hazards In Presence of Various Substances	Flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. May accumulate in confined spaces.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire. Vapours may form explosive mixtures with air. Sensitive to static discharge.
Products of Combustion	Carbon oxides (CO, CO ₂), acrid smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	<p>NAERG2000, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a moderate flash point above 40°C: Use of water spray when fighting fire may be inefficient.</p> <p>If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions.</p> <p>SMALL FIRES: Dry chemical, CO₂, water spray or regular foam. LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk. Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.</p> <p>Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discolouration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.</p>		

Section 6. Accidental Release Measures

Material Release or Spill	Evacuate non-essential personnel. Ventilate area. Ensure clean-up personnel wear appropriate personal protective equipment. If spilled in a confined space, ensure appropriate confined space entry protocols are followed. Extinguish all ignition sources. Stop leak if safe to do so. Avoid breathing vapours or mists of material. Avoid contact with spilled material. Use appropriate inert absorbent material to absorb spilled product. Do not use paper or other flammable materials to absorb product. Collect used absorbent for later disposal. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Do not allow spilled material to enter sewer systems as vapours may accumulate and may cause an explosion/fire hazard. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	FLAMMABLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Ensure all equipment is grounded/bonded. Avoid contact with any incompatible or reactive materials. Wear proper personal protective equipment (See Section 8). Avoid confined spaces and areas with poor ventilation. Remove severely contaminated clothing. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated. Exercise caution when washing/drying clothing contaminated with flammable materials. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Do not ingest this product. Avoid generating mists. Ensure container is securely closed when not in use. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning.
Storage	Store as flammable material. Store away from heat and sources of ignition. Avoid direct sunlight. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded. Store in a dry, cool and well-ventilated area.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Use explosion-proof ventilation equipment. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection -	The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	Chemical splash goggles should be worn when handling this material.
Body	If this material may come into contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information).
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with particulate filter (R and/or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator or self contained breathing apparatus if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): Polyvinyl alcohol (PVA), or Fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Liquid.	Viscosity	Not available
Colour	Yellow.	Pour Point	Not applicable.
Odour	Alcohol like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	83°C (181.4°F)	Penetration	Not applicable.
Density	0.79 @ 15°C	Oil / Water Dist. Coefficient	Not available
Vapour Density	>1	Ionicity (In water)	Not available
Vapour Pressure	Not available Evaporation rate: <1 (Ether=1)	Dispersion Properties	Not available
Volatility	>95% (VOCs)	Solubility	Negligible.

Section 10. Stability and Reactivity

Corrosivity	Not available		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, peroxides, nitric acid, strong alkalis, strong mineral acids, and oleum.	Decomposition Products	May release COx, acrid smoke, and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	<p>Acute toxicity information is not available for the product as a whole, therefore, data for the hazardous ingredient is provided below:</p> <p>Stoddard Solvent (8052-41-3): Acute Oral toxicity (LD50): >5000 mg/kg (rat) Acute Dermal toxicity (LD50): >3000 mg/kg (rabbit) Acute Inhalation toxicity (LC50): >1300 ppm/4h (rat)</p> <p>Isopropanol (67-63-0): Acute Oral toxicity (LD50): 5000 mg/kg (rat) Acute Dermal toxicity (LD50): 12,800 mg/kg (rabbit) Acute Inhalation toxicity (LC50): 17,000 ppm/4h (rat)</p> <p>1, 2, 4-Trimethylbenzene (95-63-6): Acute Oral toxicity (LD50): 5000 mg/kg (rat) Acute Inhalation toxicity (LC50): 18,000 mg/m³/4h (rat)</p> <p>Xylene (mixed isomers) (1330-20-7): Acute Oral toxicity (LD50): 1590 mg/kg (rat) Acute Dermal toxicity (LD50): >1,700 mg/kg (rabbit) Acute Inhalation toxicity (LC50): 4785 ppm/4h (mouse)</p>
Chronic or Other Toxic Effects	
Dermal Route:	This product contains a component (at >= 1%) that can cause skin irritation. Therefore, this product is considered to be a skin irritant.
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Frequent or prolonged inhalation of this product may lead to absorption of this product in harmful amounts which may have adverse effects on the: kidneys.
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs).
Eye Irritation/Inflammation:	This product contains a component (at >= 1%) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.

Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product contains a component(s) at $\geq 0.1\%$ that has been shown to cause teratogenicity and/or embryotoxicity in some laboratory tests at non-maternally toxic doses. Therefore, this product is considered to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as Group A1, A2, or A3 carcinogens by ACGIH.
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as Group 1, 2A, or 2B carcinogens by IARC.
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	No additional remark.

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	FLAMMABLE LIQUIDS, N.O.S. (Isopropanol), Class 3, UN 1993, PGII (CL-TDG)	Special Provisions for Transport	This product may be shipped as a Limited Quantity if the volume is $\leq 1L$ and in accordance with the Limited Quantity Provisions, (CL-TDG).
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Section 15. Regulatory Information

Other Regulations	This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List). This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR. Please contact Product Safety for more information.																		
DSD/DPD (Europe)	Not evaluated.	HCS (U.S.A.)	CLASS: Combustible liquid. CLASS: Irritating substance. CLASS: Target organ effects.																
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	DOT (U.S.A) (Pictograms)																	
HMIS (U.S.A.)	<table border="1"> <tr> <td>Health Hazard</td> <td>(2)</td> </tr> <tr> <td>Fire Hazard</td> <td>(3)</td> </tr> <tr> <td>Reactivity</td> <td>(0)</td> </tr> <tr> <td>Personal Protection</td> <td>n, p, u</td> </tr> </table>	Health Hazard	(2)	Fire Hazard	(3)	Reactivity	(0)	Personal Protection	n, p, u	NFPA (U.S.A.)	<table border="1"> <tr> <td>Health</td> <td>2</td> <td>Fire Hazard</td> <td>3</td> </tr> <tr> <td>Reactivity</td> <td>0</td> <td>Specific hazard</td> <td></td> </tr> </table>	Health	2	Fire Hazard	3	Reactivity	0	Specific hazard	
Health Hazard	(2)																		
Fire Hazard	(3)																		
Reactivity	(0)																		
Personal Protection	n, p, u																		
Health	2	Fire Hazard	3																
Reactivity	0	Specific hazard																	
		Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme																

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials	LDLo/LCLo - Lowest Published Lethal Dose/Concentration
BOD5 - Biological Oxygen Demand in 5 days	NAERG'96 - North American Emergency Response Guide Book (1996)
CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act	NSNR - New Substances Notification Regulations (Canada)
CFR - Code of Federal Regulations	NTP - National Toxicology Program
CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
COD5 - Chemical Oxygen Demand in 5 days	PEL - Permissible Exposure Limit
CPR - Controlled Products Regulations	RCRA - Resource Conservation and Recovery Act
DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSCL - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	STEL - Short Term Exposure Limit (15 minutes)
DSL - Domestic Substance List	TDG - Transportation Dangerous Goods (Canada)
EEC/EU - European Economic Community/European Union	TDL0/TCLo - Lowest Published Toxic Dose/Concentration
EINECS - European Inventory of Existing Commercial Chemical Substances	Tlm - Median Tolerance Limit
EPCRA - Emergency Planning and Community Right to Know Act	TLV-TWA - Threshold Limit Value-Time Weighted Average
FDA - Food and Drug Administration	TSCA - Toxic Substances Control Act
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	USEPA - United States Environmental Protection Agency
HCS - Hazardous Communication System	USP - United States Pharmacopoeia
HMIS - Hazardous Material Information System	WHMIS - Workplace Hazardous Material Information System
IARC - International Agency for Research on Cancer	

For Copy of MSDS

Internet: www.petro-canada.ca/msds

Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax:

1-800-837-1228

Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - TLM on 5/12/2004.

Data entry by Product Safety - RS.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



MATERIAL SAFETY DATA SHEET

Date Prepared: November 06, 2002
 Supersedes: November 01, 2002
 MSDS Number: 00826

1. PRODUCT INFORMATION

Product Identifier: MIDDLE DISTILLATE

ESSO MARINE GAS OIL (DYED OR CLEAR)
 ESSO RAILROAD DIESEL (DYED OR CLEAR)
 HEATING OIL (DYED OR CLEAR)
 DIESEL (DYED OR CLEAR)
 DIESEL QUALITY FURNACE FUEL (DYED OR CLEAR)
 DIESEL QUALITY HEATING OIL (DYED OR CLEAR)
 ESSO DIESEL (DYED OR CLEAR)
 ESSO DIESEL QUALITY COMMERCIAL FUEL (DYED OR CLEAR)
 ESSO DIESEL QUALITY FURNACE FUEL
 ESSO DIESEL QUALITY HEATING OIL
 ESSO FURNACE FUEL (DYED OR CLEAR)
 ESSO HEATING OIL (DYED OR CLEAR)
 ESSO MARINE DIESEL FUEL (DYED OR CLEAR)
 ESSO RAILROAD DIESEL FUEL #3 (DYED OR CLEAR)
 ESSO TOBACCO CURING OIL
 FUEL OIL 75
 FUEL OIL 76
 DIESEL MARINE (DYED OR CLEAR)
 DIESEL MARINE GAS OIL (DYED OR CLEAR)
 FURNACE (DYED OR CLEAR)
 DIESEL MARINE - POUR DEPRESSED (DYED OR CLEAR)
 NO.2 FUEL OIL
 NAVAL FUEL OIL 3-GP-11M (DYED)
 ESSO DIESEL FUEL LS
 DIESEL LOW SULFUR (DYED OR CLEAR)
 NO.2 FUEL OIL FOR EXPORT
 DIESEL FOR EXPORT (DYED OR CLEAR)
 FURNACE TOBACCO CURING OIL
 DIESEL NAVAL 3GP-11 (DYED OR CLEAR)
 DIESEL NAVAL 3GP-15 (DYED OR CLEAR)
 DIESEL LOW SULFUR RAIL (DYED OR CLEAR)
 DIESEL LOW SULFUR DYED EP
 DIESEL RAIL (DYED OR CLEAR)
 DIESEL RAIL #3 (DYED OR CLEAR)
 DIESEL RAIL #3 (HD) (DYED OR CLEAR)
 DIESEL LOW SULFUR (032) (DYED OR CLEAR)

FURNACE URBAN (DYED OR CLEAR)
 DIESEL (032) (DYED OR CLEAR)
 DIESEL LOW SULFUR (EXP DYED)
 FURNACE FUEL (032) DYED
 DIESEL LOW SULFUR (EXPORT)
 MARINE GAS OIL
 MDO - MARINE DIESEL OIL 3 CST (CLEAR)

Application and Use:
 Multi-purpose fuel

Product Description:

A complex mixture of aliphatic, olefinic, naphthenic and aromatic hydrocarbons.

REGULATORY CLASSIFICATION

WHMIS:

Class B, Division 3: Combustible Liquids.
 Class D, Division 2, Subdivision B: Toxic Material

CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT

All components of this product are either on the Domestic Substances List (DSL) or are exempt.

TDG INFORMATION (RAIL/ROAD):

Shipping Name: FUEL OIL
 Class: 3
 Packing Group: III
 PIN Number: UN1202
 Marine Pollutant: N

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr. (519) 339-2145
 Technical Info. (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
 Products Division
 111 St Clair Avenue West
 Toronto, Ontario
 M5W 1K3
 (416) 968-4441

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #
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Fuel Oil No.2

>99.9 V/V 68476-30-2

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
Specific gravity: 0.820 to 0.900 at 15.5 deg C
Viscosity: 1.30 cSt at 40 deg C
to 11.00 cSt at 40 deg C
Vapour Density: 4
Boiling Point: 150 to 370 deg C
Evaporation rate: <1 (1= n-butylacetate)
Solubility in water: negligible
Freezing/Pour Point: -4 deg C -39 (RANGE)
Odour Threshold: not available
Vapour Pressure: 4 kPa at 38 deg C
Appearance/odour: White or pale yellow liquid, petroleum odour

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

Negligible hazard at normal temperatures (up to 38 deg C).
High vapour concentrations are irritating to the eyes, nose, throat and lungs; may cause headaches and dizziness; may be anesthetic and may cause other central nervous system effects.
Avoid breathing vapours or mists.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity.
Irritating.

INGESTION:

Low toxicity.
Small amounts of this liquid drawn into the lungs from swallowing or vomiting may cause severe health effects (e.g. bronchopneumonia or pulmonary edema).

CHRONIC:

Lifetime skin painting tests indicate that materials of similar composition have produced skin cancer in experimental animals. The relationship of these results to humans has not been fully established.

ACUTE TOXICITY DATA:

Based on animal testing data from similar materials and products, the acute toxicity of this product is expected to be:

Oral : LD50 > 5000 mg/kg (Rat)
Dermal : LD50 > 2000 mg/kg (Rabbit)
Inhalation : LC50 > 2500 mg/m3 (Rat)

OCCUPATIONAL EXPOSURE LIMIT:

Manufacturer Recommends:
100 ppm based on composition.

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

In emergency situations use proper respiratory protection to immediately remove the affected victim from exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Immediately flush with large amounts of water. Use soap if available. Remove contaminated clothing, including shoes, after flushing has begun. If irritation persists, seek medical attention.

INGESTION:

DO NOT induce vomiting since it is important that no amount of the material should enter the lungs (aspiration). Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon conditions of use.

In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves. Where only incidental contact is likely, wear safety goggles, long sleeves, and chemical-resistant gloves.

Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

ENGINEERING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

HANDLING, STORAGE AND SHIPPING:

Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials. In keeping with good personal hygiene practices, wash hands thoroughly after handling the material. Do not handle or store near an open flame, sources of heat, or sources of ignition. Material will accumulate static charges which may cause a spark. Static charge build-up could become an ignition source. Use proper relaxation and grounding procedures. Empty containers may contain product residue. Do not pressurize cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.

LAND SPILL:

Eliminate source of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard. Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust. Recover by pumping (use an explosion proof motor or hand pump), or by using a suitable absorbent. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

WATER SPILL:

Remove from surface by skimming or with suitable absorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

7. FIRE AND EXPLOSION HAZARD

Flashpoint and method: >40 deg C PMCT ASTM D93

Autoignition: NA Flammable Limits: LEL: 0.7% UEL: 6.5%

GENERAL HAZARDS:

Combustible Liquid; may form combustible mixtures at or above the flash point.

Toxic gases will form upon combustion.

Static Discharge; material may accumulate static charges which may cause a fire.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off fuel to fire.

Use foam, dry chemical or water spray to extinguish fire.

Respiratory and eye protection required for fire fighting personnel.

Avoid spraying water directly into storage containers due to danger of boilover.

A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.

HAZARDOUS COMBUSTION PRODUCTS:

Smoke, carbon monoxide, carbon dioxide and traces of oxides of sulphur

8. REACTIVITY DATA

STABILITY:

This product is stable. Hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents

HAZARDOUS DECOMPOSITION:

none

9. NOTES

All components of this product are listed on the U.S. TSCA inventory.

REVISED.

10. PREPARATION

Date Prepared: November 06, 2002
Prepared by: Lubricants & Specialties
IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(800) 268-3183

CAUTION: " The information contained herein relates only to this product or material and may not be valid when used in combination with any other product or material or in any process. If the product is not to be used for a purpose or under conditions which are normal or reasonably foreseeable, this information cannot be relied upon as complete or applicable. For greater certainty, uses other than those described in Section 1 must be reviewed with the supplier. The information contained herein is based on the information available at the indicated date of preparation. This MSDS is for the use of Imperial Oil customers and their employees and agents only. Any further distribution of this MSDS by Imperial Oil customers is prohibited without the written consent of Imperial Oil."



MATERIAL SAFETY DATA SHEET

Date Prepared: April 06, 2002
Supersedes: January 08, 1999
MSDS Number: 08259

1. PRODUCT INFORMATION

Product Identifier: UNIVIS N 32

Application and Use:
Hydraulic fluid

Product Description:

Mixture of paraffinic and naphthenic hydrocarbons (saturated and unsaturated), and additives.

REGULATORY CLASSIFICATION

WHMIS:
Not a controlled product

CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT
All components of this product are either on the Domestic Substances List (DSL) or are exempt.

TDG INFORMATION (RAIL/ROAD):
Not Regulated in Canada.

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr. (519) 339-2145
Technical Info. (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(416) 968-4441

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #
Not applicable		

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
Specific gravity: not available
Viscosity: 32.00 cSt at 40 deg C
Vapour Density: not available
Boiling Point: 229 to 512 deg C
Evaporation rate: <0.1 (1= n-butylacetate)
Solubility in water: negligible
Freezing/Pour Point: -42 deg C ASTM D97
Odour Threshold: not available
Vapour Pressure: <1 kPa at 38 deg C
Density: 0.87 g/cc at 15 deg C
Appearance/odour: Yellow oil, petroleum odour

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

Negligible hazard at normal temperatures (up to 38 deg C).
Elevated temperatures or mechanical action may form vapours, mists or fumes which may be irritating to the eyes, nose, throat and lungs.
Avoid breathing vapours or mists.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity.
Frequent or prolonged contact may irritate the skin.

INGESTION:

Low toxicity.

ACUTE TOXICITY DATA:

Based on animal testing data from similar materials and products, the acute toxicity of this product is expected to be:

Oral : LD50 > 5000 mg/kg (Rat)
Dermal : LD50 > 3160 mg/kg (Rabbit)
Inhalation : LC50 > 5000 mg/m3 (Rat)

OCCUPATIONAL EXPOSURE LIMIT:

ACGIH recommends:

For oil mists, 5 mg/m3

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

Vapour pressure of this material is low and as such inhalation under normal conditions is usually not a problem. If overexposed to oil mist, remove from further exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Flush with large amounts of water. Use soap if available. Remove severely contaminated clothing (including shoes) and launder before reuse. If irritation persists, seek medical attention.

INGESTION:

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon conditions of use.

In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves.

Where only incidental contact is likely, wear safety glasses with side shields. No other special precautions are necessary provided skin/eye contact is avoided.

Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

ENGINEERING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

HANDLING, STORAGE AND SHIPPING:

Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials. In keeping with good personal hygiene practices, wash hands thoroughly after handling the material. Empty containers may contain product residue. Do not pressurize cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.

LAND SPILL:

Eliminate source of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard. Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Recover by pumping or by using a suitable absorbant. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

WATER SPILL:

Remove from surface by skimming or with suitable absorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

7. FIRE AND EXPLOSION HAZARD

Flashpoint and method: 165 deg C COC ASTM D92

Autoignition: NA Flammable Limits: LEL: NA UEL: NA

GENERAL HAZARDS:

Low Hazard; liquids may burn upon heating to temperatures at or above the flash point.

Toxic gases will form upon combustion.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off fuel to fire.

Use foam, dry chemical or water spray to extinguish fire. Respiratory and eye protection required for fire fighting personnel. Avoid spraying water directly into storage containers due to danger of boilover.

A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.

HAZARDOUS COMBUSTION PRODUCTS:

Smoke, carbon monoxide, carbon dioxide and traces of oxides of sulphur

8. REACTIVITY DATA

STABILITY:

This product is stable. Hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents

HAZARDOUS DECOMPOSITION:

none

9. NOTES

All components of this product are listed on the U.S. TSCA inventory.

THREE YEAR WHMIS REVIEW.

10. PREPARATION

Date Prepared: April 06, 2002
Prepared by: Lubricants & Specialties
IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario

M5W 1K3
(800) 268-3183

CAUTION: " The information contained herein relates only to this product or material and may not be valid when used in combination with any other product or material or in any process. If the product is not to be used for a purpose or under conditions which are normal or reasonably foreseeable, this information cannot be relied upon as complete or applicable. For greater certainty, uses other than those described in Section 1 must be reviewed with the supplier. The information contained herein is based on the information available at the indicated date of preparation. This MSDS is for the use of Imperial Oil customers and their employees and agents only. Any further distribution of this MSDS by Imperial Oil customers is prohibited without the written consent of Imperial Oil."



MATERIAL SAFETY DATA SHEET

Date Prepared: April 06, 2002
Supersedes: January 08, 1999
MSDS Number: 08258

1. PRODUCT INFORMATION

Product Identifier: UNIVIS N 22

Application and Use:
Hydraulic fluid

Product Description:

Mixture of paraffinic and naphthenic hydrocarbons (saturated and unsaturated), and additives.

REGULATORY CLASSIFICATION

WHMIS:
Not a controlled product

CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT
All components of this product are either on the Domestic Substances List (DSL) or are exempt.

TDG INFORMATION (RAIL/ROAD):
Not Regulated in Canada.

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr. (519) 339-2145
Technical Info. (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(416) 968-4441

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #
Not applicable		

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
Specific gravity: not available
Viscosity: 22.00 cSt at 40 deg C
Vapour Density: not available
Boiling Point: 229 to 512 deg C
Evaporation rate: <0.1 (1= n-butylacetate)
Solubility in water: negligible
Freezing/Pour Point: -48 deg C ASTM D97
Odour Threshold: not available
Vapour Pressure: <1 kPa at 38 deg C
Density: 0.87 g/cc at 15 deg C
Appearance/odour: Yellow oil, petroleum odour

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

Negligible hazard at normal temperatures (up to 38 deg C).
Elevated temperatures or mechanical action may form vapours, mists or fumes which may be irritating to the eyes, nose, throat and lungs.
Avoid breathing vapours or mists.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity.
Frequent or prolonged contact may irritate the skin.

INGESTION:

Low toxicity.

ACUTE TOXICITY DATA:

Based on animal testing data from similar materials and products, the acute toxicity of this product is expected to be:

Oral : LD50 > 5000 mg/kg (Rat)
Dermal : LD50 > 3160 mg/kg (Rabbit)
Inhalation : LC50 > 5000 mg/m³ (Rat)

OCCUPATIONAL EXPOSURE LIMIT:

ACGIH recommends:

For oil mists, 5 mg/m³.

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

Vapour pressure of this material is low and as such inhalation under normal conditions is usually not a problem. If overexposed to oil mist, remove from further exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Flush with large amounts of water. Use soap if available. Remove severely contaminated clothing (including shoes) and launder before reuse. If irritation persists, seek medical attention.

INGESTION:

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon conditions of use.

In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves. Where only incidental contact is likely, wear safety glasses with side shields. No other special precautions are necessary provided skin/eye contact is avoided.

Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

ENGINEERING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

HANDLING, STORAGE AND SHIPPING:

Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials. Do not handle or store near an open flame, sources of heat, or sources of ignition. In keeping with good personal hygiene practices, wash hands thoroughly after handling the material. Empty containers may contain product residue. Do not pressurize cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.

LAND SPILL:

Eliminate source of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard. Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Recover by pumping or by using a suitable absorbant. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

WATER SPILL:

Remove from surface by skimming or with suitable absorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

7. FIRE AND EXPLOSION HAZARD

Flashpoint and method: 150 deg C COC ASTM D92

Autoignition: NA Flammable Limits: LEL: NA UEL: NA

GENERAL HAZARDS:

Low Hazard; liquids may burn upon heating to temperatures at or above the flash point.
Toxic gases will form upon combustion.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off fuel to fire.
Use foam, dry chemical or water spray to extinguish fire.
Respiratory and eye protection required for fire fighting personnel.
Avoid spraying water directly into storage containers due to danger of boilover.
A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.

HAZARDOUS COMBUSTION PRODUCTS:

Smoke, carbon monoxide, carbon dioxide under thermal decomposition.

8. REACTIVITY DATA

STABILITY:

This product is stable. Hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents

HAZARDOUS DECOMPOSITION:

none

9. NOTES

All components of this product are listed on the U.S. TSCA inventory.

THREE YEAR WHMIS REVIEW.

10. PREPARATION

Date Prepared: April 06, 2002
Prepared by: Lubricants & Specialties
IMPERIAL OIL
Products Division

111 St Clair Avenue West
Toronto, Ontario
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(800) 268-3183

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MATERIAL SAFETY DATA SHEET

Date Prepared: November 14, 2003
Supersedes: September 17, 1998
MSDS Number: 08366

1. PRODUCT INFORMATION

Product Identifier: UNIREX LOTEMP MOLY GREASE

Application and Use:
Lubricating grease

Product Description:

A grease, a mixture of lubricating oil, soap and additives.

REGULATORY CLASSIFICATION

WHMIS:

Not a controlled product

CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT

All components of this product are either on the Domestic Substances List (DSL), exempt, or have been notified under CEPA.

TDG INFORMATION (RAIL/ROAD):

Not Regulated in Canada.

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr. (519) 339-2145
Technical Info. (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(416) 968-4441

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #
Not applicable		

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
 Specific gravity: not available
 Viscosity: <20.00 cSt at 40 deg C
 Vapour Density: not available
 Boiling Point: not available
 Evaporation rate: <1 (1= n-butylacetate)
 Solubility in water: negligible
 Freezing/Pour Point: 245 deg C ASTM D97
 Odour Threshold: not available
 Vapour Pressure: 0.002 kPa at 20 deg C
 Density: 0.92 g/cc at 15 deg C
 Appearance/odour: Black paste, petroleum odour.

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

Negligible hazard at normal temperatures (up to 38 deg C).
 Elevated temperatures or mechanical action may form vapours, mists or fumes which may be irritating to the eyes, nose, throat and lungs.
 Avoid breathing vapours or mists.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity.
 Frequent or prolonged contact may irritate the skin.
 High pressure greasing equipment is capable of injecting grease under the skin which may have severe health consequences.

INGESTION:

Low toxicity.
 Small amounts of this liquid drawn into the lungs from swallowing or vomiting may cause severe health effects (e.g. bronchopneumonia or pulmonary edema).

ACUTE TOXICITY DATA:

Based on animal testing data from similar materials and products, the acute toxicity of this product is expected to be:

Oral : LD50 > 5000 mg/kg (Rat)
Dermal : LD50 > 3160 mg/kg (Rabbit)
Inhalation : LC50 > 5000 mg/m3 (Rat)

OCCUPATIONAL EXPOSURE LIMIT:

ACGIH recommends:

For insoluble Molybdenum compounds, 10 mg/m3.
For oil mists, 5 mg/m3.

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

In case of adverse exposure to vapours, mists and/or fumes formed at elevated temperature, or by mechanical action, immediately remove the affected victim from exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Flush with large amounts of water. Use soap if available. Remove severely contaminated clothing (including shoes) and launder before reuse. If irritation persists, seek medical attention. Consult a physician immediately if the material is injected under the skin from the misuse of high pressure greasing equipment.

INGESTION:

DO NOT induce vomiting since it is important that no amount of the material should enter the lungs (aspiration). Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon

conditions of use.

In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves.

Where only incidental contact is likely, wear safety glasses with side shields. No other special precautions are necessary provided skin/eye contact is avoided.

Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

ENGINEERING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

HANDLING, STORAGE AND SHIPPING:

Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials. In keeping with good personal hygiene practices, wash hands thoroughly after handling the material.

Store and load at normal (up to 38 deg C) temperature and at atmospheric pressure.

Empty containers may contain product residue. Do not pressurize cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.

LAND SPILL:

Eliminate source of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard.

Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth.

Allow material to solidify and scrape up. Place material in suitable containers for recycle or disposal.

Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

WATER SPILL:

Remove from surface by skimming or with suitable absorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters.

Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

7. FIRE AND EXPLOSION HAZARD

Flashpoint and method: >110 deg C COC ASTM D92 est.baseoil

Autoignition: NA Flammable Limits: LEL: NA UEL: NA

GENERAL HAZARDS:

Low Hazard; liquids may burn upon heating to temperatures at or above the flash point.

Decomposes; flammable/toxic gases will form at elevated temperatures (thermal decomposition).

Toxic gases will form upon combustion.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off fuel to fire.

Use foam, dry chemical or water spray to extinguish fire.

Respiratory and eye protection required for fire fighting personnel.

A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.

HAZARDOUS COMBUSTION PRODUCTS:

Smoke, carbon monoxide, carbon dioxide and traces of oxides of sulphur

8. REACTIVITY DATA

STABILITY:

This product is stable. Hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents

HAZARDOUS DECOMPOSITION:

Fumes, smoke, carbon monoxide and sulphur oxides in case of incomplete combustion

9. NOTES

All components of this product are listed on the U.S. TSCA inventory.

REVISION SUMMARY:

Since 17 September 1998, this MSDS has been revised in Section(s):
1, 7

10. PREPARATION

Date Prepared: November 14, 2003
Prepared by: Lubricants & Specialties
IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
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(800) 268-3183

CAUTION: " The information contained herein relates only to this product or material and may not be valid when used in combination with any other product or material or in any process. If the product is not to be used for a purpose or under conditions which are normal or reasonably foreseeable, this information cannot be relied upon as complete or applicable. For greater certainty, uses other than those described in Section 1 must be reviewed with the supplier. The information contained herein is based on the information available at the indicated date of preparation. This MSDS is for the use of Imperial Oil customers and their employees and agents only. Any further distribution of this MSDS by Imperial Oil customers is prohibited without the written consent of Imperial Oil."

SECTION 1 – PRODUCT INFORMATION

Product Name: Propane
Trade Name: LPG (Liquified Petroleum Gas), LP-Gas
Chemical Formula: C₃H₈

Supplier: Superior Propane Inc.
 1111 - 49th Avenue N.E.
 Calgary, AB T2E 8V2

WHMIS CLASSIFICATION
 Class A - Compressed Gas
 Class B, Division 1 - Flammable Gas

Business: (403) 730-7500

Local Market
Emergency Number: _____

(Non Medical)

Application and Use: Propane is commonly used as a fuel for heating, cooking, automobiles, forklift trucks, crop drying and welding and cutting operations. Propane is used in industry as a refrigerant, solvent and as a chemical feedstock.

SECTION 2 – HAZARDOUS INGREDIENTS

COMPONENTS	CAS NO.	% Volume (v/v)	LD50
Propane	74 -98-6	90% - 99%	Not Applicable
Propylene	115 -07-1	0% - 5%	Not Applicable
Ethane	74 -84-0	0% - 5%	Not Applicable
Butane and heavier hydro carbons	106 -97-8	0% - 2.5%	Not Applicable

Occupational Exposure Limit:

Based upon animal test data, the acute toxicity of this product is expected to be inhalation: 4 hour LC50 = 280,000 ppm (Rat).

Note: Composition is typical for HD-5 Propane per The Canadian General Standard Board CGSB 3.14 National Standard of Canada. Exact composition will vary from shipment to shipment.

SECTION 3 – CHEMICAL AND PHYSICAL DATA

Form: Liquid and vapour while stored under pressure.

Boiling Point: -42°C @ 1 atm.

Freezing Point: -188°C

Evaporation Rate: Rapid (Gas at normal ambient conditions).

Vapour Pressure: 1435 kPa (maximum) @ 37.8°C

Vapour Density: 1.52 (Air = 1)

Coefficient of Water/Oil Distribution: Not available.

pH: Not available.

Solubility in water: Slight, 6.1% by volume @ 17.8°C

Specific Gravity: 0.51 (water = 1)

Appearance/Odour: Colourless liquid and vapour while stored under pressure. Colourless and odourless gas in natural state at any concentration. Commercial propane has an odourant added, ethyl mercaptan, which has an odour similar to boiling cabbage.*

Odour Threshold: 4800 ppm

* With proper handling, transportation and storage, adding a chemical odourant such as eth-merc has proven to be a very effective warning device, but all odourants have certain limitations. The effectiveness of the odourant may be diminished by a person's sense of smell, by competing odours and by oxidation which may cause a potentially dangerous situation.

SECTION 4 – FIRE OR EXPLOSION HAZARD

Flash Point: -103.4°C

Method: Closed cup.

Flammable Limits: Lower 2.4%, Upper 9.5%

Auto Ignition Temperature: 432°C

Products Evolved Due To Heat Or Combustion: Carbon monoxide can be produced when primary air and secondary air are deficient while combustion is taking place.

Fire and Explosive Hazards: Explosive air-vapour mixtures may form if allowed to leak to atmosphere.

Sensitivity To Impact: No.

Sensitivity To Static Discharge: Yes.

Fire Extinguishing Precautions: Use water spray to cool exposed cylinders or tanks. Do not extinguish fire unless the source of the escaping gas that is fueling the fire can be turned off. Fire can be extinguished with carbon dioxide and/or dry chemical (BC). Container metal shells require cooling with water to prevent flame impingement and the weakening of metal. If sufficient water is not available to protect the container shell from weakening, the area will be required to be evacuated. If gas has not ignited, liquid or vapour may be dispersed by water spray or flooding.

Special Fire Fighting Equipment: Protective clothing, hose monitors, fog nozzles, self-contained breathing apparatus.

SECTION 5 – REACTIVITY DATA

Stability: Stable.

Conditions To Avoid: Keep separate from oxidizing agents. Gas explodes spontaneously when mixed with chloride dioxide.

Incompatibility: Remove sources of ignition and observe distance requirements for storage tanks from combustible material, drains and openings to building.

Hazardous Decomposition Products: Deficient primary and secondary air can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

SECTION 6 – TOXICOLOGICAL PROPERTIES OF MATERIAL

ROUTES OF ENTRY:

Inhalation: Simple asphyxiant. No effect at concentrations of 10,000 ppm (peak exposures). Higher concentrations may cause central nervous system disorder and/or damage. Lack of oxygen may cause dizziness, loss of coordination, weakness, fatigue, euphoria, mental confusion, blurred vision, convulsions, breathing failure, coma and death. Breathing high vapour concentrations (saturated vapours) for a few minutes may be fatal. Saturated vapours may be encountered in confined spaces and/or under conditions of poor ventilation. Avoid breathing vapours or mist.

Skin and Eye Contact: Exposure to vapourizing liquid may cause frostbite (cold burns) and permanent eye damage.

Ingestion: Not considered to be a hazard.

Acute Exposure: The acute toxicity of this product is expected to be inhalation: 4 hour LC50=280,000ppm (Rat).

Chronic Exposure: There are no reported effects from long term low level exposure.

Sensitization to Product: Skin–unknown, Respiratory–unknown.

Occupational Exposure Limits: American Conference of Governmental Industrial Hygienists (ACGIH) lists as a simple asphyxiant. ACGIH TLV: 1000 ppm.

Carcinogenicity, Reproductive Toxicity, Teratogenicity, Mutagenicity: No effects reported.

SECTION 7 – PREVENTIVE MEASURES

Eyes: Safety glasses, are recommended when transferring product.

Skin: Insulated gloves required if contact with liquid or liquid cooled equipment is expected. Wear gloves and long sleeves when transferring product.

Inhalation: Where concentration in air would reduce the oxygen level below 18% air or exceed occupational exposure limits in section 6, self-contained breathing apparatus is required.

Ventilation: Explosion proof ventilation equipment required in confined spaces.

SECTION 8 – EMERGENCY AND FIRST AID PROCEDURES

FIRST AID:

Eyes: Should eye contact with liquid occur, flush eyes with lukewarm water for 15 minutes. Obtain immediate medical care.

Skin: In case of "Cold Burn" from contact with liquid, immediately place affected area in lukewarm water and keep at this temperature until circulation returns. If fingers or hands are frostbitten, have the victim hold his hand next to his body such as under the armpit. Obtain immediate medical care.

Ingestion: None considered necessary.

Inhalation: Remove person to fresh air. If breathing is difficult or has stopped, administer artificial respiration. Obtain immediate medical care.

SPILL OR LEAK:

Eliminate leak if possible.

Eliminate source of ignition.

Ensure cylinder is upright.

Disperse vapours with hose streams using fog nozzles. Monitor low areas as propane is heavier than air and can settle into low areas. Remain upwind of leak. Keep people away. Prevent vapour and/or liquid from entering into sewers, basements or confined areas.

SECTION 9 – TRANSPORTATION, HANDLING AND STORAGE

- Transport and store cylinders and tanks secured in an upright position in a ventilated space away from ignition sources (so the pressure relief valve is in contact with the vapour space of the cylinder or tank).
- Cylinders that are not in use must have the valves in the closed position and be equipped with a protective cap or guard.
- Do not store with oxidizing agents, oxygen, or chlorine cylinders.

- Empty cylinders and tanks may contain product residue. Do not pressurize, cut, heat or weld empty containers.
- Transport, handle and store according to applicable federal and provincial codes and regulations.

Transportation of Dangerous Goods (TDG)

- TDG Classification: Flammable Gas 2.1
- TDG Shipping Name: Liquefied Petroleum Gas (Propane)
- TDG Special Provisions: 56, 90, 102
- PIN Number: UN1075

SECTION 10 – PREPARATION

Superior Propane Inc., Regulations & Safety Department. (403) 730-7500 Date prepared: November 2001.
Supersedes: September 1999.

The information contained herein is believed to be accurate. It is provided independently of any sale of the product. It is not intended to constitute performance information concerning the product. No express warranty, implied warranty of merchantability or fitness for a particular purpose is made with respect to the product information contained herein.

MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Portland Cement, GU (General use hydraulic cement, formerly Normal Portland Cement), HE (High early-strength hydraulic cement) and HS (High sulphate-resistant hydraulic cement).

CAS #: 65997-15-1

Product Use: Preparation of concrete and mortar.

MSDS Information: This MSDS was produced in November, 2002, and replaces any previous versions. This MSDS covers all types of portland cement. Individual composition of constituents will vary within the range shown in Section 2.

Product Code: Not Applicable.

Chemical Family: Calcium compounds. Calcium silicate compounds and other calcium compounds containing iron and aluminum make up the majority of this product.

Chemical Name And Synonyms: Portland cement. Portland cement is also known as hydraulic cement and/or normal portland cement.

Formula: This product consists of finely ground portland cement clinker, gypsum and limestone (for some products).

Supplier/Manufacturer: Lehigh Inland Cement Limited
P.O. Box 3961, Station D,
12640 - 156 Street
Edmonton, Alberta, Canada, T5L 4P5 Telephone (780) 420 2500

Emergency Contact Information: Lehigh Inland Cement Limited
P.O. Box 3961, Station D,
12640 - 156 Street
Edmonton, Alberta, Canada, T5L 4P5 Telephone (780) 420 2541

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Portland Cement Exposure Limits:

ACGIH TLV-TWA	10 mg total dust/m ³
OSHA PEL-TWA	15 mg total dust/m ³
OSHA PEL-TWA	5 mg respirable dust/m ³

Portland Cement Ingredients & Their Exposure Limits:

Ingredient	CAS#	% By Weight	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium Silicates	various	60-80%	10 mg total dust/m ³	15 mg total dust/m ³ 5 mg respirable dust/m ³
Gypsum	7778-18-9	3-7%	10 mg total dust/m ³	15 mg total dust/m ³ 5 mg respirable dust/m ³
Crystalline Silica	14808-60-7	less than 0.1%	0.10 mg respirable quartz/m ³ NIOSH REL (8-hour TWA) = 0.05 mg respirable quartz dust/m ³	(10 mg respirable dust/m ³)/(percent silica+2)
Calcium Carbonate	1317-65-3	0-5%	10 mg total dust/m ³	15 mg total dust/m ³ 5 mg respirable dust/m ³
Magnesium Oxide	1309-48-4	1-4%	10 mg total dust/m ³	10 mg total dust/m ³
Calcium Oxide	1305-78-8	0.5-1.5%	2 mg total dust/m ³	5 mg total dust/m ³

Trace Elements:

Portland cement is made from materials mined from the earth and is processed using energy provided by fuels. Trace amounts of chemicals, some of which may be potentially harmful, might be detected during chemical analysis. For example, in addition to the ingredients listed above, portland cement may contain potassium and sodium sulfate compounds, chromium compounds (including up to 0.003% hexavalent chromium) and nickel compounds.

MATERIAL SAFETY DATA SHEET

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview:

Portland cement is a light gray powder that poses little immediate hazard. A single short term exposure to the dry powder is not likely to cause serious harm. However, exposure of sufficient duration to wet portland cement can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns, including third degree burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry portland cement.

Potential Health Effects:

• **Relevant routes of exposure are:**

Eye contact, skin contact, inhalation, and ingestion.

Effects Resulting From EYE CONTACT:

Exposure to airborne dust may cause immediate or delayed irritation or inflammation.

Eye contact by larger amounts of dry powder or splashes of wet portland cement may cause effects ranging from moderate eye irritation to chemical burns and blindness. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.

Effects Resulting From SKIN CONTACT:

Discomfort or pain cannot be relied upon to alert a person to a hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly contact with wet cement. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Exposure to dry portland cement may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Dry portland cement contacting wet skin or exposure to moist or wet portland cement may cause more severe skin effects including thickening, cracking, or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (caustic) chemical burns.

Some individuals may exhibit an allergic response upon exposure to portland cement, possibly due to trace amounts of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may first experience this effect after years of contact with portland cement products.

Effects Resulting From INHALATION:

Portland cement may contain trace amounts of crystalline silica. Prolonged exposure to respirable free crystalline silica may aggravate other lung conditions. It also may cause delayed lung injury including silicosis, a disabling and potentially fatal lung disease, and/or other diseases. (Also see "Carcinogenic Potential" below.)

Exposure to portland cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.

Effects Resulting From INGESTION:

Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Portland cement should not be eaten.

• **Carcinogenic Potential:**

Portland cement is not listed as a carcinogen by NTP, OSHA, or IARC. It may, however, contain trace amounts of substances listed as carcinogens by these organizations.

Crystalline silica, a potential trace level contaminant in portland cement, is now classified by IARC as a known human carcinogen (Group 1). NTP has characterized respirable silica as "reasonably anticipated to be [a] carcinogen".

• **Medical Conditions That May Be Aggravated By Inhalation Or Dermal Exposure:**

Pre-existing upper respiratory and lung diseases.
Unusual (hyper) sensitivity to hexavalent chromium (chromium⁺⁶) salts.

MATERIAL SAFETY DATA SHEET

SECTION 4 - FIRST-AID MEASURES

Eyes:

Immediately flush eyes thoroughly with water. Continue flushing for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

Skin:

Wash skin with cool water and pH-neutral soap or a mild detergent intended for use on skin. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

Inhalation Of Airborne Dust:

Remove to fresh air. Seek medical help if coughing and other symptoms do not subside. ("Inhalation" of gross amounts of portland cement requires immediate medical attention.)

Ingestion:

Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

SECTION 5 - FIRE-FIGHTING MEASURES

Flammability:	Not Flammable.
Flash Point:	Not Applicable.
Lower Explosive Limit:	Not Applicable.
Upper Explosive Limit:	Not Applicable.
Auto Ignition Temperature:	Not Applicable.
Sensitivity To Static Discharge:	Not Applicable.
Sensitivity To Impact:	Not Applicable.
Extinguishing Media:	Not Applicable.
Special Fire-Fighting Procedures:	None.
Hazardous Combustion Products:	Not Applicable.
Unusual Fire And Explosion Hazards:	Not Applicable.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment as described in Section 8.

Scrape up wet material and place in an appropriate container. Allow the material to "dry" before disposal. Do not attempt to wash portland cement down drains.

Dispose of waste material according to local, provincial, state and federal regulations.

SECTION 7 - HANDLING AND STORAGE

Keep portland cement dry until used. Normal temperatures and pressures do not affect the material.

Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust or wet cement mixtures or fluids.

MATERIAL SAFETY DATA SHEET

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection:

When engaged in activities where cement dust or wet cement or concrete could contact the eye, wear safety glasses with side shields or goggles. In extremely dusty environments and unpredictable environments, wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with portland cement or fresh cement products.

Skin Protection:

Prevention is essential to avoiding potentially severe skin injury. Avoid contact with unhardened (wet) portland cement products. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened portland cement products might occur, wear impervious clothing and gloves to eliminate skin contact. Where required, wear boots that are impervious to water to eliminate foot and ankle exposure.

Do not rely on barrier creams; barrier creams should not be used in place of gloves.

Periodically wash areas contacted by dry portland cement or by wet cement or concrete fluids with a pH-neutral soap. Wash again at the end of work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet concrete, it should be removed and replaced with clean dry clothing.

Respiratory Protection:

Avoid actions that cause dust to become airborne. Use local or general ventilation to control exposures below applicable exposure limits.

Use NIOSH/MSHA-approved (under 30 CFR 11) or NIOSH-approved (under 42 CFR 84 after July 10, 1998) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation.

Ventilation:

Use local exhaust or general dilution ventilation to control exposure within applicable limits.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	White to gray powder.
Odor:	No distinct odor.
Odor Threshold:	Not applicable.
Physical State:	Solid (powder).
pH (as a solid):	Not applicable.
pH (in water) (ASTM D 1293-95):	12 to 13
Solubility in Water:	Slightly soluble (0.1 to 1.0 %).
Vapor Pressure:	Not applicable.
Vapor Density:	Not applicable.
Boiling Point:	Not applicable (i.e., >1000°C).
Freezing Point:	Not applicable.
Melting Point:	Not applicable.
Specific Gravity (H₂O = 1.0):	3.15
Evaporation Rate:	Not applicable.
Coeff. Water/Oil Dist.:	Not applicable.

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Conditions to avoid:	Unintentional contact with water.
Incompatibility:	Portland cement reacts with water to produce a caustic solution, pH 12 to pH 13. Wet portland cement is alkaline. As such it is incompatible with acids, ammonium salts and aluminum metal. Aluminum powder and other alkali and alkaline earth elements will react in wet mortar or concrete, liberating hydrogen gas. Portland cement dissolves in hydrofluoric acid producing corrosive silicon tetrafluoride gas. Silicates react with powerful oxidizers such as fluorine, chlorine, trifluoride and oxygen difluoride.

MATERIAL SAFETY DATA SHEET

SECTION 10 - STABILITY AND REACTIVITY (CONTINUED)

Hazardous Decomposition: Will not spontaneously occur. Adding water results in hydration and produces (caustic) calcium hydroxide.

Hazardous Polymerization: Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

Effects Of Acute Exposure:

Portland cement and wet portland cement mixtures can dry the skin, cause alkali burns and irritate the eyes and upper respiratory tract. Ingestion can cause irritation of the throat.

Effects Of Chronic Exposure:

Portland cement dust can cause inflammation of the tissue lining the interior of the nose and the cornea (white) of the eye.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: No recognized unusual toxicity to plants or animals.

Relevant Physical And Chemical Properties: See Sections 9 and 10.

SECTION 13 - DISPOSAL CONSIDERATIONS

Dispose of waste material according to local, provincial, state and federal regulations. (Since portland cement is stable, uncontaminated material may be saved for future use.)

Dispose of bags in an approved landfill or incinerator.

SECTION 14 - TRANSPORT INFORMATION

Hazardous materials description/proper shipping name:	Portland cement is not hazardous under the TDG Act (Canada) or DOT regulations (USA).
Hazard Class:	Not applicable.
Identification Number:	Not applicable.
Required Label Text:	Not applicable.
Hazardous substances/reportable quantities (RO):	Not applicable.

SECTION 15 - REGULATORY INFORMATION

Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200:

Portland cement is considered a "hazardous chemical" under this regulation, and should be part of any hazard communication program.

Status under CERCLA/Superfund, 40 CFR 117 and 302:

Not listed.

Hazard Category under SARA (Title III), Sections 311 and 312:

Portland cement qualifies as a "hazardous substance" with delayed health effects.

Status under SARA (Title III), Section 313:

Not subject to reporting requirements under Section 313.

MATERIAL SAFETY DATA SHEET
SECTION 15 - REGULATORY INFORMATION (CONTINUED)

Status under TSCA (as of May 1997):

Some substances in portland cement are on the TSCA inventory list.

Status under the Federal Hazardous Substances Act:

Portland cement is a "hazardous substance" subject to statutes promulgated under the subject act.

Status under California Proposition 65:

This product contains chemicals (trace metals) known to the State of California to cause cancer, birth defects or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove the defined risks do not exist.

Status under Canadian Environmental Protection Act:

Not listed.

Status under WHMIS:

Portland cement is considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations and is therefore subject to the labeling and MSDS requirements of the Workplace Hazardous Materials Information System (WHMIS).

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

SECTION 16 - OTHER INFORMATION

Prepared By:	Robin Cowdrey
Approved By:	Bob Rimes
Approval Date or Revision Date:	September 1, 2004
Date Of Previous MSDS:	November 1, 2002
MSDS Number:	Not Applicable

Other Important Information:

Portland cement should only be used by knowledgeable persons. A key to using the product safely requires the user to recognize that portland cement chemically reacts with water, and that some of the intermediate products of this reaction (that is, those present while a portland cement product is "setting") pose a far more severe hazard than does portland cement itself.

While the information provided in this material safety data sheet is believed to provide a useful summary of the hazards of portland cement as it is commonly used, the sheet cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

In particular, the data furnished in this sheet does not address hazards that may be posed by other materials mixed with portland cement to produce portland cement products. Users should review other relevant material safety data sheets before working with this portland cement or working on portland cement products, for example, portland cement concrete.

No representations or warranties with respect to the accuracy or correctness of this information, or of any kind or nature whatsoever are given, made or intended by Lehigh Inland Cement Limited. No legal responsibility whatsoever is assumed for this information, or for any injuries or damages, however caused which may result from the use of this information. This information is offered solely for informational purposes and is subject to your own independent investigation and verification.



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification

Product Name	TOOL JOINT COMPOUND	Code	650-774, TOOL
Synonym	Not available.	DSL	See Section 15
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	TSCA	See Section 15
Material Uses	Tool Joint Compound is used in drilling operations as a thread compound for rotary shouldered pipe connections to prevent galling and to provide a positive seal against drilling mud pressure.	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

Section 2. Composition and Information on Ingredients

Name	CAS #	% (W/W)	Exposure Limits (ACGIH)		
			TLV-TWA(8 h)	STEL	CEILING
1) Proprietary ingredients.	Not available.	≥90	Not available.	Not available.	Not available.
2) Mica	12001-26-2	≤10	3 mg/m ³	Not established	Not established

Section 3. Hazards Identification.

Potential Health Effects	Non irritating to slight transient irritation to skin and eyes, but no permanent damage. Relatively non-toxic via ingestion. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours or mists, inhalation of product may cause irritation of the breathing passages. For more information, refer to Section 11.
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Section 4. First Aid Measures

Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. High pressure grease gun is capable of injecting grease through the skin. Grease gun injuries require immediate physician assessment. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	May be combustible at high temperature.	Flammable Limits	Lower: 0.9%; Upper: 7%
Flash Points	Mineral Oil Blend: OPEN CUP: 250°C (482°F) (Cleveland)	Auto-Ignition Temperature	>260°C (500°F)
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), hydrocarbons, metal oxides, smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.		

Continued on Next Page

Available in French

Section 6. Accidental Release Measures

Material Release or Spill	NAERG96, GUIDE 171, Substances (low to moderate hazard). ELIMINATE ALL IGNITION SOURCES. Avoid contact. Stop leak if without risk. Contain spill. Absorb with inert absorbents, dry clay, or diatomaceous earth. Avoid inhaling dust of diatomaceous earth for it may contain silica in very fine particle size, making this a potential respiratory hazard. Place used absorbent in closed metal containers for later disposal or burn absorbent in a suitable combustion chamber. DO NOT FLUSH TO SEWERS, STREAMS OR OTHER BODIES OF WATER. Check with applicable jurisdiction for specific disposal requirements of spilled material and empty containers. Notify the appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Keep away from sources of ignition. DO NOT reuse empty containers without commercial cleaning or reconditioning. Practice good personal hygiene. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods.
Storage	Store in tightly closed containers in cool, dry, isolated, well-ventilated area, and away from incompatibles.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection -	<i>The selection of personal protective equipment varies, depending upon conditions of use.</i>
Eyes	Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.
Respiratory	Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.
Hands	Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.
Exposure Limits	Consult local authorities for acceptable exposure limits. This product is not expected to form a mist based on its properties and expected use.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Smooth buttery paste.	Viscosity	Mineral Oil Blend: 103.3 cSt @ 40°C, 11.5 cSt @ 100°C, VI=98
Colour	Grey.	Pour Point	Mineral Oil Blend: -15°C
Odour	Mild petroleum odour.	Softening Point	Not available.
Odour Threshold	Not available.	Dropping Point	196°C
Boiling Point	<316°C (600°F)	Penetration	280 (60 strokes)
Specific Gravity	Mineral Oil Blend: 0.8741 kg/L @ 15°C (59°F).	Oil / Water Dist. Coeff.	Not available.
Vapor Density	Not available.	Ionicity (in water)	Not available.
Vapor Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available.
Volatility	Non-volatile	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Not available.		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents and acids.	Decomposition Products	May release COx, NOx, SOx, hydrocarbons, metal oxides, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, and ingestion.
Acute Lethality	Not available.
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact may cause skin irritation characterized by dermatitis or oil acne.
Inhalation Route:	Negligible breathing hazard at normal temperatures (up to 38°C) or recommended blending temperatures. Elevated temperatures or mechanical action may form vapours, mists or fumes. Inhalation of oil mists or vapours from hot oil may cause irritation of the upper respiratory tract.
Oral Route:	Low toxicity; has laxative effect.

Continued on Next Page

Available in French

Eye Irritation/Inflammation:	Repeated or prolonged contact may cause transient irritation, but no permanent damage.
Immunotoxicity:	Not available.
Skin Sensitization:	This product is not expected to be a skin sensitizer, based on the available data and the known hazards of the components.
Respiratory Tract Sensitization:	This product is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.
Mutagenic:	This product is not expected to be a mutagen, based on the available data and the known hazards of the components.
Reproductive Toxicity:	This product is not expected to be a reproductive hazard, based on the available data and the known hazards of the components.
Teratogenicity/Embryotoxicity:	This product is not expected to be a teratogen or an embryotoxin, based on the available data and the known hazards of the components.
Carcinogenicity (ACGIH):	Not available.
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as group 1, 2A or 2B carcinogens by IARC.
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	Not available.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	No additional remark.

Section 12. Ecological Information

Environmental Fate	Not available.	Persistence/ Bioaccumulation Potential	Not available
BOD5 and COD	Not available.	Products of Biodegradation	Not available.
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Preferred waste management priorities are: (1) recycle or reprocess; (2) incineration with energy recovery; (3) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations. Consult your local or regional authorities.
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Section 14. Transport Information

TDG Classification	Not controlled under TDG (Canada).	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations	<p>This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).</p> <p>All components of this formulation are listed on the US EPA-TSCA Inventory.</p> <p>This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.</p> <p>Please contact Product Safety for more information.</p>																		
DSD/DPD (Europe)	Not evaluated.																		
DSD/DPD (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	DOT (U.S.A) (Pictograms)																	
HMIS (U.S.A.)	<table border="1"> <tr><td>Health Hazard</td><td>1</td></tr> <tr><td>Fire Hazard</td><td>1</td></tr> <tr><td>Reactivity</td><td>1</td></tr> <tr><td>Personal Protection</td><td>B</td></tr> </table>	Health Hazard	1	Fire Hazard	1	Reactivity	1	Personal Protection	B	NFPA (U.S.A.)	<table border="1"> <tr><td>Health</td><td>1</td></tr> <tr><td>Fire Hazard</td><td>1</td></tr> <tr><td>Reactivity</td><td>1</td></tr> <tr><td>Specific hazard</td><td></td></tr> </table>	Health	1	Fire Hazard	1	Reactivity	1	Specific hazard	
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Personal Protection	B																		
Health	1																		
Fire Hazard	1																		
Reactivity	1																		
Specific hazard																			

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials (LDLo/LCLo - Lowest Published Lethal Dose/Concentration
BOD5 - Biological Oxygen Demand in 5 days	NAERG'96 - North American Emergency Response Guide Book (1996)
CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act	NSNR - New Substances Notification Regulations (Canada)
CFR - Code of Federal Regulations	NTP - National Toxicology Program
CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
COD5 - Chemical Oxygen Demand in 5 days	PEL - Permissible Exposure Limit
CPR - Controlled Products Regulations	RCRA - Resource Conservation and Recovery Act
DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSCL - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	STEL - Short Term Exposure Limit (15 minutes)
DSL - Domestic Substance List	TDG - Transportation Dangerous Goods (Canada)
EEC/EU - European Economic Community/European Union	TDLo/TCLo - Lowest Published Toxic Dose/Concentration
EINECS - European Inventory of Existing Commercial Chemical Substances	TLM - Median Tolerance Limit
EPCRA - Emergency Planning and Community Right to Know Act	TLV-TWA - Threshold Limit Value-Time Weighted Average
FDA - Food and Drug Administration	TSCA - Toxic Substances Control Act
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	USEPA - United States Environmental Protection Agency
HCS - Hazardous Communication System	USP - United States Pharmacopoeia
HMIS - Hazardous Material Information System	WHMIS - Workplace Hazardous Material Information System
IARC - International Agency for Research on Cancer	

Information Contact Internet: www.petro-canada.ca

Lubricants:
Western Canada, telephone: 1-800-661-1199;
fax: (780) 464-9564
Ontario & Central Canada, telephone:
1-800-268-5850 and (905) 822-4222; fax:
1-800-201-6285
Quebec & Eastern Canada, telephone:
1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 12/18/2002.

Data entry by Product Safety - JDW.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification			
Product Name	SNOWMOBILE MOTOR OIL	Code	460-401-8, PSNOL
Synonym	Not available	Validated on	5/28/2001.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canotec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Low ash engine oil specifically designed to lubricate two-cycle snowmobile engine		

Section 2. Composition and Information on Ingredients					
			<i>Exposure Limits (ACGIH)</i>		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
1) Severely hydrotreated paraffinic oil and additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits Consult local, state, provincial or territory authorities for acceptable exposure limits.					

Section 3. Hazards Identification.	
Potential Health Effects	Non irritating to slight transient irritation to skin and eyes, but no permanent damage. Relatively non-toxic via ingestion. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours or mists, inhalation of product may cause irritation of the breathing passages. For more information, refer to Section 11.

Section 4. First Aid Measures	
Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures			
Flammability	May be combustible at high temperature.	Flammable Limits	Not available
Flash Points	OPEN CUP: 152°C (305.6°F) (Cleveland)	Auto-Ignition Temperature	Not available
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.		

Section 6. Accidental Release Measures

Material Release or Spill	NAERG96, GUIDE 171, Substances (low to moderate hazard). ELIMINATE ALL IGNITION SOURCES. Avoid contact. Stop leak if without risk. Contain spill. Absorb with inert absorbents, dry clay, or diatomaceous earth. Avoid inhaling dust of diatomaceous earth for it may contain silica in very fine particle size, making this a potential respiratory hazard. Place used absorbent in closed metal containers for later disposal or burn absorbent in a suitable combustion chamber. DO NOT FLUSH TO SEWERS, STREAMS OR OTHER BODIES OF WATER. Check with applicable jurisdiction for specific disposal requirements of spilled material and empty containers. Notify the appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid inhalation and skin contact especially when handling used oil. Keep away from sources of ignition. DO NOT reuse empty containers without commercial cleaning or reconditioning. Practice good personal hygiene. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods.
Storage	Store in tightly closed containers in cool, dry, isolated, well-ventilated area, and away from incompatibles.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection -	The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.
Respiratory	Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.
Hands	Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Viscous liquid.	Viscosity	21.1 cSt @ 40°C, 4.5 cSt @ 100°C, VI=127.
Colour	Blue-green	Pour Point	<-54°C
Odour	Mild petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	Not available	Penetration	Not applicable.
Density	0.88 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	Not available	Ionicity (in water)	Not available
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non-volatile.	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Not available		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, reducing agents and acids.	Decomposition Products	May release COx, NOx, aldehydes, methacrylate monomers, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.		
Acute Lethality	Based on toxicity of components. Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >2500 mg/m ³ /4h (rat).		
Chronic or Other Toxic Effects	Dermal Route: Prolonged or repeated contact may cause skin irritation characterized by dermatitis or oil acne.		

Inhalation Route:	Negligible breathing hazard at normal temperatures (up to 38°C) or recommended blending temperatures. Elevated temperatures or mechanical action may form vapours, mists or fumes. Inhalation of oil mists or vapours from hot oil may cause irritation of the upper respiratory tract.
Oral Route:	Low toxicity; has laxative effect.
Eye Irritation/Inflammation:	Repeated or prolonged contact may cause transient irritation, but no permanent damage.
Immunotoxicity:	Not available
Skin Sensitization:	This product is not expected to be a skin sensitizer, based on the available data and the known hazards of the components.
Respiratory Tract Sensitization:	This product is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.
Mutagenic:	Based on actual test results of base oils and results of similar products, severely hydrotreated base oils give negative results when tested for: (a) Salmonella Typhimurium TA98 using the Modified Ames Assay for Petroleum Product; (b) Salmonella-Escherichia coli/Mammalian-Microsome Reverse Mutation Assay (Ames test) with a Confirmatory Assay; (c) Structural Chromosomal Aberrations in Chinese Hamster Ovary (CHO) Cells.
Reproductive Toxicity:	This product is not expected to be a reproductive hazard, based on the available data and the known hazards of the components.
Teratogenicity/Embryotoxicity:	This product is not expected to be a teratogen or an embryotoxin, based on the available data and the known hazards of the components.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as A1 or A2 carcinogens by ACGIH.
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as group 1, 2A or 2B carcinogens by IARC.
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	Not available
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	No additional remark.

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Spent/used/waste oil may meet the requirements of a hazardous waste. Consult your local or regional authorities. Preferred waste management priorities are: (1) recycle or reprocess; (2) incineration with energy recovery; (3) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not controlled under TDG (Canada).	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations	<p>This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).</p> <p>All components of this formulation are listed on the US EPA-TSCA Inventory.</p> <p>All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).</p> <p>This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.</p> <p>Please contact Product Safety for more information.</p>		
DSD/DPD (Europe)	Not classified under the Dangerous Substances or Dangerous Preparations Directives.	HCS (U.S.A.)	Not controlled under the HCS (United States).

ADR (Europe) (Pictograms) 		DOT (U.S.A.) (Pictograms) 		
HMIS (U.S.A.)	Health Hazard	1	NFPA (U.S.A.) Health  Fire Hazard Reactivity Specific hazard	Rating 0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
	Fire Hazard	1		
	Reactivity	0		
	Personal Protection	B		

Section 16. Other Information

References Available upon request.
 * Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists ADR - Agreement on Dangerous goods by Road (Europe) ASTM - American Society for Testing and Materials (BOD5 - Biological Oxygen Demand in 5 days CAN/CGA B149.2 Propane Installation Code CAS - Chemical Abstract Services CEPA - Canadian Environmental Protection Act CERCLA - Comprehensive Environmental Response, Compensation and Liability Act CFR - Code of Federal Regulations CHIP - Chemicals Hazard Information and Packaging Approved Supply List COD5 - Chemical Oxygen Demand in 5 days CPR - Controlled Products Regulations DOT - Department of Transport DSCL - Dangerous Substances Classification and Labeling (Europe) DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe) DSL - Domestic Substance List EEC/EU - European Economic Community/European Union EINECS - European Inventory of Existing Commercial Chemical Substances EPCRA - Emergency Planning and Community Right to Know Act FDA - Food and Drug Administration FIFRA - Federal Insecticide, Fungicide and Rodenticide Act HCS - Hazardous Communication System HMIS - Hazardous Material Information System IARC - International Agency for Research on Cancer	IRIS - Integrated Risk Information System LD50/LC50 - Lethal Dose/Concentration kill 50% LDLo/LCLo - Lowest Published Lethal Dose/Concentration NAERG'96 - North American Emergency Response Guide Book (1996) NFPA - National Fire Prevention Association NIOSH - National Institute for Occupational Safety & Health NPRI - National Pollutant Release Inventory NSNR - New Substances Notification Regulations (Canada) NTP - National Toxicology Program OSHA - Occupational Safety & Health Administration PEL - Permissible Exposure Limit RCRA - Resource Conservation and Recovery Act SARA - Superfund Amendments and Reorganization Act SD - Single Dose STEL - Short Term Exposure Limit (15 minutes) TDG - Transportation Dangerous Goods (Canada) TDLo/TCLo - Lowest Published Toxic Dose/Concentration TLm - Median Tolerance Limit TLV-TWA - Threshold Limit Value-Time Weighted Average TSCA - Toxic Substances Control Act USEPA - United States Environmental Protection Agency USP - United States Pharmacopoeia WHMIS - Workplace Hazardous Material Information System
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For Copy of MSDS

Lubricants:
 Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564
 Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax:
 1-800-201-6285
 Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

Prepared by Product Safety - TAR on 5/28/2001.

Data entry by Product Safety - JDW.

For Product Safety Information: (905) 804-4752

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification			
Product Name	DRILL ROD HEAVY GREASE	Code	650-265, DRODH
Synonym	Not available.	DSL	See Section 15
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	TSCA	See Section 15
Material Uses	This product is recommended for the lubrication of diamond drill rods.	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

Section 2. Composition and Information on Ingredients						
			Exposure Limits (ACGIH)			
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING	
1) Mixture of severely hydrotreated and hydrocracked, and/or solvent-refined base oil (petroleum) and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established	

Section 3. Hazards Identification.	
Potential Health Effects	Non irritating to slight transient irritation to skin and eyes, but no permanent damage. Relatively non-toxic via ingestion. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours or mists, inhalation of product may cause irritation of the breathing passages. For more information, refer to Section 11.

Section 4. First Aid Measures	
Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. High pressure grease gun is capable of injecting grease through the skin. Grease gun injuries require immediate physician assessment. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures			
Flammability	May be combustible at high temperature.	Flammable Limits	Not available.
Flash Points	Mineral Oil Blend: OPEN CUP: 252°C (485.6°F). (Cleveland).	Auto-Ignition Temperature	Not available.
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Containers may explode in heat of fire. Do not cut, weld, heat, drill or pressurize empty container.
Products of Combustion	Carbon oxides (CO, CO ₂), smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.		

Section 6. Accidental Release Measures

Material Release or Spill Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.

Section 7. Handling and Storage

Handling Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.

Storage Store in dry, cool, well-ventilated area. Keep container tightly closed. Store away from incompatible and reactive materials (See section 5 and 10).

Section 8. Exposure Controls/Personal Protection

Engineering Controls For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.

Personal Protection - The selection of personal protective equipment varies, depending upon conditions of use.

- Eyes** Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
- Body** Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.
- Respiratory** Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.
- Hands** Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.
- Feet** Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Exposure Limits Consult local, state, provincial or territory authorities for acceptable exposure limits. This product is not expected to form a mist based on its properties and expected use.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Paste of long fibred texture.	Viscosity	Mineral Oil Blend: 155.5 cSt @ 40°C (104°F), 14.42 cSt @ 100°C (212°F), VI=89
Colour	Dark greenish-brown	Pour Point	Mineral Oil Blend: -15°C (5°F)
Odour	Mild grease like.	Softening Point	Not available
Odour Threshold	Not available.	Dropping Point	201°C (394°F)
Boiling Point	Not available.	Penetration	234 (60 strokes)
Specific Gravity	Mineral Oil Blend: 0.8898 kg/L @ 15°C (59°F).	Oil / Water Dist. Coeff.	Not available.
Vapor Density	Not available.	Ionicity (in water)	Not available
Vapor Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available.
Volatility	Non-volatile.	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Not corrosive to copper.		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, acids and alkalis.	Decomposition Products	May release COx, NOx, SOx, diphenylamine, alkenes, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	Based on toxicity of components. Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit).
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact may cause skin irritation characterized by dermatitis or oil acne.
Inhalation Route:	Negligible breathing hazard at normal temperatures (up to 38°C) or recommended blending temperatures. Elevated temperatures or mechanical action may form vapours, mists or fumes. Inhalation of oil mists or vapours from hot oil may cause irritation of the upper respiratory tract.
Oral Route:	Low toxicity; has laxative effect.
Eye Irritation/Inflammation:	Repeated or prolonged contact may cause transient irritation, but no permanent damage.
Immunotoxicity:	Not available.
Skin Sensitization:	This product is not expected to be a skin sensitizer, based on the available data and the known hazards of the components.
Respiratory Tract Sensitization:	This product is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.
Mutagenic:	Based on actual test results of base oils and results of similar products, severely hydrotreated base oils give negative results when tested for: (a) Salmonella Typhimurium TA98 using the Modified Ames Assay for Petroleum Product; (b) Salmonella-Escherichia coli/Mammalian-Microsome Reverse Mutation Assay (Ames test) with a Confirmatory Assay; (c) Structural Chromosomal Aberrations in Chinese Hamster Ovary (CHO) Cells.
Reproductive Toxicity:	This product is not expected to be a reproductive hazard, based on the available data and the known hazards of the components.
Teratogenicity/Embryotoxicity:	This product is not expected to be a teratogen or an embryotoxin, based on the available data and the known hazards of the components.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as A1 or A2 carcinogens by ACGIH.
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as group 1, 2A or 2B carcinogens by IARC.
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	Not available.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	No additional remark.

Section 12. Ecological Information

Environmental Fate	Not available.	Persistence/ Bioaccumulation Potential	Not available
BOD5 and COD	Not available.	Products of Biodegradation	Not available.
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not controlled under TDG (Canada).	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Please contact Product Safety for more information.

DSD/DPD (Europe) Not evaluated.

DSD/DPD (Europe) (Pictograms) NOT EVALUATED FOR EUROPEAN TRANSPORT
NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.

DOT (U.S.A) (Pictograms)



HMIS (U.S.A.)	Health Hazard	1
	Fire Hazard	1
	Reactivity	0
	Personal Protection	B

NFPA (U.S.A.)



Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

- ACGIH - American Conference of Governmental Industrial Hygienists
- ADR - Agreement on Dangerous goods by Road (Europe)
- ASTM - American Society for Testing and Materials (
- BOD5 - Biological Oxygen Demand in 5 days
- CAN/CGA B149.2 Propane Installation Code
- CAS - Chemical Abstract Services
- CEPA - Canadian Environmental Protection Act
- CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
- CFR - Code of Federal Regulations
- CHIP - Chemicals Hazard Information and Packaging Approved Supply List
- COD5 - Chemical Oxygen Demand in 5 days
- CPR - Controlled Products Regulations
- DOT - Department of Transport
- DSCL - Dangerous Substances Classification and Labeling (Europe)
- DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
- DSL - Domestic Substance List
- EEC/EU - European Economic Community/European Union
- EINECS - European Inventory of Existing Commercial Chemical Substances
- EPCRA - Emergency Planning and Community Right to Know Act
- FDA - Food and Drug Administration
- FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
- HCS - Hazardous Communication System
- HMIS - Hazardous Material Information System
- IARC - International Agency for Research on Cancer
- IRIS - Integrated Risk Information System
- LD50/LC50 - Lethal Dose/Concentration kill 50%
- LDLo/LCLo - Lowest Published Lethal Dose/Concentration
- NAERG'96 - North American Emergency Response Guide Book (1996)
- NFPA - National Fire Prevention Association
- NIOSH - National Institute for Occupational Safety & Health
- NPRI - National Pollutant Release Inventory
- NSNR - New Substances Notification Regulations (Canada)
- NTP - National Toxicology Program
- OSHA - Occupational Safety & Health Administration
- PEL - Permissible Exposure Limit
- RCRA - Resource Conservation and Recovery Act
- SARA - Superfund Amendments and Reorganization Act
- SD - Single Dose
- STEL - Short Term Exposure Limit (15 minutes)
- TDG - Transportation Dangerous Goods (Canada)
- TDLo/TCLo - Lowest Published Toxic Dose/Concentration
- TLM - Median Tolerance Limit
- TLV-TWA - Threshold Limit Value-Time Weighted Average
- TSCA - Toxic Substances Control Act
- USEPA - United States Environmental Protection Agency
- USP - United States Pharmacopoeia
- WHMIS - Workplace Hazardous Material Information System

Information Contact Internet: www.petro-canada.ca

Lubricants:
Western Canada, telephone: 1-800-661-1199;
fax: (780) 464-9564
Ontario & Central Canada, telephone:
1-800-268-5850 and (905) 822-4222; fax:
1-800-201-6285
Quebec & Eastern Canada, telephone:
1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 4/29/2003.

Data entry by Product Safety - JDW.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification

Product Name	PETRO-CANADA SUPREME 5W-30, 10W-30, 10W-40, 20W-50 MOTOR OIL	Code	410-344, MOSP53 410-341, MOSP13 410-342, MOSP14 410-343, MOSP25
Synonym	Not available.	Validated on	8/31/2004.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Supreme is designed for the lubrication of all gasoline, propane and CNG engines where the manufacturer recommends the use of API SM quality oils. SAE 5W-30 and 10W-30 grades also meet the requirements of ILSAC GF-4.		

Section 2. Composition and Information on Ingredients

Name	CAS #	% (W/W)	Exposure Limits (ACGIH)		
			TLV-TWA(8 h)	STEL	CEILING
Mixture of severely hydrotreated and hydrocracked base oil (petroleum) and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Not expected to cause more than slight skin or eye irritation. With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation. Ingestion may produce a laxative effect. For more information refer to Section 11 of this MSDS.
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Section 4. First Aid Measures

Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	May be combustible at high temperature.	Flammable Limits	Not available.
Flash Points	OPEN CUP: 223°C (433.4°F) (Cleveland)	Auto-Ignition Temperature	Not available
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.

Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), calcium oxides (CaO _x), phosphorus compounds (PO _x), zinc oxides, boron oxides and molybdenum, smoke and irritating vapours as products of incomplete combustion.
Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.

Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store away from incompatible and reactive materials (See section 5 and 10). Keep container tightly closed. Store in dry, cool, well-ventilated area.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection - <i>The selection of personal protective equipment varies, depending upon conditions of use.</i>	
Eyes	Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.
Respiratory	Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.
Hands	Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Viscous liquid.	Viscosity	5W-30: 62.3 cSt @ 40°C (104°F), 10.6 cSt @ 100°C (212°F). VI=160 10W-30: 67.4 cSt @ 40°C (104°F), 10.5 cSt @ 100°C (212°F). VI=143 10W-40: 97.2 cSt @ 40°C (104°F), 14.1 cSt @ 100°C (212°F). VI=143 20W-50: 170 cSt @ 40°C (104°F), 19.0 cSt @ 100°C (212°F). VI=127
Colour	Light amber.	Pour Point	5W-30: -36°C (-33°F) 10W-30: -36°C (-33°F) 10W-40: -30°C (-22°F) 20W-50: -24°C (-11°F)
Odour	Mild petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available.	Dropping Point	Not applicable.
Boiling Point	Not available.	Penetration	Not applicable.

Density	0.8566 - 0.8775 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available.
Vapour Density	Not available.	Ionicity (in water)	Not available
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non-volatile	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Copper corrosion, 3h, 121°C (ASTM D0130): 1a		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents and acids.	Decomposition Products	May release COx, H2S, methacrylate monomers, alkyl mercaptans, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, and ingestion.		
Acute Lethality	Acute toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >2500 mg/m ³ /4h (rat).		
Chronic or Other Toxic Effects	<p>Dermal Route: Prolonged or repeated contact may defat and dry skin, and cause dermatitis. Short-term exposure is expected to cause only slight irritation, if any.</p> <p>Inhalation Route: With its relatively low vapour pressure, this product is not expected to be inhaled in any appreciable quantity at ambient conditions. If heated to high temperatures or subjected to mechanical actions which produce vapours or mists, inhalation may cause respiratory tract irritation.</p> <p>Oral Route: Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs). May produce a laxative effect.</p> <p>Eye Irritation/Inflammation: Short-term exposure is expected to cause only slight irritation, if any.</p> <p>Immunotoxicity: Not available.</p> <p>Skin Sensitization: Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.</p> <p>Respiratory Tract Sensitization: Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.</p> <p>Mutagenic: This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.</p> <p>Reproductive Toxicity: This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.</p> <p>Teratogenicity/Embryotoxicity: This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.</p> <p>Carcinogenicity (ACGIH): This product is not known to contain any chemicals at reportable quantities that are listed as Group A1 or A2 carcinogens by ACGIH.</p> <p>Carcinogenicity (IARC): This product is not known to contain any chemicals at reportable quantities that are listed as Group 1, 2A, or 2B carcinogens by IARC.</p> <p>Carcinogenicity (NTP): This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.</p> <p>Carcinogenicity (IRIS): This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.</p> <p>Carcinogenicity (OSHA): This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.</p>		
Other Considerations	No additional remark.		

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available.	Products of Biodegradation	Not available.
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.

Section 14. Transport Information

TDG Classification	Not a hazardous material for transport according to the TDG Regulations. (Canada)	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Please contact Product Safety for more information.

DSD/DPD (Europe)	Not evaluated.	HCS (U.S.A.)	Does not meet the definitions of a health or physical hazard according to the OSHA - Hazard Communication Standard. (United States)
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ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	DOT (U.S.A) (Pictograms)	
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HMIS (U.S.A.)	<table border="1"> <tr> <td>Health Hazard</td> <td>1</td> </tr> <tr> <td>Fire Hazard</td> <td>1</td> </tr> <tr> <td>Reactivity</td> <td>0</td> </tr> <tr> <td>Personal Protection</td> <td>B</td> </tr> </table>	Health Hazard	1	Fire Hazard	1	Reactivity	0	Personal Protection	B	NFPA (U.S.A.)	<table border="1"> <tr> <td>Health</td> <td>1</td> <td>Fire Hazard</td> <td>1</td> </tr> <tr> <td></td> <td>1</td> <td>Reactivity</td> <td>0</td> </tr> </table> <p>Specific hazard</p>	Health	1	Fire Hazard	1		1	Reactivity	0	Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme
Health Hazard	1																				
Fire Hazard	1																				
Reactivity	0																				
Personal Protection	B																				
Health	1	Fire Hazard	1																		
	1	Reactivity	0																		

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary	ACGIH - American Conference of Governmental Industrial Hygienists ADR - Agreement on Dangerous goods by Road (Europe) ASTM - American Society for Testing and Materials BOD5 - Biological Oxygen Demand in 5 days CAN/CGA B149.2 Propane Installation Code CAS - Chemical Abstract Services CEPA - Canadian Environmental Protection Act CERCLA - Comprehensive Environmental Response, Compensation and Liability Act CFR - Code of Federal Regulations CHIP - Chemicals Hazard Information and Packaging Approved Supply List COD5 - Chemical Oxygen Demand in 5 days CPR - Controlled Products Regulations DOT - Department of Transport DSCl - Dangerous Substances Classification and Labeling (Europe) DSD/DPD - Dangerous Substances or Dangerous Preparations	IRIS - Integrated Risk Information System LD50/LC50 - Lethal Dose/Concentration kill 50% LDLo/LCLo - Lowest Published Lethal Dose/Concentration NAERG'96 - North American Emergency Response Guide Book (1996) NFPA - National Fire Prevention Association NIOSH - National Institute for Occupational Safety & Health NPRI - National Pollutant Release Inventory NSNR - New Substances Notification Regulations (Canada) NTP - National Toxicology Program OSHA - Occupational Safety & Health Administration PEL - Permissible Exposure Limit RCRA - Resource Conservation and Recovery Act SARA - Superfund Amendments and Reorganization Act SD - Single Dose STEL - Short Term Exposure Limit (15 minutes) TDG - Transportation Dangerous Goods (Canada) TDLo/TCLo - Lowest Published Toxic Dose/Concentration
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Directives (Europe)
DSL - Domestic Substance List
EEC/EU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPCRA - Emergency Planning and Community Right to Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
HCS - Hazard Communication Standard
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer

TLM - Median Tolerance Limit
TLV-TWA - Threshold Limit Value-Time Weighted Average
TSCA - Toxic Substances Control Act
USEPA - United States Environmental Protection Agency
USP - United States Pharmacopoeia
WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS

The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

Internet: www.petro-canada.ca

Lubricants:

Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564
Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285
Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - TLM on 8/31/2004.

Data entry by Product Safety - RS.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
 	B-2, D-2A, D-2B	   	

Section 1. Chemical Product and Company Identification

Product Name	JET B AVIATION TURBINE FUEL	Code	W219 SAP: 150, 151, 152
Synonym	Jet B; Jet B DI; JP-4; Jet F-40; NATO F-40; Turbine Fuel, Aviation, Wide Cut Type (CAN/CGSB-3.22).	Validated on	12/3/2001.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Used as aviation turbine fuel. May contain a fuel system icing inhibitor.		

Section 2. Composition and Information on Ingredients

Name	CAS #	% (V/V)	Exposure Limits (ACGIH)		
			TLV-TWA(8 h)	STEL	CEILING
1) Complex mixture of petroleum hydrocarbons (C6-C14).	64741-41-9	>99	Not established	Not established	Not established
2) Benzene	71-43-2	<0.5	0.5 ppm	2.5 ppm	Not established
3) Fuel System Icing Inhibitor (FSII) (if added*): Diethylene Glycol Monomethyl Ether	111-77-3	≤0.15	Not established	Not established	Not established
4) Anti-static, antioxidant and metal deactivator additives.	Not applicable	<0.1	Not applicable	Not applicable	Not applicable
* Please note that Jet B DI, JP-4, Jet F-40 and NATO F-40 all contain Fuel System Icing Inhibitor (FSII).					
Manufacturer	Not applicable				
Recommendation					
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.

Potential Health Effects	Skin and eye contact can cause irritation. Inhalation of vapours can cause irritation of the respiratory tract and CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death. Aspiration into the lungs may produce potentially fatal chemical pneumonitis (fluid in the lungs), severe lung damage, or respiratory failure. This product contains a cancer causing agent. For more information, refer to Section 11.
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Section 4. First Aid Measures

Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Flammable liquid (NFPA).	Flammable Limits	LOWER: 1.3% UPPER: 8% (NFPA)
Flash Points	CLOSED CUP: -31°C (-24°F) (NFPA)	Auto-Ignition Temperature	240°C (464°F) (NFPA)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite. May accumulate in confined spaces.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.		

Continued on Next Page

Available in French

**Fire Fighting
Media and
Instructions**

NAERG96, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible).

CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient.

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions.

SMALL FIRES: Dry chemical, CO₂, water spray or regular foam.

LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk.

Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discoloration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6. Accidental Release Measures**Material Release
or Spill**

NAERG96, GUIDE 128, Flammable Liquids (Non-polar/ Water-immiscible). ELIMINATE ALL IGNITION SOURCES. Avoid contact. Stop leak if without risk. Contain spill. Absorb with inert absorbents, dry clay, or diatomaceous earth. Avoid inhaling dust of diatomaceous earth for it may contain silica in very fine particle size, making this a potential respiratory hazard. Place used absorbent in closed metal containers for later disposal or burn absorbent in a suitable combustion chamber. DO NOT FLUSH TO SEWERS, STREAMS OR OTHER BODIES OF WATER. Check with applicable jurisdiction for specific disposal requirements of spilled material and empty containers. Notify the appropriate authorities immediately.

Section 7. Handling and Storage**Handling**

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk. DO NOT reuse empty containers without commercial cleaning or reconditioning. Ground/bond line and equipment during pumping or transfer to avoid accumulation of static charge. DO NOT ingest. Do not breathe gas/vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately. Avoid contact with skin and eyes. Practice good personal hygiene. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods.

Storage

Store in tightly closed containers in cool, dry, isolated, well-ventilated area, and away from incompatibles. Ground all equipment containing material. Keep away from direct sunlight.

Section 8. Exposure Controls/Personal Protection

Engineering Controls For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.

Personal Protection - *The selection of personal protective equipment varies, depending upon conditions of use.*

Eyes Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.

Body Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.

Respiratory Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.

Hands Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.

Feet Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Clear liquid.	Viscosity	Not available (similar to gasoline)
Colour	Clear and colourless.	Pour Point	Freezing Point: <-51°C (<-60°F) for Jet B/Jet B DL; <-58°C (<-72°F) for Jet Fuel F-40.
Odour	Gasoline like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	50 to 270°C (122 to 518°F)	Penetration	Not applicable.
Density	0.75 to 0.80 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	3.5 (Air = 1)	Ionicity (In water)	Not available
Vapour Pressure	21 kPa (158 mmHg) @ 37.8°C (100°F).	Dispersion Properties	Not available
Volatility	Volatile.	Solubility	Insoluble in water. Partially miscible in some alcohols. Miscible in other petroleum solvents.

Continued on Next Page

Available in French

Section 10. Stability and Reactivity

Corrosivity	Not available		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents and acids.	Decomposition Products	May release CO _x , NO _x , SO _x , aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.		
Acute Lethality	<p>Based on toxicity of similar product. Acute oral toxicity (LD50): >20000 mg/kg (rat). Acute dermal toxicity (LD50): >5000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >5000 mg/m³/4h (rat).</p> <p>Benzene Acute oral toxicity (LD50): 930 mg/kg (rat). Acute dermal toxicity (LD50): >9400 mg/kg (rabbit). Acute inhalation toxicity (LC50): 13200 ppm/4h (rat).</p> <p>Diethylene Glycol Monomethyl Ether Acute oral toxicity (LD50): 4140-5180 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >50000 mg/m³/4h (rat).</p>		
Chronic or Other Toxic Effects			
Dermal Route:	Skin contact can cause irritation.		
Inhalation Route:	Inhalation of vapours can cause irritation of the respiratory tract and CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death.		
Oral Route:	Aspiration into the lungs may produce potentially fatal chemical pneumonitis (fluid in the lungs), severe lung damage, or respiratory failure.		
Eye Irritation/Inflammation:	Eye contact can cause irritation.		
Immunotoxicity:	Not available		
Skin Sensitization:	This product is not expected to be a skin sensitizer, based on the available data and the known hazards of the components.		
Respiratory Tract Sensitization:	This product is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.		
Mutagenic:	Benzene is tumorigenic by RTECS criteria.		
Reproductive Toxicity:	This product is not expected to be a reproductive hazard, based on the available data and the known hazards of the components.		
Teratogenicity/Embryotoxicity:	Fetotoxicity, embryotoxicity and/or teratogenicity have been observed in rats or rabbits following oral or dermal administration, in the absence of maternal toxicity. [Diethylene Glycol Monomethyl Ether]		
Carcinogenicity (ACGIH):	ACGIH A1: confirmed human carcinogen. [Benzene]		
Carcinogenicity (IARC):	IARC Group 1: carcinogenic to Humans. [Benzene]		
Carcinogenicity (NTP):	NTP Group 1: known to be a carcinogen. [Benzene]		
Carcinogenicity (IRIS):	Not available		
Carcinogenicity (OSHA):	Benzene is an OSHA known carcinogen.		
Other Considerations	No additional remark.		

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal Preferred waste management priorities are: (1) recycle or reprocess; (2) incineration with energy recovery; (3) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations. Consult your local or regional authorities.

Section 14. Transport Information

TDG Classification	Currently: Fuel, aviation, turbine engine, 3, UN1863, PGII As of August 15, 2002: FUEL, AVIATION, TURBINE ENGINE, 3, UN1863, PGII	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations	<p>This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).</p> <p>All components of this formulation are listed on the US EPA-TSCA Inventory.</p> <p>All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).</p> <p>This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.</p> <p>Please contact Product Safety for more information.</p>																																			
DSD/DPD (Europe)	Not evaluated.	HCS (U.S.A.)	<p>CLASS: Contains material which may cause cancer.</p> <p>CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F).</p> <p>CLASS: Toxic.</p> <p>CLASS: Irritating substance.</p> <p>CLASS: Target organ effects.</p>																																	
ADR (Europe) (Pictograms)	<p>NOT EVALUATED FOR EUROPEAN TRANSPORT</p> <p>NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.</p>	DOT (U.S.A) (Pictograms)																																		
HMIS (U.S.A.)	<table border="1"> <tr><td>Health Hazard</td><td>2*</td></tr> <tr><td>Fire Hazard</td><td>3</td></tr> <tr><td>Reactivity</td><td>0</td></tr> <tr><td>Personal Protection</td><td>H</td></tr> </table>	Health Hazard	2*	Fire Hazard	3	Reactivity	0	Personal Protection	H	NFPA (U.S.A.)	<table border="1"> <tr> <td>Health</td> <td></td> <td>Fire Hazard</td> <td>Rating</td> <td>0 Insignificant</td> </tr> <tr> <td></td> <td></td> <td>Reactivity</td> <td></td> <td>1 Slight</td> </tr> <tr> <td></td> <td></td> <td>Specific hazard</td> <td></td> <td>2 Moderate</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>3 High</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>4 Extreme</td> </tr> </table>	Health		Fire Hazard	Rating	0 Insignificant			Reactivity		1 Slight			Specific hazard		2 Moderate					3 High					4 Extreme
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				4 Extreme																																

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

<p>Glossary</p> <p>ACGIH - American Conference of Governmental Industrial Hygienists ADR - Agreement on Dangerous goods by Road (Europe) ASTM - American Society for Testing and Materials () BOD5 - Biological Oxygen Demand in 5 days CAN/CGA B149.2 Propane Installation Code CAS - Chemical Abstract Services CEPA - Canadian Environmental Protection Act CERCLA - Comprehensive Environmental Response, Compensation and Liability Act CFR - Code of Federal Regulations CHIP - Chemicals Hazard Information and Packaging Approved Supply List COD5 - Chemical Oxygen Demand in 5 days CPR - Controlled Products Regulations DOT - Department of Transport DSSL - Dangerous Substances Classification and Labeling (Europe) DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe) DSL - Domestic Substance List EEC/EU - European Economic Community/European Union EINECS - European Inventory of Existing Commercial Chemical Substances EPCRA - Emergency Planning and Community Right to Know Act FDA - Food and Drug Administration FIFRA - Federal Insecticide, Fungicide and Rodenticide Act HCS - Hazardous Communication System HMIS - Hazardous Material Information System IARC - International Agency for Research on Cancer</p>	<p>IRIS - Integrated Risk Information System LD50/LC50 - Lethal Dose/Concentration kill 50% LDLo/LCLo - Lowest Published Lethal Dose/Concentration NAERG'96 - North American Emergency Response Guide Book (1996) NFPA - National Fire Prevention Association NIOSH - National Institute for Occupational Safety & Health NPRI - National Pollutant Release Inventory NSNR - New Substances Notification Regulations (Canada) NTP - National Toxicology Program OSHA - Occupational Safety & Health Administration PEL - Permissible Exposure Limit RCRA - Resource Conservation and Recovery Act SARA - Superfund Amendments and Reorganization Act SD - Single Dose STEL - Short Term Exposure Limit (15 minutes) TDG - Transportation Dangerous Goods (Canada) TDLo/TCLo - Lowest Published Toxic Dose/Concentration TLM - Median Tolerance Limit TLV-TWA - Threshold Limit Value-Time Weighted Average TSCA - Toxic Substances Control Act USEPA - United States Environmental Protection Agency USP - United States Pharmacopoeia WHMIS - Workplace Hazardous Material Information System</p>
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For Copy of MSDS Prepared by Product Safety - TAR on 12/3/2001.

Western Canada, telephone: 403-296-4158; fax: 403-296-6551
Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228
Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

Data entry by Product Safety - JDW.

For Product Safety Information: (905) 804-4752

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification			
Product Name	TRAXON* XL SYNTHETIC BLEND 75W-90, 80W-140	Code	TRXL759, 470-499-0 TRXL814, 470-500-0
Synonym	Not available	Validated on	5/29/2003.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-8666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	These products are multipurpose automotive hypoid gear lubricants, suitable for use in lower temperatures in passenger cars, trucks and off-highway vehicles.		

Section 2. Composition and Information on Ingredients					
Name	CAS#	% (W/W)	Exposure Limits (ACGIH)		
			TLV-TWA(8 h)	STEL	CEILING
1) Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum), synthetic hydrocarbons and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.	
Potential Health Effects	Non irritating to slight transient irritation to skin and eyes, but no permanent damage. Relatively non-toxic via ingestion. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours or mists, inhalation of product may cause irritation of the breathing passages. For more information, refer to Section 11.

Section 4. First Aid Measures	
Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures			
Flammability	May be combustible at high temperature.	Flammable Limits	Not available
Flash Points	OPEN CUP: ≥183°C (361.4°F) (Cleveland)	Auto-Ignition Temperature	Not available
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), smoke and irritating vapours as products of incomplete combustion.		

Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, water spray or CO2. LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.
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Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store in dry, cool, well-ventilated area. Keep container tightly closed. Store away from incompatible and reactive materials (See section 5 and 10).

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.
Respiratory	Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.
Hands	Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Viscous liquid.	Viscosity	75W90: 106.7 cSt @ 40°C (104°F), 16.52 cSt @ 100°C (212°F), VI=168 80W140: 254.8 cSt @ 40°C (104°F), 25.24 cSt @ 100°C (212°F), VI=127
Colour	Colourless to pale yellow.	Pour Point	75W90: -42°C (-44°F) 80W140: -36°C (-33°F)
Odour	No odour or slight petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	Not available	Penetration	Not applicable.
Density	0.8699 - 0.878 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	Not available	Ionicity (in water)	Not available
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non-volatile	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Copper corrosion, 3h, 121°C (ASTM D0130): 1b		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents.	Decomposition Products	May release COx, NOx, SOx, H2S, POx, SiOx, methacrylate monomers, aldehydes, alkyl mercaptans, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.		
Acute Lethality	Based on toxicity of components. Acute oral toxicity (LD50): >5000 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >2500 mg/m ³ /4h (rat).		
Chronic or Other Toxic Effects			
Dermal Route:	Prolonged or repeated contact may cause skin irritation characterized by dermatitis or oil acne.		
Inhalation Route:	Negligible breathing hazard at normal temperatures (up to 38°C) or recommended blending temperatures. Elevated temperatures or mechanical action may form vapours, mists or fumes. Inhalation of oil mists or vapours from hot oil may cause irritation of the upper respiratory tract.		
Oral Route:	Low toxicity; has laxative effect.		
Eye Irritation/Inflammation:	Repeated or prolonged contact may cause transient irritation, but no permanent damage.		
Immunotoxicity:	Not available		
Skin Sensitization:	This product is not expected to be a skin sensitizer, based on the available data and the known hazards of the components.		
Respiratory Tract Sensitization:	This product is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.		
Mutagenic:	This product is not expected to be a mutagen, based on the available data and the known hazards of the components.		
Reproductive Toxicity:	This product is not expected to be a reproductive hazard, based on the available data and the known hazards of the components.		
Teratogenicity/Embryotoxicity:	This product is not expected to be a teratogen or an embryotoxin, based on the available data and the known hazards of the components.		
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as A1 or A2 carcinogens by ACGIH.		
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as group 1, 2A or 2B carcinogens by IARC.		
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.		
Carcinogenicity (IRIS):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.		
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.		
Other Considerations	No additional remark.		

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not controlled under TDG (Canada).	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Please contact Product Safety for more information.

DSD/DPD (Europe)	Not classified under the Dangerous Substances or Dangerous Preparations Directives.	HCS (U.S.A.)	Not controlled under the HCS (United States).
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ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	DOT (U.S.A.) (Pictograms)	
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HMS (U.S.A.)	Health Hazard	1	NFPA (U.S.A.)		Fire Hazard	Reactivity	Specific hazard	Rating	0 Insignificant
	Fire Hazard	1						1 Slight	
	Reactivity	0						2 Moderate	
	Personal Protection	B						3 High	
								4 Extreme	

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

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| <p>ACGIH - American Conference of Governmental Industrial Hygienists
 ADR - Agreement on Dangerous goods by Road (Europe)
 ASTM - American Society for Testing and Materials (
 BOD5 - Biological Oxygen Demand in 5 days
 CAN/CGA B149.2 Propane Installation Code
 CAS - Chemical Abstract Services
 CEPA - Canadian Environmental Protection Act
 CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
 CFR - Code of Federal Regulations
 CHIP - Chemicals Hazard Information and Packaging Approved Supply List
 COD5 - Chemical Oxygen Demand in 5 days
 CPR - Controlled Products Regulations
 DOT - Department of Transport
 DSCL - Dangerous Substances Classification and Labeling (Europe)
 DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
 DSL - Domestic Substance List
 EEC/EU - European Economic Community/European Union
 EINECS - European Inventory of Existing Commercial Chemical Substances
 EPCRA - Emergency Planning and Community Right to Know Act
 FDA - Food and Drug Administration
 FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
 HCS - Hazardous Communication System
 HMIS - Hazardous Material Information System
 IARC - International Agency for Research on Cancer</p> | <p>IRIS - Integrated Risk Information System
 LD50/LC50 - Lethal Dose/Concentration kill 50%
 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant Release Inventory
 NSNR - New Substances Notification Regulations (Canada)
 NTP - National Toxicology Program
 OSHA - Occupational Safety & Health Administration
 PEL - Permissible Exposure Limit
 RCRA - Resource Conservation and Recovery Act
 SARA - Superfund Amendments and Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration
 TLM - Median Tolerance Limit
 TLV-TWA - Threshold Limit Value-Time Weighted Average
 TSCA - Toxic Substances Control Act
 USEPA - United States Environmental Protection Agency
 USP - United States Pharmacopoeia
 WHMIS - Workplace Hazardous Material Information System</p> |
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For Copy of MSDS

The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

Internet: www.petro-canada.ca

Lubricants:

Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564

Prepared by Product Safety - JDW on 5/29/2003.

Data entry by Product Safety - JDW.

Ontario & Central Canada, telephone: 1-800-269-5850 and (905) 822-4222; fax:
1-800-201-6285

Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	B-2, D-2A, D-2B		

Section 1. Chemical Product and Company Identification	
Product Name GASOLINE, UNLEADED	Code W102E
Synonym Regular, Unleaded Gasoline (US Grade), Mid-Grade, Plus, Super, WinterGas, SummerGas, Supreme, SuperClean WinterGas, RegularClean, PlusClean, Premium, marked or dyed gasoline, Super Premium (94 RO)	Validated on 6/9/2004.
Manufacturer PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses Unleaded gasoline is used in spark ignition engines including motor vehicles, inboard and outboard boat engines, small engines such as chain saws and lawn mowers, and recreational vehicles.	

Section 2. Composition and Information on Ingredients					
Name	CAS #	% (V/V)	Exposure Limits (ACGIH)		
			TLV-TWA(8 h)	STEL	CEILING
Gasoline	8006-61-9	85-100	300 ppm (890 mg/m ³)	500 ppm (1480 mg/m ³)	Not established
Methyl tert-butyl ether	1634-04-4	0-15	40 ppm (144mg/m ³)	Not established	Not established
Note: Petro-Canada does not use MTBE in the manufacturing of its gasoline, however MTBE can be introduced from time to time through the use of external gasoline blendstocks.					
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.	
Potential Health Effects	Possible cancer hazard. Inhalation of vapours can be irritating to respiratory tract and cause CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death. Skin and eye contact can cause irritation. Toxic if ingested. For more information, refer to Section 11.

Section 4. First Aid Measures	
Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention if irritation persists.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Flammable liquid (NFPA).	Flammable Limits	Lower: 1.3%; Upper: 7.6% (NFPA).
Flash Points	Closed Cup: -50 to -38°C (-58 to -36°F), ASTM D56 Standard Test Method for Flash Point by Tag Closed Tester.	Auto-Ignition Temperature	257°C (495°F) (NFPA).
Fire Hazards in Presence of Various Substances	Extremely flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Rapid escape of vapour may generate static charge causing ignition.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire. Vapours may form explosive mixtures with air.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), polynuclear aromatic hydrocarbons, phenols, smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 128, flammable/combustible liquid (non-polar/water-immiscible). CAUTION: This product has a very low flash point, use of water spray when fighting fire may be inefficient. SMALL FIRE: Use DRY chemicals, CO ₂ , water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions. DO NOT extinguish a leaking gas flame unless leak can be stopped. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. Avoid flushing spilled material into sewers, streams or other bodies of water. Self-contained breathing apparatus (SCBA) will be required if approaching the fire from downwind, or to enter enclosed areas or buildings.		

Section 6. Accidental Release Measures

Material Release or Spill	NAERG96, GUIDE 128, flammable/combustible liquid (non-polar/water-immiscible). Evacuate in a downwind direction for at least 300 meters (1000 feet). ELIMINATE ALL IGNITION SOURCES. Ventilate closed spaces before entering. By forced ventilation, maintain concentration of vapour below the range of explosive mixture. Avoid contact, fully-encapsulating, vapour-protective clothing should be worn for spills and leaks with no fire. Stop leak if without risk. Use vapour suppressing foam or water spray to reduce vapours; it may reduce vapour, but it may not prevent ignition in closed spaces; isolate area until vapour has dispersed. Contain spill. Absorb with inert absorbents such as dry clay, or diatomaceous earth, or recover using electrically grounded explosion-proof pumps. Avoid inhaling dust of diatomaceous earth for it may contain silica (very fine particle size), making this a potential respiratory hazard. Place used absorbent in closed metal containers for later disposal or burn absorbent in a suitable combustion chamber. DO NOT FLUSH TO SEWERS, STREAMS OR OTHER BODIES OF WATER. Check with applicable jurisdiction for specific disposal requirements of spilled material and empty containers. Notify the appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Keep away from heat, spark and other sources of ignition. Empty container may contain flammable/explosive residues or vapours. DO NOT reuse empty containers without commercial cleaning or reconditioning. Ground/bond line and equipment during pumping or transfer to avoid accumulation of static charge. DO NOT USE AS CLEANING FLUID OR SIPHON BY MOUTH. Wear proper protective equipment. Avoid inhalation and contact with skin or eyes. Practice good personal hygiene. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods.
Storage	Store in cool, dry, isolated, well-ventilated area, and away from direct sunlight, sources of ignition and incompatibles. Flammable materials should be stored in a separate safety storage cabinet or room. Ground all equipment containing material.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	- The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.

Respiratory Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.

Hands Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.

Feet Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Clear liquid.	Viscosity	Not available
Colour	Clear to slightly yellow, undyed liquid. May be dyed red for taxation purposes.	Pour Point	Not applicable.
Odour	Gasoline. MTBE has a terpene-like odour.	Softening Point	Not applicable.
Odour Threshold	Less than 1 ppm.	Dropping Point	Not applicable.
Boiling Point	25 to 220°C (77 to 428°F) Initial boiling point by ASTM D86 Standard Test Method.	Penetration	Not applicable.
Density	0.7 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	3 to 4 (Air = 1) (NFPA).	Ionicity (in water)	Insoluble in water.
Vapour Pressure	<107 kPa @ 37.8°C (100°F)	Dispersion Properties	Not available
Volatility	Volatile.	Solubility	Hydrocarbon components virtually insoluble in water. Soluble in alcohol, ether, chloroform, and benzene. Dissolves fats, oils and natural resins.

Section 10. Stability and Reactivity

Corrosivity	Non corrosive.		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, acids.	Decomposition Products	May release CO _x , NO _x , phenols, polynuclear aromatic hydrocarbons, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, and ingestion.		
Acute Lethality	<p>Gasoline: Acute oral toxicity (LD50): 13 600 mg/kg (rat). Acute dermal toxicity (LD50): >5000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >300 000 mg/m³/4h (rat).</p> <p>MTBE: Acute oral toxicity (LD50): 29630 mg/kg (rat). Acute dermal toxicity (LD50): >6800 mg/kg (rabbit). Acute inhalation toxicity (LC50): 23 576 ppm/4h (rat).</p>		
Chronic or Other Toxic Effects	<p>Dermal Route: This product can cause skin irritation. Prolonged or repeated contact with skin may cause dermatitis.</p> <p>Inhalation Route: Inhalation of vapours can be irritating to respiratory tract and cause CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconsciousness and possibly death.</p> <p>Oral Route: Swallowing or vomiting of the liquid may result in aspiration into the lungs. Can cause CNS depression. (See Inhalation Route for symptoms).</p> <p>Eye Irritation/Inflammation: Can cause irritation to the eyes.</p> <p>Immunotoxicity: Not available</p>		

Skin Sensitization:	This product is not expected to be a skin sensitizer, based on the available data and the known hazards of the components.
Respiratory Tract Sensitization:	This product is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.
Mutagenic:	This product is not considered to be a mutagen, based on the available data and the known hazards of the components.
Reproductive Toxicity:	This product is not considered to be a reproductive hazard, based on the available data and the known hazards of the components.
Teratogenicity/Embryotoxicity:	This product is not considered to be a teratogen or an embryotoxin, based on the available data and the known hazards of the components.
Carcinogenicity (ACGIH):	ACGIH A3: animal carcinogen. [Gasoline, MTBE]
Carcinogenicity (IARC):	IARC Group 2B: possibly carcinogenic to humans. [Gasoline]
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	Not available
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	Unleaded gasoline caused kidney effects in male rats and liver effects in female mice.

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks	Not available		

Section 13. Disposal Considerations

Waste Disposal	Preferred waste management priorities are: (1) recycle or reprocess; (2) incineration with energy recovery; (3) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations. Consult your local or regional authorities.
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Section 14. Transport Information

TDG Classification	GASOLINE, 3, UN1203, PGII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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Section 15. Regulatory Information

Other Regulations	<p>CEPA: This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List). EPA: All components of this formulation are listed on the US EPA-TSCA Inventory.</p> <p>This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR. Please contact Product Safety for more information.</p>																
DSD/DPD (Europe)	Not evaluated.	HCS (U.S.A.)	<p>CLASS: Contains material which may cause cancer.</p> <p>CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F).</p> <p>CLASS: Irritating substance.</p> <p>CLASS: Target organ effects.</p>														
ADR (Europe) (Pictograms)	<p>NOT EVALUATED FOR EUROPEAN TRANSPORT</p> <p>NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.</p>	DOT (U.S.A) (Pictograms)															
HMIS (U.S.A.)	<table border="1"> <tr> <td>Health Hazard</td> <td>2*</td> </tr> <tr> <td>Fire Hazard</td> <td>4</td> </tr> <tr> <td>Reactivity</td> <td>0</td> </tr> </table>	Health Hazard	2*	Fire Hazard	4	Reactivity	0	NFPA (U.S.A.)	<table border="1"> <tr> <td>Health</td> <td>2</td> <td>Fire Hazard</td> <td>4</td> </tr> <tr> <td></td> <td></td> <td>Reactivity</td> <td>0</td> </tr> </table>	Health	2	Fire Hazard	4			Reactivity	0
Health Hazard	2*																
Fire Hazard	4																
Reactivity	0																
Health	2	Fire Hazard	4														
		Reactivity	0														
		Rating	<p>0 Insignificant</p> <p>1 Slight</p> <p>2 Moderate</p>														

Personal Protection



Specific hazard

3 High

4 Extreme

Section 16. Other Information**References**

Available upon request.

* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists
 ADR - Agreement on Dangerous goods by Road (Europe)
 ASTM - American Society for Testing and Materials
 BOD5 - Biological Oxygen Demand in 5 days
 CAN/CGA B149.2 Propane Installation Code
 CAS - Chemical Abstract Services
 CEPA - Canadian Environmental Protection Act
 CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
 CFR - Code of Federal Regulations
 CHIP - Chemicals Hazard Information and Packaging Approved Supply List
 COD5 - Chemical Oxygen Demand in 5 days
 CPR - Controlled Products Regulations
 DOT - Department of Transport
 DSCL - Dangerous Substances Classification and Labeling (Europe)
 DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
 DSL - Domestic Substance List
 EEC/EU - European Economic Community/European Union
 EINECS - European Inventory of Existing Commercial Chemical Substances
 EPCRA - Emergency Planning and Community Right to Know Act
 FDA - Food and Drug Administration
 FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
 HCS - Hazardous Communication System
 HMIS - Hazardous Material Information System
 IARC - International Agency for Research on Cancer
 IRIS - Integrated Risk Information System
 LD50/LC50 - Lethal Dose/Concentration kill 50%
 LDLo/LCLo - Lowest Published Lethal Dose/Concentration
 NAERG'96 - North American Emergency Response Guide Book (1996)
 NFPA - National Fire Prevention Association
 NIOSH - National Institute for Occupational Safety & Health
 NPRI - National Pollutant Release Inventory
 NSNR - New Substances Notification Regulations (Canada)
 NTP - National Toxicology Program
 OSHA - Occupational Safety & Health Administration
 PEL - Permissible Exposure Limit
 RCRA - Resource Conservation and Recovery Act
 SARA - Superfund Amendments and Reorganization Act
 SD - Single Dose
 STEL - Short Term Exposure Limit (15 minutes)
 TDG - Transportation Dangerous Goods (Canada)
 TDLo/TCLo - Lowest Published Toxic Dose/Concentration
 TLm - Median Tolerance Limit
 TLV-TWA - Threshold Limit Value-Time Weighted Average
 TSCA - Toxic Substances Control Act
 USEPA - United States Environmental Protection Agency
 USP - United States Pharmacopoeia
 WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS**Fuels & Solvents:**

Western Canada, telephone: 403-296-4158; fax: 403-296-6551

Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228

Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 6/9/2004.

Data entry by Product Safety - RS.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
 	B-3, D-2B	   	

Section 1. Chemical Product and Company Identification	
Product Name	DIESEL FUEL
Synonym	Diesel 50, Diesel 50 LS, #1 Diesel, #1 Diesel LS, Diesel LC, Seasonal Diesel, Seasonal Diesel LS, Diesel AA, Domestic Marine Diesel, International marine Diesel, Seasonal Diesel Locomotive, Domestic Marine diesel LS, diesel -20°C (LS), LSD, Low Sulphur Diesel, dyed diesel, marked diesel, coloured diesel, Naval Distillate, Ultra Low Sulphur Diesel, ULS Diesel, Mining Diesel, Mining Diesel Special, Mining Diesel Special LS, High Flash Mining Diesel, Furnace Oil, Stove Oil.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3
Material Uses	Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining Diesel has a higher flash point requirement, for safe use in underground mines.
Code	W104, W293 SAP: 120, 121, 122, 287
Validated on	2/6/2004.
In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

Section 2. Composition and Information on Ingredients					
			<i>Exposure Limits (ACGIH)</i>		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
1) Diesel oil.	68334-30-5	>99.9	100 mg/m ³ (as total hydrocarbons) *	Not established	Not established
2) Proprietary additives.	Not available	<0.1	Not established	Not established	Not established
Aromatic content is 50% maximum (benzene: nil). Sulphur content is 0-0.50%.					
Manufacturer Recommendation	* Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.	
Potential Health Effects	Combustible liquid. Exercise caution when handling this material. Contact with this product may cause skin and eye irritation. Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.

Section 4. First Aid Measures	
Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Class II - combustible liquid (NFPA).	Flammable Limits	LOWER: 0.7%, UPPER: 6% (NFPA)
Flash Points	Diesel Fuel: Closed Cup: >40°C (>104°F) Marine Diesel Fuel: Closed Cup: >60°C (>140°F) Mining Diesel: Closed Cup: 52°C (126°F)	Auto-Ignition Temperature	225°C (437°F)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, or heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite. May accumulate in confined spaces.	Explosion Hazards in Presence of Various Substances	Containers may explode in heat of fire. Do not cut, weld, heat, drill or pressurize empty container. Vapour explosion hazard indoors, outdoors or in sewers. Runoff to sewer may create fire or explosion hazard.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NOx), sulphur oxides (SOx), sulphur compounds (H ₂ S), water vapour (H ₂ O), smoke and irritating vapours as products of incomplete combustion. See Section 11 (Other Considerations) for information regarding the toxicity of the combustion products.		
Fire Fighting Media and Instructions	<p>NAERG96, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a moderate flash point above 40°C: Use of water spray when fighting fire may be inefficient.</p> <p>If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions.</p> <p>SMALL FIRES: Dry chemical, CO₂, water spray or regular foam. LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk. Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.</p> <p>Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discoloration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.</p>		

Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Extinguish all ignition sources. Stop leak if safe to do so. Ventilate area. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid breathing vapours or mists of material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Evacuate non-essential personnel. Ensure clean-up personnel wear appropriate personal protective equipment. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	COMBUSTIBLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated. Avoid confined spaces and areas with poor ventilation. Ensure all equipment is grounded/bonded. Wear proper personal protective equipment (See Section 8).
Storage	Store away from heat and sources of ignition. Store in dry, cool, well-ventilated area. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.
Respiratory	Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.
Hands	Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Bright oily liquid.	Viscosity	1.3 - 4.1 cSt @ 40°C (104°F)
Colour	Clear to yellow / brown (may be dyed for taxation purposes).	Pour Point	Variable, -50°C to 0°C (-58°F to -32°F)
Odour	Petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	150 - 371°C (302-700°F)	Penetration	Not applicable.
Density	0.80 - 0.85 kg/L @ 15°C (59°F)	Oil / Water Dist. Coefficient	Not available
Vapour Density	4.5 (Air = 1)	Ionicity (In water)	Not applicable.
Vapour Pressure	Not available	Dispersion Properties	Not available
Volatility	Semivolatile to volatile.	Solubility	Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

Section 10. Stability and Reactivity

Corrosivity	Not available		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents and acids.	Decomposition Products	May release COx, NOx, SOx, H2S, H2O, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, and ingestion.		
Acute Lethality	Acute oral toxicity (LD50): 7500 mg/kg (rat).		
Chronic or Other Toxic Effects			
Dermal Route:	This product contains a component (at $\geq 1\%$) that can cause skin irritation. Therefore, this product is considered to be a skin irritant. Prolonged or repeated contact may defat and dry skin, and cause dermatitis. (See Other Considerations)		
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.		
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.		
Eye Irritation/Inflammation:	This product contains a component (at $\geq 1\%$) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.		
Immunotoxicity:	Not available		
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.		
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.		
Mutagenic:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.		
Reproductive Toxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.		
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at $\geq 0.1\%$ that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.		
Carcinogenicity (ACGIH):	ACGIH A3: animal carcinogen. [Diesel oil] (See Other Considerations)		
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as Group 1, 2A, or 2B carcinogens by IARC.		
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.		
Carcinogenicity (IRIS):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.		

Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer. Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	DIESEL FUEL, 3, UN1202, PGIII (CL-TDG)	Special Provisions for Transport	See Transportation of Dangerous Goods Regulations.
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Section 15. Regulatory Information

Other Regulations	This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List). All components of this formulation are listed on the US EPA-TSCA Inventory. All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS). This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR. Please contact Product Safety for more information.																												
DSD/DPD (Europe)	Not evaluated.	HCS (U.S.A.)	CLASS: Irritating substance. CLASS: Target organ effects. CLASS: Combustible liquid having a flash point between 37.8°C (100°F) and 93.3°C (200°F).																										
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	DOT (U.S.A) (Pictograms)																											
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		Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme																										

Section 16. Other Information

References	Available upon request. * Marque de commerce de Petro-Canada - Trademark
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Glossary

ACGIH - American Conference of Governmental Industrial Hygienists	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials (LDLo/LCLo - Lowest Published Lethal Dose/Concentration
BOD5 - Biological Oxygen Demand in 5 days	NAERG'96 - North American Emergency Response Guide Book (1996)
CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act	NSNR - New Substances Notification Regulations (Canada)
CFR - Code of Federal Regulations	NTP - National Toxicology Program
CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
COD5 - Chemical Oxygen Demand in 5 days	PEL - Permissible Exposure Limit
CPR - Controlled Products Regulations	RCRA - Resource Conservation and Recovery Act
DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSCL - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
	STEL - Short Term Exposure Limit (15 minutes)

DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	TDG - Transportation Dangerous Goods (Canada)
DSL - Domestic Substance List	TDL _o /TCL _o - Lowest Published Toxic Dose/Concentration
EEC/EU - European Economic Community/European Union	TL _m - Median Tolerance Limit
EINECS - European Inventory of Existing Commercial Chemical Substances	TLV-TWA - Threshold Limit Value-Time Weighted Average
EPCRA - Emergency Planning and Community Right to Know Act	TSCA - Toxic Substances Control Act
FDA - Food and Drug Administration	USEPA - United States Environmental Protection Agency
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	USP - United States Pharmacopoeia
HCS - Hazardous Communication System	WHMIS - Workplace Hazardous Material Information System
HMIS - Hazardous Material Information System	
IARC - International Agency for Research on Cancer	

For Copy of MSDSInternet: www.petro-canada.ca/msds

Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228

Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 2/6/2004.

Data entry by Product Safety - JDW.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	Not controlled		

Section 1. Chemical Product and Company Identification	
Product Name	CHAIN OIL (SUMMER, WINTER)
Synonym	Not available
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3
Material Uses	These products are designed for lubrication of chain saw chains in both high and low ambient temperatures.
Code	CHAS, 490-431 CHAW, 490-430
Validated on	5/6/2003.
In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

Section 2. Composition and Information on Ingredients					
			<i>Exposure Limits (ACGIH)</i>		
Name	CAS #	% (V/V)	TLV-TWA(8 h)	STEL	CEILING
1) Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum) and other proprietary, non-hazardous additives.	Mixture	100	5 mg/m ³ (oil mist)	10 mg/m ³ (oil mist)	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.	
Potential Health Effects	Non irritating to slight transient irritation to skin and eyes, but no permanent damage. Relatively non-toxic via ingestion. This product has a low vapour pressure and is not expected to present an Inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours or mists, inhalation of product may cause irritation of the breathing passages. For more information, refer to Section 11.

Section 4. First Aid Measures	
Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures			
Flammability	May be combustible at high temperature.	Flammable Limits	Not available
Flash Points	OPEN CUP: ≥168°C (334.4°F) (Cleveland)	Auto-Ignition Temperature	Not available
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO ₂), nitrogen oxides (NO _x), sulphur oxides (SO _x), sulphur compounds (H ₂ S), phosphorus compounds (PO _x), smoke and irritating vapours as products of incomplete combustion.		

Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, water spray or CO2. LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.
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Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store in dry, cool, well-ventilated area. Keep container tightly closed. Store away from incompatible and reactive materials (See section 5 and 10).

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection -	The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.
Respiratory	Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.
Hands	Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Stringy liquid.	Viscosity	CHAS: 155 cSt @ 40°C (104°F), 16.2 cSt @ 100°C (212°F), VI=109 CHAW: 32 @ 40°C (104°F), 6.29 cSt @ 100°C (212°F), VI=151
Colour	Dark red.	Pour Point	CHAS: -21°C (-6°F) CHAW: -42°C (-44°F)
Odour	Slight petroleum oil like.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	Not available	Penetration	Not applicable.
Density	0.831 - 0.88 kg/L @ 15°C (59°F).	Oil / Water Dist. Coefficient	Not available
Vapour Density	Not available	Ionicity (In water)	Not available
Vapour Pressure	Negligible at ambient temperature and pressure.	Dispersion Properties	Not available
Volatility	Non-volatile.	Solubility	Insoluble in water.

Section 10. Stability and Reactivity

Corrosivity	Copper corrosion, 3h, 100°C (ASTM D0130): 1a		
Stability	The product is stable under normal handling and storage conditions.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, reducing agents and acids.	Decomposition Products	May release COx, NOx, SOx, H2S, POx, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	Not available
Chronic or Other Toxic Effects	
Dermal Route:	Prolonged or repeated contact may cause skin irritation characterized by dermatitis or oil acne.
Inhalation Route:	Negligible breathing hazard at normal temperatures (up to 38°C) or recommended blending temperatures. Elevated temperatures or mechanical action may form vapours, mists or fumes. Inhalation of oil mists or vapours from hot oil may cause irritation of the upper respiratory tract.
Oral Route:	Low toxicity; has laxative effect.
Eye Irritation/Inflammation:	Repeated or prolonged contact may cause transient irritation, but no permanent damage.
Immunotoxicity:	Not available
Skin Sensitization:	This product is not expected to be a skin sensitizer, based on the available data and the known hazards of the components.
Respiratory Tract Sensitization:	This product is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.
Mutagenic:	This product is not expected to be a mutagen, based on the available data and the known hazards of the components.
Reproductive Toxicity:	This product is not expected to be a reproductive hazard, based on the available data and the known hazards of the components.
Teratogenicity/Embryotoxicity:	This product is not expected to be a teratogen or an embryotoxin, based on the available data and the known hazards of the components.
Carcinogenicity (ACGIH):	This product is not known to contain any chemicals at reportable quantities that are listed as A1 or A2 carcinogens by ACGIH.
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as group 1, 2A or 2B carcinogens by IARC.
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	Not available
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	No additional remark

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not controlled under TDG (Canada).	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations	This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).																						
	All components of this formulation are listed on the US EPA-TSCA Inventory.																						
	All components of this formulation are listed on EINECS or are exempt.																						
	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.																						
	Please contact Product Safety for more information.																						
DSD/DPD (Europe)	Not classified under the Dangerous Substances or Dangerous Preparations Directives.	HCS (U.S.A.)	Not controlled under the HCS (United States).																				
ADR (Europe) (Pictograms)		DOT (U.S.A) (Pictograms)																					
HMIS (U.S.A.)	<table border="1"> <tr> <td>Health Hazard</td> <td>1</td> </tr> <tr> <td>Fire Hazard</td> <td>1</td> </tr> <tr> <td>Reactivity</td> <td>0</td> </tr> <tr> <td>Personal Protection</td> <td>B</td> </tr> </table>	Health Hazard	1	Fire Hazard	1	Reactivity	0	Personal Protection	B	NFPA (U.S.A.)	<table border="1"> <tr> <td>Health</td> <td>1</td> <td>Fire Hazard</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td>Reactivity</td> <td>0</td> </tr> <tr> <td></td> <td></td> <td>Specific hazard</td> <td></td> </tr> </table>	Health	1	Fire Hazard	0			Reactivity	0			Specific hazard	
Health Hazard	1																						
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Health	1	Fire Hazard	0																				
		Reactivity	0																				
		Specific hazard																					
		Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme																				

Section 16. Other Information

References	Available upon request. * Marque de commerce de Petro-Canada - Trademark
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Glossary

ACGIH - American Conference of Governmental Industrial Hygienists	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials (LDLo/LCLo - Lowest Published Lethal Dose/Concentration
BOD5 - Biological Oxygen Demand in 5 days	NAERG'96 - North American Emergency Response Guide Book (1996)
CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act	NSNR - New Substances Notification Regulations (Canada)
CFR - Code of Federal Regulations	NTP - National Toxicology Program
CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
COD5 - Chemical Oxygen Demand in 5 days	PEL - Permissible Exposure Limit
CPR - Controlled Products Regulations	RCRA - Resource Conservation and Recovery Act
DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSCL - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	STEL - Short Term Exposure Limit (15 minutes)
DSL - Domestic Substance List	TDG - Transportation Dangerous Goods (Canada)
EEC/EU - European Economic Community/European Union	TDLo/TCLo - Lowest Published Toxic Dose/Concentration
EINECS - European Inventory of Existing Commercial Chemical Substances	Tm - Median Tolerance Limit
EPCRA - Emergency Planning and Community Right to Know Act	TLV-TWA - Threshold Limit Value-Time Weighted Average
FDA - Food and Drug Administration	TSCA - Toxic Substances Control Act
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	USEPA - United States Environmental Protection Agency
HCS - Hazardous Communication System	USP - United States Pharmacopoeia
HMIS - Hazardous Material Information System	WHMIS - Workplace Hazardous Material Information System
IARC - International Agency for Research on Cancer	

For Copy of MSDSInternet: www.petro-canada.ca**Lubricants:**

Western Canada, telephone: 1-800-661-1199; fax: (780) 464-8564
 Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285
 Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 800-201-6285

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - JDW on 5/6/2003.

Data entry by Product Safety - JDW.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	D-2A, D-2B		

Section 1. Chemical Product and Company Identification	
Product Name ANTIFREEZE	Code W269
Synonym Universal Antifreeze, Radiator Antifreeze, Diesel Antifreeze, Petro-Canada Antifreeze-Coolant, Petro-Canada Heavy Duty Antifreeze-Coolant, Pre-Mix Antifreeze, Petro-Canada Premium Radiator Antifreeze, Diesel Engine Coolant.	Validated on 7/6/2004.
Manufacturer PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	In case of Emergency Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses Used as an engine antifreeze coolant.	

Section 2. Composition and Information on Ingredients					
			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Ethylene glycol	107-21-1	≥90	Not established	Not established	100 mg/m ³ (aerosol)
Sodium tetraborate pentahydrate (Diesel Engine Coolant only)	12179-04-3	≤5	1 mg/m ³	Not established	Not established
Manufacturer Recommendation	Not applicable				
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.				

Section 3. Hazards Identification.	
Potential Health Effects	Contact with this product may cause eye irritation. Not expected to cause more than slight skin irritation. Inhalation of this product may cause respiratory tract irritation. Ingestion may be extremely hazardous. May cause teratogenicity/embryotoxicity. May cause damage to reproductive organs. For more information refer to Section 11 of this MSDS.

Section 4. First Aid Measures	
Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section 5. Fire-fighting Measures	
Flammability	May be combustible at high temperature.
Flash Points	Closed Cup: 116°C (241°F) (Tagliabue) Open Cup: 116°C (241°F) (Cleveland)
Flammable Limits	Lower: 3.2%, Upper: 15.3%
Auto-ignition Temperature	413°C (775°F)

Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.	Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, drill or pressurize empty container.
Products of Combustion	Carbon oxides (CO, CO ₂), smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard). If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, water spray or CO ₂ . LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.		

Section 6. Accidental Release Measures

Material Release or Spill	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Ventilate area. Ensure clean-up personnel wear appropriate personal protective equipment. Avoid breathing vapours or mists of material. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately.
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Section 7. Handling and Storage

Handling	Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid confined spaces and areas with poor ventilation. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Do not ingest this product. Wear proper personal protective equipment (See Section 8). Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store in dry, cool, well-ventilated area. Store away from heat and sources of ignition. Keep container tightly closed. Store away from incompatible and reactive materials (See section 5 and 10).

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	- The selection of personal protective equipment varies, depending upon conditions of use.
Eyes	Chemical splash goggles should be worn when handling this material.
Body	If this material may come into contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information).
Respiratory	A minimum of NIOSH-approved air-purifying respirator with a organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): Neoprene, Polyvinyl chloride (PVC). Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Clear viscous liquid.	Viscosity	Not available
Colour	Green.	Pour Point	Not available
Odour	Odourless.	Softening Point	Not applicable.
Odour Threshold	Not available	Dropping Point	Not applicable.
Boiling Point	129 to 197°C (264 to 387°F)	Penetration	Not applicable.
Density	1.115 to 1.145 (Water = 1)	Oil / Water Dist. Coefficient	Not available
Vapour Density	2.1 (Air=1).	Ionicity (in water)	Not available
Vapour Pressure	0.06 mmHg @ 20°C (68°F).	Dispersion Properties	Not available
Volatility	0% (w/w)	Solubility	Soluble in water, methanol and diethyl ether.

Section 10. Stability and Reactivity

Corrosivity	Not available		
Stability	The product is stable.	Hazardous Polymerization	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, acids, alkalis, perchloric acid, phosphorus, silvered copper wires carrying DC current, aliphatic amines, isocyanates, chlorosulfonic acid and oil.	Decomposition Products	May release CO _x , smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	<u>Ethylene glycol (107-21-1):</u> LD50: 4700 mg/kg (oral/rat). LD50: 9530 mg/kg (dermal/rabbit). <u>Sodium tetraborate pentahydrate (12179-04-3):</u> LD50: 3200-3500 mg/kg (oral/rat) (Boric acid). [Sodium tetraborate pentahydrate]
Chronic or Other Toxic Effects	
Dermal Route:	<u>Short-term exposure is expected to cause only slight irritation, if any.</u>
Inhalation Route:	<u>Inhalation of this product may cause respiratory tract irritation.</u>
Oral Route:	<u>Extremely dangerous in case of ingestion.</u>
Eye Irritation/Inflammation:	<u>This product contains a component (at >= 1%) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.</u>
Immunotoxicity:	<u>Not available</u>
Skin Sensitization:	<u>Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.</u>
Respiratory Tract Sensitization:	<u>Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.</u>
Mutagenic:	<u>This product is not known to contain any components at >= 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.</u>
Reproductive Toxicity:	<u>Borates are possible reproductive toxins based upon available animal ingestion studies in several species. These studies usually involved high doses, over prolonged periods of time. A human study following occupational exposure to borate by inhalation concluded that, no adverse effects to reproduction were found in this population, under the conditions of this study.</u>
Teratogenicity/Embryotoxicity:	<u>This product contains a component(s) at >= 0.1% that has been shown to cause teratogenicity and/or embryotoxicity in laboratory tests. Therefore, this product is considered to be a teratogen/embryotoxin (Ethylene glycol).</u>

Carcinogenicity (ACGIH):	ACGIH A4: not classifiable as a human carcinogen (Ethylene glycol). This product is not known to contain any chemicals at reportable quantities that are listed as Group A1, A2, or A3 carcinogens by ACGIH.
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as Group 1, 2A, or 2B carcinogens by IARC.
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	The substance may be toxic to kidneys and liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 12. Ecological Information

Environmental Fate	Not available	Persistence/ Bioaccumulation Potential	Not available
BOD5 and COD	Not available	Products of Biodegradation	Not available
Additional Remarks No additional remark.			

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.
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Section 14. Transport Information

TDG Classification	Not a hazardous material for transport according to the TDG Regulations. (Canada)	Special Provisions for Transport	Not applicable.
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Section 15. Regulatory Information

Other Regulations	All of the components of this product are on the Domestic Substances List (DSL), are considered to be on the DSL, or are exempt from the New Substance Notification (NSN) requirements. All components of this formulation are listed on the US EPA-TSCA Inventory. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR. Please contact Product Safety for more information.																						
DSD/DPD (Europe)	Not evaluated.	HCS (U.S.A.)	CLASS: Target organ effects. CLASS: Irritating substance.																				
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	DOT (U.S.A) (Pictograms)																					
HMIS (U.S.A.)	<table border="1"> <tr> <td>Health Hazard</td> <td>2</td> </tr> <tr> <td>Fire Hazard</td> <td>1</td> </tr> <tr> <td>Reactivity</td> <td>0</td> </tr> <tr> <td>Personal Protection</td> <td>H</td> </tr> </table>	Health Hazard	2	Fire Hazard	1	Reactivity	0	Personal Protection	H	NFPA (U.S.A.)	<table border="1"> <tr> <td>Health</td> <td>2</td> <td>Fire Hazard</td> <td>1</td> </tr> <tr> <td></td> <td></td> <td>Reactivity</td> <td>0</td> </tr> <tr> <td colspan="4">Specific hazard</td> </tr> </table>	Health	2	Fire Hazard	1			Reactivity	0	Specific hazard			
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		Reactivity	0																				
Specific hazard																							
		Rating	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme																				

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists	IRIS - Integrated Risk Information System
ADR - Agreement on Dangerous goods by Road (Europe)	LD50/LC50 - Lethal Dose/Concentration kill 50%
ASTM - American Society for Testing and Materials	LDLo/LCLo - Lowest Published Lethal Dose/Concentration
BOD5 - Biological Oxygen Demand in 5 days	NAERG'96 - North American Emergency Response Guide Book (1996)
CAN/CGA B149.2 Propane Installation Code	NFPA - National Fire Prevention Association
CAS - Chemical Abstract Services	NIOSH - National Institute for Occupational Safety & Health
CEPA - Canadian Environmental Protection Act	NPRI - National Pollutant Release Inventory
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act	NSNR - New Substances Notification Regulations (Canada)
CFR - Code of Federal Regulations	NTP - National Toxicology Program
CHIP - Chemicals Hazard Information and Packaging Approved Supply List	OSHA - Occupational Safety & Health Administration
COD5 - Chemical Oxygen Demand in 5 days	PEL - Permissible Exposure Limit
CPR - Controlled Products Regulations	RCRA - Resource Conservation and Recovery Act
DOT - Department of Transport	SARA - Superfund Amendments and Reorganization Act
DSCL - Dangerous Substances Classification and Labeling (Europe)	SD - Single Dose
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)	STEL - Short Term Exposure Limit (15 minutes)
DSL - Domestic Substance List	TDG - Transportation Dangerous Goods (Canada)
EEC/EU - European Economic Community/European Union	TDL _o /TCL _o - Lowest Published Toxic Dose/Concentration
EINECS - European Inventory of Existing Commercial Chemical Substances	TLM - Median Tolerance Limit
EPCRA - Emergency Planning and Community Right to Know Act	TLV-TWA - Threshold Limit Value-Time Weighted Average
FDA - Food and Drug Administration	TSCA - Toxic Substances Control Act
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	USEPA - United States Environmental Protection Agency
HCS - Hazardous Communication System	USP - United States Pharmacopoeia
HMIS - Hazardous Material Information System	WHMIS - Workplace Hazardous Material Information System
IARC - International Agency for Research on Cancer	

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Internet: www.petro-canada.ca/msds

Fuels & Solvents:

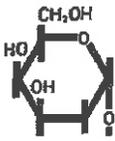
Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228
Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - TLM on 7/6/2004.

Data entry by Product Safety - RS.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Poly-Drill Drilling Systems

1824 - 104 Avenue, S.W.
Calgary, Alberta, Canada T2W-OA8
(403) 259-5112 FAX (403) 255-7185
email: polydril@telus.net
www.poly-drill.com

poly-drill.com



MATERIAL SAFETY DATA SHEET/FICHE SIGNALÉTIQUE

1. PRODUCT IDENTIFICATION

PRODUCT TRADE NAME(S): Poly Drill O.B.X.
WHMIS CLASSIFICATION: Non-regulated
TDG Classification: Non dangerous goods
DATE: January 17, 2004

A liquid polymer containing guar gum, mineral oil, vegetable oil, acrylamide copolymer and a surfactant: Evaluation of the ingredient(s) has found no ingredient(s) hazardous as per WHMIS regulations.

2. PHYSICAL DATA

Boiling Point: Not available
Specific Gravity: 0.9 g/cm
Solubility in Water: disperses in water(forms viscous, slippery solution).
pH: 3.8 (1% concentration)
Density (g/ml): Not available
Physical State: Liquid
Appearance and Odor: Brown. Odor slight.

3. FIRE AND EXPLOSION DATA

Flash Point (method used): (PMCC) greater than 100 C.
Conditions of flammability: Very low risk.
Hazardous combustion products: None known.
Upper and Lower flammable limits: Not available.
Extinguishing media: Carbon dioxide, dry chemicals, foam, in preference to water spray

4. REACTIVITY

Chemical stability: Stable under normal conditions.
Hazardous Polymerization: Will not occur.
Incompatible substances: Avoid strong oxidants such as liquid chlorine, concentrated oxygen, sodium or calcium hypo chloride.
Hazardous decomposition products: None known

5. HEALTH HAZARD DATA

TOXICITY RATING: Practically non-harmful.

Routes of Exposure and Effects:

SKIN: Slight irritant: prolonged contact may cause skin irritation or dermatitis in some individuals

EYE: No effects of exposure expected with the exception of possible irritation.

INHALATION: Due to low volatility of mineral distillates a small inhalation hazard exists.

INGESTION: can cause nausea, vomiting, cramps, diarrhea
Chronic exposure limits: None
Sensitization of product: Not suspected to be a sensitizer.
Teratogenicity: Not available.
Mutagenicity: Not available.
Carcinogenicity: None of the components of this product are listed as carcinogens by IARC and ACGIH

6. EMERGENCY AND FIRST AID PROCEDURES

SKIN: Wash exposed area with soap and water. Remove contaminated clothing. Launder contaminated clothing before re-use. If irritation or abnormalities persist, call a physician.

EYE: Immediately flush eyes with water for 15 minutes, lifting upper and lower lids occasionally. Get medical attention.

INHALATION: Remove to fresh air. If breathing becomes difficult, give oxygen and call a physician.

INGESTION: Do not induce vomiting: Call a physician immediately or poison control center. Never give anything by mouth to an unconscious person. Seek medical advice.

8. INDUSTRIAL HYGIENE CONTROL MEASURES

Respiratory Protection: None normally required.

Ventilation: If mist and/or vapors are present, use air purifying respirator or self-contained breathing apparatus, but this is rarely required.

Eye Protection: Safety glasses, if personally preferred

Gloves: Generally not necessary. Personal preference.

7. HANDLING AND USE PRECTIONS

Storage requirements: keep container closed when not in use. Store in a cool dry location away from oxidizing and reducing agents.

Waste Disposal: product should be disposed of in accordance with applicable local, Provincial and Federal regulations.

Steps must be taken if product is released or spilled: clean spill areas thoroughly to avoid hazardous slippery conditions.

8. TOXICOLOGICAL PROPERTIES

G50 Microtox Analysis prepared by HydroQual Laboratories, Calgary, AB--97/6/26 Test#970978:

Test Description	EC20	EC50	Pass/Fail
MTX	>91	>91	PASS

9. DEPARTMENT OF TRANSPORTATION INFORMATION

Shipping Name: Liquid Drilling Additive

Hazard Class: Not hazardous

Hazardous Substances: None

Cautionary Labeling: None required

SECTION I-MATERIAL IDENTIFICATION AND USE

Material Name/Identifier:	Supreme Fuel Injector G.L.A.F. & Conditioner	Stock No.	409/412/414/415/418
Manufacturer's Name:	Kleen-Flo Tumbler Industries Ltd	Street Address:	75 Advance Blvd.
City:	Brampton	Province:	Ontario
Postal Code:	L6T 4N1	Emergency Phone #:	(905) 793-4311
Chemical Name:	N/A (mixture)	Chemical Family:	Blend of aliphatic alcohol
Chemical Formula:	N/A	Trade Names & Synonyms:	& aromatic hydrocarbons
Material Use:	Solvent/Cleaner	Molecular Weight:	N/A

SECTION II-HAZARDOUS INGREDIENTS OF MATERIAL

Hazardous Ingredients	C.A.S.	Approximate Concentration	LD50 Species & Route	LC50 Species & Route
2-propanol	67-63-0	60-90%	4.72 g/kg rat-oral	>12000 ppm (8hr) rat-inh.
xylene	1330-20-7	10-30%	4300 mg/kg rabbit-derma	> 6700 ppm (4hr) rat-inh.
ethyl benzene	100-41-4	1-5%	3.5 g/kg rat-oral	N/A

SECTION III-PHYSICAL DATA FOR MATERIAL

Physical State:	Liquid	Odour/Appearance:	Alcohol odour; clear, red liquid
Specific Gravity:	0.8 @15°C	Odour Threshold(p.p.m.):	N/A
Boiling Point:	82-137°C	Evaporation Rate:	N/A
Freezing Point:	N/A	Solubility in Water:	40%
% Volatile(by volume):	100%	Vapour Pressure(mm)Hg:	4.4 kPa @ 20°C
Vapour Density(Air=1):	2.2	Coefficient of Water/Oil Distribut:	N/E
pH	N.Ap.		

SECTION IV-FIRE AND EXPLOSION HAZARD OF MATERIAL

Flammability Yes/No	Yes	If yes under which conditions:	heat, open flame and sparks
Auto Ignition Temperature:	N/A	Means of Extinction:	carbon dioxide, alcohol foam
Flashpoint and Method:	11°C TCC		Carbon dioxide or dry chemical for small fires.
		Hazardous Combustion Products:	carbon monoxide and carbon dioxide
Upper Flammable limit (% by volume):	12%	Lower Flammable Limit(% by volume):	2%
Explosion Data:	Sensitivity of mechanical impact: Yes	Sensitivity to Static Discharge: Electrical & mechanical	equipment should be explosion proof.

SECTION V-REACTIVITY DATA

Chemical Stability Yes/No:	Yes	If NO under which conditions?	N.Ap.
Incompatibility to Other Substances Yes/No:	Yes	If so which ones?	strong oxidizing compounds. May react with aluminum at high temperature.
Reactivity and under what conditions?	Normally stable, but can become unstable at elevated temperatures & pressure		
Hazardous Decomposition Products:	Carbon monoxide, carbon dioxide produced upon combustion.		

N/E: not established

N.Ap.: not applicable

N/A: not available

SECTION VI-TOXICOLOGICAL PROPERTIES OF PRODUCT

Route of Entry: ALL Routes	--SKIN CONTACT --SKIN ABSORPTION --EYE CONTACT --INHALATION --INGESTION	
Effects of Acute Exposure:	Slight eye irritation. May cause headache, dizziness, nausea, drowsiness and central nervous system depression.	
Effects of Chronic Exposure:	High exposure to dimethylbenzene in some animal studies have been reported to cause health effects on developing embryo/fetus. Their effects were often at levels toxic to the mother. The significance of these findings to humans has not been determined.	
LD 50 of Product:	5840 mg.kg rat-oral	LC 50 of Product: > 12000 ppm (8hr) rat
Irritancy of Product:	Skin and eye irritant	Exposure Limits of Product: 400 ppm- I.P.A.
Sensitization of Product:	N/A	2-propanol- 100 ppm, xylene- 100 ppm
		Toxicologically Synergistic Materials: N/A
--CARCINOGENICITY --REPRODUCTIVE EFFECTS --TERATOGENICITY --MUTAGENICITY		none known

SECTION VII-PREVENTIVE MEASURES

Personal Protective Equipment to be used:

Gloves(specify):	Nitrile, Viton, Polyethylene	Eye(specify):	Chemical safety glasses
Respiratory(specify):	Organic canister mask	Clothing:	Not required
Respiratory Protection:	If used indoors or on a continuous basis, use of cartridge type respirator is recommended		
Engineering Controls:	To maintain TLV; electrical and mechanical equipment should b spark proof.		
Leak and Spill Procedure:	Dry and contain spill. Soak residue with natural absorbent.		
Waste Disposal:	Incinerate or dispose of at an approved waste disposal facility.		
Storage Requirements:	Keep in a cool place.		
Handling Procedures and Equipment:	Handle with care. Keep away from children. Do not inhale or ingest.		
TDG Classification:	#409 & 412: Consumer commodity		
	#414 & 415 & 418: Flammable liquids, N.O.S.(2-propanol solution), Class 3, UN1993,Pkg. Grp. II		
WHMIS Classification:	Consumer Commodity #409/412; Class B2, D2B & D2A for #414, 415 &418		
Domestic substance list:	All components of this product are either on the DSL or exempt.		

SECTION VIII-FIRST AID MEASURES

Eye:	Wash with water for at least 15 minutes.
Skin:	Wash with soap and water.
Inhalation:	Move patient to fresh air and restore breathing if required. Call a physician.
Ingestion:	Contains petroleum distillate. Do NOT induce vomiting. Guard against aspiration. Seek medical help.

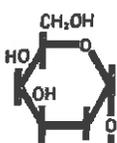
SECTION IX-PREPARATION DATE OF M.S.D.S.

Additional Info/Comments:		Sources Used: NOISH Registry of Toxic Effects of Chemical Sut
Phone Number:	(905) 793-4311	Prepared By: Quality Control Laboratory
Date:	March 3, 2003	Kleen-Flo Tumbler Industries Limited

THIS SHEET SUPERSEDES ANY OTHER M.S.D.S. PREVIOUSLY PREPARED

N/A: not available

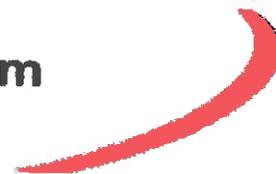
N/E: not established



Poly-Drill Drilling Systems

1824 - 104 Avenue, S.W.
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(403) 259-5112 FAX (403) 255-7185
email: polydril@telus.net
www.poly-drill.com

poly-drill.com



MATERIAL SAFETY DATA SHEET/FICHE SIGNALÉTIQUE

1. PRODUCT IDENTIFICATION

PRODUCT TRADE NAME: Poly-Drill 133-X
PRODUCT DESCRIPTION: LIQUID ANIONIC POLYMER
CHEMICAL DESCRIPTION: Polymer, Surfactant(s), Water, Hydrocarbon solvent
UPDATED: March 15, 2004

NFPA704M/HMIS RATING

HEALTH: 0/1 FLAMMABILITY: 1/1 REACTIVITY: 0/0 OTHER:
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

2. COMPOSITION

A liquid polymer: Evaluation of the ingredient(s) has found no ingredient(s) hazardous as per WHMIS regulations. None of the substances in this product are hazardous.

3. PHYSICAL DATA

Flash Point: >100°C (PMCC)
Specific Gravity (@ 25°C.): 1.08
Solubility in Water: Emulsifiable
pH: 8.1 (1.0% solution)
Freeze Point: -10 °C (14 Degrees F)
Density (g/ml): 1.08 at 25 °C
Physical State: Liquid
Appearance: Blue liquid
Odor: Hydrocarbon

Note: These physical properties are typical values for this product.

4. FIRE AND EXPLOSION DATA

INCOMPATIBILITY: Avoid contact with strong oxidizers (eg. Chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, oxides of carbon (CO_x), oxides of nitrogen (NO_x) may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

5. FIRE FIGHTING MEASURES

FLASH POINT: >100°C (PMCC)

EXTINGUISHING MEDIA: Based on the NFPA guide, use dry chemical, foam, carbon dioxide or other extinguishing agent suitable for Class B fires. Use water to cool containers exposed to fire. For larger fires, use water spray or fog, thoroughly drenching the burning material.

UNSUITABLE EXTINGUISHING MEDIA:
Do not use water unless flooding amounts are available.

UNUSUAL FIRE AND EXPLOSION HAZARD: May evolve oxides of nitrogen (NOx) under fire conditions.

6. HEALTH HAZARD DATA

EMERGENCY OVERVIEW:

CAUTION: May cause irritation to skin and eyes. Avoid contact with skin, eyes and clothing. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

PRIMARY ROUTE(S) OF EXPOSURE: Eye & Skin

EYE CONTACT: Can cause mild to moderate irritation
SKIN CONTACT: Can cause mild, short-lasting irritation

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS: A review of available data does not identify any worsening of existing conditions.

7. EMERGENCY AND FIRST AID PROCEDURES

SKIN: Wash exposed area with soap and water. If irritation or abnormalities persist, call a physician.

EYE: Immediately flush eyes with water for 15 minutes, if irritation or abnormalities persist, call a physician.

INHALATION: Remove to fresh air. If breathing becomes difficult, give oxygen and call a physician.

INGESTION: Do not induce vomiting: Call a physician immediately.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water. Call for medical assistance immediately.

8. HANDLING, ACCIDENTAL RELEASE MEASURES & DISPOSAL CONSIDERATIONS

Storage: Keep container tightly closed when not in use.

DISPOSAL:
In Ontario, the waste class under Regulation 347 is: 233L

SMALL SPILLS:
Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area.

LARGE SPILLS:
Contain liquid using absorbent material, by digging trenches or by dyking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated.

Dispose of wastes in an approved incinerator or waste treatment/disposal site, in accordance with all applicable regulations. Do not dispose of wastes in local sewer or with normal garbage.

ENVIRONMENTAL PRECAUTIONS

This product should NOT be directly discharged into lakes, ponds, streams, waterways or public water supplies.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be incinerated in accordance with local, state, provincial and federal regulations.

9. INDUSTRIAL HYGIENE CONTROL MEASURES

OCCUPATIONAL EXPOSURE LIMITS:

This product does not contain any substance that has an established exposure limit.

Respiratory Protection: None normally required.

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a positive pressure, self-contained breathing apparatus is recommended.

Ventilation: General ventilation is recommended.

Eye Protection: Safety glasses, if personally preferred

Gloves: Generally not necessary. Personal preference. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, viton, and butyl (compatibility studies have not been performed).

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

10. TOXICOLOGICAL PROPERTIES

SENSITIZATION:

This product is not expected to be a sensitizer.

A "LC50-96" Pass/Fail Bioassay test. This test determines the lethality of a fluid on young aquatic organisms. The fluid fails if 50% or more of the animals are dead after 96 hours in the fluid.

96 hour static acute LC50 to Rainbow Trout = Greater than 1,000 mg/L

96 hour no observed effect concentration = 125 mg/L based on no mortality or abnormal effects

96 hour static acute LC50 to Sheepshead Minnow = Greater than 1,000 mg/L

96 hour no observed effect concentration = 1,000 mg/L (highest concentration tested) based on no mortality or abnormal effects.

96 hour static acute LC50 to Mysid Shrimp = 400 mg/L

96 hour no observed effect concentration = 180 mg/L based on no mortality or abnormal effects.

96 hour static acute LC50 to Daphnia Magna - 400 mg/L

96 hour no observed effect concentration = 56 mg/L (lowest concentration tested) based on no mortality or abnormal effects.

Microtoxicity

The Microtox bioassay has been established as the reference test for mud additive toxicity testing.

Test Method: Luminescent Bacteria, IC50@ 15 min

Reference: Appendix 1: Microtox Bioassay Procedure, Drilling Waste Management, Guide G50. 1993. Alberta Energy and Utilities Board, Calgary, AB, Canada.

Sample: Poly Drill 1330, sample #97324-1 for test #970723, 97/05/09 by D. Lintott

Preparation: Sample was diluted to 2 g/L, which formed thick, slightly cloudy liquid. The sample was then centrifuged for 1 hour.

Test Results:

SAMPLE	TREATMENT	%CTL	IC20%	IC50	RESULT
97324-1	None	N/A	14 (9-22)	>91	PASS

The following results are for a 1% aqueous solution of product.

CARCINOGENICITY:

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Government Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION:

Based on our Hazard Characterization, the potential human hazard is: LOW

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION:

Based on our Hazard Characterization, the potential environmental hazard is: LOW.

11. DEPARTMENT OF TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

Shipping Name: Liquid Drilling Additive

Hazard Class: Not hazardous

Cautionary Labeling: None required

14. OTHER INFORMATION

This information contained herein is given in good faith, but no warranty, expressed or implied is made



MATERIAL SAFETY DATA SHEET

Date Prepared: November 14, 2003
Supersedes: April 12, 2001
MSDS Number: 12232

1. PRODUCT INFORMATION

Product Identifier: EPIC EP MOLY GREASE

Application and Use:
Lubricating grease

Product Description:

A grease, a mixture of lubricating oil, soap and additives.

REGULATORY CLASSIFICATION

WHMIS:
Not a controlled product

CEPA: CANADIAN ENVIRONMENTAL PROTECTION ACT
All components of this product are either on the Domestic Substances List (DSL), exempt, or have been notified under CEPA.

TDG INFORMATION (RAIL/ROAD):
Not Regulated in Canada.

Please be aware that other regulations may apply.

TELEPHONE NUMBERS

Emergency 24 hr. (519) 339-2145
Technical Info. (800) 268-3183

MANUFACTURER/SUPPLIER:

IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(416) 968-4441

2. REGULATED COMPONENTS

The following components are defined in accordance with sub-paragraph 13(a) (i) to (iv) or paragraph 14(a) of the Hazardous Products Act:

NAME	%	CAS #
Not applicable		

3. TYPICAL PHYSICAL & CHEMICAL PROPERTIES

Physical State: Liquid
 Specific gravity: 0.930 at 15.6 deg C/15.6 deg C
 Viscosity: >20.00 cSt at 40 deg C
 Vapour Density: not available
 Boiling Point: 249 deg C
 Evaporation rate: 0.1 (1= n-butylacetate)
 Solubility in water: NEGLIGIBLE
 Freezing/Pour Point: 230 deg C DROP
 Odour Threshold: not available
 Vapour Pressure: <0.01 kPa at 20 deg C
 Appearance/odour: Black paste, petroleum odour.

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

Negligible hazard at normal temperatures (up to 38 deg C).
 Elevated temperatures or mechanical action may form vapours, mists or fumes which may be irritating to the eyes, nose, throat and lungs.
 Avoid breathing vapours or mists.

EYE CONTACT:

Slightly irritating, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity.
 Frequent or prolonged contact may irritate the skin.
 High pressure greasing equipment is capable of injecting grease under the skin which may have severe health consequences.

INGESTION:

Low toxicity.

ACUTE TOXICITY DATA:

Based on animal testing data from similar materials and products,

the acute toxicity of this product is expected to be:

Oral : LD50 > 5000 mg/kg (Rat)
Dermal : LD50 > 3160 mg/kg (Rabbit)
Inhalation : LC50 > 5000 mg/m3 (Rat)

OCCUPATIONAL EXPOSURE LIMIT:

ACGIH recommends:

For insoluble Molybdenum compounds, 10 mg/m3.
For oil mists, 5 mg/m3.

Local regulated limits may vary.

5. FIRST AID MEASURES

INHALATION:

In case of adverse exposure to vapours, mists and/or fumes formed at elevated temperature, or by mechanical action, immediately remove the affected victim from exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Flush with large amounts of water. Use soap if available. Remove severely contaminated clothing (including shoes) and launder before reuse. If irritation persists, seek medical attention. Consult a physician immediately if the material is injected under the skin from the misuse of high pressure greasing equipment.

INGESTION:

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon conditions of use. In open systems where contact is likely, wear safety goggles, chemical-resistant overalls, and chemically impervious gloves. Where only incidental contact is likely, wear safety glasses with side shields. No other special precautions are necessary provided skin/eye

contact is avoided.

Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

ENGINEERING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

HANDLING, STORAGE AND SHIPPING:

Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials. In keeping with good personal hygiene practices, wash hands thoroughly after handling the material. Empty containers may contain product residue. Do not pressurize cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.

LAND SPILL:

Eliminate source of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard. Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Allow material to solidify and scrape up. Place material in suitable containers for recycle or disposal. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

WATER SPILL:

Remove from surface by skimming or with suitable absorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters. Consult an expert on disposal of recovered material. Ensure disposal in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

7. FIRE AND EXPLOSION HAZARD

Flashpoint and method: 145 deg C COC ASTM D92

Autoignition: NA Flammable Limits: LEL: NA UEL: NA

GENERAL HAZARDS:

Low Hazard; liquids may burn upon heating to temperatures at or above the flash point.

Toxic gases will form upon combustion.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off fuel to fire.

Use foam, dry chemical or water spray to extinguish fire.

Respiratory and eye protection required for fire fighting personnel.

Avoid spraying water directly into storage containers due to danger of boilover.

A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.

HAZARDOUS COMBUSTION PRODUCTS:

Fumes, smoke, carbon monoxide, sulfur oxides, nitrogen oxides, phosphorus oxides, aldehydes and other decomposition products, in the case of incomplete combustion

Various metal oxides

8. REACTIVITY DATA

STABILITY:

This product is stable. Hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents

HAZARDOUS DECOMPOSITION:

none

9. NOTES

All components of this product are listed on the U.S. TSCA inventory.

REVISION SUMMARY:

Since 12 April 2001, this MSDS has been revised in Section(s):

1

10. PREPARATION

Date Prepared: November 14, 2003
Prepared by: Lubricants & Specialties
IMPERIAL OIL
Products Division
111 St Clair Avenue West
Toronto, Ontario
M5W 1K3
(800) 268-3183

CAUTION: " The information contained herein relates only to this product or material and may not be valid when used in combination with any other product or material or in any process. If the product is not to be used for a purpose or under conditions which are normal or reasonably foreseeable, this information cannot be relied upon as complete or applicable. For greater certainty, uses other than those described in Section 1 must be reviewed with the supplier. The information contained herein is based on the information available at the indicated date of preparation. This MSDS is for the use of Imperial Oil customers and their employees and agents only. Any further distribution of this MSDS by Imperial Oil customers is prohibited without the written consent of Imperial Oil."



FUEL MANAGEMENT PLAN

Kahuna Property
Dunnedin Ventures Inc.

Submitted: November 8, 2017
Effective Date: November 8, 2017

Prepared By: Andrew Berry, VP Operations
Dunnedin Ventures Inc.
Suite 1020-800 West Pender Street
Vancouver, BC, V6C 2V6

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1 Introduction

This Fuel Management Plan (FMP) shall be in effect from November 8, 2017 and has been specifically prepared for the Kahuna Property. Dunnedin Ventures Inc. (Dunnedin) Kahuna Property is located between the communities of Rankin Inlet (Kangiqtiniq) and Chesterfield Inlet (Igluigaarjuk) in the Kivalliq Region of Nunavut.

The purpose of this Fuel Management Plan is to ensure that the storage, transportation and handling of fuel and chemical materials is done in a manner that is environmentally sound and safe to personnel and contractors. A copy of this plan will be kept in the office at site and at the head office in Vancouver. Copies of this plan may be obtained from Dunnedin Ventures Inc.

This Fuel Management Plan should be used in conjunction with other property plans and best management practices. Other plans at the Kahuna Property include:

- Abandonment and Restoration Plan
- Emergency Response Plan
- Environmental and Wildlife Management Plan
- Field Safety Manual
- Spill Prevention and Response Plan
- Waste Management Plan

1.1 Corporate Details

Dunnedin Ventures Inc.
Suite 1020-800 West Pender Street
Vancouver, British Columbia, V6C 2V6
Tel: (604) 646-8351
Fax: (604) 646-4526
www.dunnedinventures.com

1.2 Project Description

The Kahuna Property comprises 145 mineral claims encompassing 166,463 hectares of land located on NTS map sheets 0550/02, 0550/03, 0550/04, 0550/05, 0550/06, 0550/07, 055J/13, 055J/14, 055N/01 and 055N08. The southern boundary of the property adjoins the north boundary of subsurface Inuit Owned Land (IOL) parcel RI-01, approximately 25 kilometres northeast of Rankin Inlet. The northeast corner of the property is located approximately 10 kilometres southeast of Chesterfield Inlet. The northwest corner of the property is located approximately 75 kilometres west of Chesterfield Inlet. The Property extends north, south, east and west between Latitudes 62°58' and 63°19' North and Longitudes 90°44' and 92°13' West (UTM coordinates: 6,983,000mN to 7,023,000mN and 539,000mE to 614,000mE, NAD83, Zone 15). A total of 82 mineral claims have surface rights covering 87,570 Ha that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15.

Exploration activities on the Kahuna Property are currently permitted under INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01, KIA Land Use Licence KVR16F01 and NWB Water Licence 2BE-KDP1722.

The exploration program planned and proposed for 2018 will consist of rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, diamond drilling, reverse circulation drilling and bulk sampling.

An amendment application has been submitted to NPC and NIRB to authorize a temporary field camp and fuel cache on Crown Lands under INAC Land Use Permit N2015C0010, and authorize domestic water use for the temporary camp under NWB Water Licence 2BE-KDP1722. The temporary camp will be used to support exploration activities authorized by Dunnedin's permits and licences.

Members of the Chesterfield Inlet HTO provided assistance and recommendations for the selected location of Dunnedin's new field camp. A large, flat topped esker feature was recommended as the best location. The site is on Crown Lands approximately 40 kilometres northeast from Rankin Inlet and 50 kilometres southwest from Chesterfield Inlet at 575,975mE and 6,990,875mN in Zone 15, UTM NAD83. The camp will operate seasonally from March through September. The field camp will accommodate up to 20 people and will be comprised of: 1 kitchen tent, 1 office tent, 1 dry tent, 1 utility tent, 1 core logging tent, 7 supplementary sleep tents, a PACTO latrine facility, a small generator shed and 2 arctic grade containment berms. The structures will consist of a combination of WeatherPort vinyl tents, canvas prospectors' tents and small plywood sheds. The field camp will be fully closed and dismantled completely once exploration activities cease. The site will then be reclaimed and restored to its original state. Full details regarding the temporary field camp can be found in the "2018 Work Plan".

1.3 Applicable Legislation and Guidelines

Acts, Regulations, and Legislation that applies to the storage, handling and transport of fuel include but are not limited to:

1.3.1 Federal

- National Fire Code of Canada (Federal)
- Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations
- Federal Aboveground Storage Tank Technical Guidelines
- CCME Environmental Codes of Practice for Underground and Aboveground Storage Tank Systems
- Transport of Dangerous Goods Act
- The Workplace Hazardous Materials Information System (WHMIS)
- Workers' compensation Board
- Canadian Environmental Protection Act
- Fisheries Act
- Environmental Protection Act
- Guidelines for Spill Contingency Planning, INAC
- Draft Fuel Storage and Handling Guidelines, April 2009, Indian and Northern Affairs Canada - Nunavut

1.3.2 Territorial

- Fire Prevention Act
- Nunavut Waters Act
- Nunavut Surface Rights Tribunal Act
- Draft Recommended Best Practices for the Storage and Handling of Petroleum and Allied Petroleum Products on Federal Crown Lands in Nunavut
- Nunavut "Guideline for the General Management of Hazardous Waste"

- The Mine, Health and Safety Act and Regulations (Nunavut)
- The NWT and Nunavut Safety Act, the Occupational Health and Safety Regulations

2 Training

Proper use and monitoring is paramount to safe fuel storage and handling. Personnel that will be tasked with handling and inspecting will be required to receive proper and adequate training. This training will include, but not be limited to the following areas:

- Operations/Maintenance
- Spill Response
- WHMIS

3 Fuel Inventory

Diesel, jet fuel, propane and gasoline will be stored at the Kahuna Property. These fuels must be stored in a manner that minimizes risks to the environment, personnel/contractors and camp, while minimizing and preventing the potential impact of infrastructure developments. The majority of fuel to be cached on the property will be transported via Challenger and cargo sled during winter months on the overland winter trail. Additional fuel may be delivered to site via helicopter during the summer months.

Dunnedin's existing permits and licenses include authorization for 3 fuel caches that together contain an aggregate of 75 drums (205L each) of jet fuel and 120 drums of diesel fuel. Dunnedin requests an increase in the amount of fuel to be cached on the Kahuna Property to support the field camp, the proposed 2018 winter drill program and the summer 2018 exploration program.

A main fuel cache will be established on the east side of the new field camp facilities at 576065mE 6990845mN UTM Zone 15, UTM NAD83. Fuel to be cached on the site will include:

- 150 – 205 L drums of diesel fuel
- 150 – 205 L drums of jet fuel
- 10 – 205 L drums of gasoline
- 20 – 100 lb. cylinders of propane

Temporary supply caches of less than nine drums will be located at drill sites and bulk sampling sites to maintain operations of diamond drilling equipment and bulk sampling equipment, respectively.

Dunnedin endeavors to consume a majority of the cached fuel by the end of each season. Please refer to the "Spill Prevention and Response Plan" for more information.

A complete inventory of all fuel and hazardous materials on site will be recorded at the beginning and end of seasonal operations. The Camp Manager will be responsible for daily inspections of the fuel berms and the monitoring, tracking and recording of fuel inventories while operations are active.

4 Storage and Secondary Containment

The use of fuel is required to support operations on the Kahuna Property. All fuel on the property will be stored in secondary containment fuel berms. These fuel berms will be established and operated in accordance with this Fuel Management Plan and Dunnedin's Spill Prevention and Response Plan.

- All fuel drums will be stored in secondary containment berms.
- All secondary containment berms will be capable of holding 110 percent of the volume of the largest fuel reservoir that is housed within the secondary containment.
- All secondary containment will be of sufficient height and depth to hold any potential spill or failure.
- Secondary containment berms will be made of material (Arctic Grade) that is sufficiently durable to withstand Nunavut's climate and the natural terrain.
- Secondary containment berms will be equipped with hydrocarbon filtration systems (rain drains) to safely remove water that is collected inside the berms.
- Secondary containment berms will be inspected daily during operations.
- Within the secondary containment berms fuel drums will be stored in rows on their sides with bungs facing at the 3:00 and 9:00 position.
- Propane cylinders will be stored standing up and away from any potential sources of ignition.
- All drums, tanks, valves, regulators and hoses will be regularly inspected for cracks or leaks.
- Drummed fuel used for heating tents will be placed in secondary containment behind each tent.
- All fuel storage sites will be located a **minimum** of 31 metres from the normal high-water mark of any water body and will be inspected regularly.
- Spill Kits will be placed and will be easily identifiable with clear signage at each fuel storage site.
- "NO SMOKING" signs will be erected at each fuel storage area.
- Smoking, open flame and any potential sources of ignition are prohibited within 31 metres of any fuel storage site.
- Empty fuel drums will be removed from site regularly.

Chemicals and hazardous materials that may be located on the Kahuna Property include limited volumes of motor oil and hydraulic oil, cleaners, batteries, electronics, fluorescent light bulbs/tubes and small quantities of hydrochloric acid. All such materials will be stored on drip trays in their original containers.

A limited supply of motor oil and hydraulic oil will be located in the utility tent at the temporary field camp. Oil containers will be kept on a drip tray with a spill kit nearby. Hydrochloric acid is used for core logging in very small amounts (<0.5 litre) and will be kept in a sealed container in the core shack. Cleaners (solvents) will be kept in a designated area on a drip tray and in their original containers. Cleaners, batteries and fluorescent light bulbs/tubes will be kept in their original containers.

Please refer to the "Spill Prevention and Response Plan" for MSDS sheets that accompany these materials and the "Waste Management Plan" for additional information.

5 Handling, Transfer and Transportation

Fuel will be transported to the property via Caterpillar Challenger and sleds during the winter and via helicopters in the summer in accordance with the regulations outlined in the Transportation of Dangerous Goods Act and Transport Canada Aviation legislation. Empty drums will be removed from the property regularly and shipped to an authorized facility for recycling or disposal.

Manual and electric pumps will be used for the transfer of petroleum products. Smoking, sparks, or open flames are **prohibited** in fuel storage and fuel transfer areas at all times. Spill kits will be placed with clear signage in all fuel storage and fuel transfer areas. When transferring fuel from drums those drums will be placed upon platforms underlain by a secondary containment.

Preventative mitigation measures include:

Handling and Transfer

- Fuel transfer hoses with cam lock mechanisms to prevent leakage are used.
- Fuel absorbent pads are placed appropriately to protect from drips and spills.
- Personnel will carefully monitor fuel content in the receiving vessel during transfer and always have absorbent pads available while transferring fuel.
- Any drips or leakages are cleaned immediately.
- All operating personnel will be trained in proper fuel handling and spill response procedures.
- Smoking, open flame and any potential sources of ignition are prohibited within 31 metres of any fuel storage site and fuel transfer locations.
- “NO SMOKING” signs will be erected at each fuel transfer area.
- Equipment maintenance and servicing will be conducted in designated areas. Equipment will be underlain by absorbent pads and spill trays for lubricant changes.
- Funnels will be used to reduce the potential for spillage.
- Waste fuels, oils and fluids will be collected in sealed 20 litre pails or sealed 205 litre drums and will be labelled appropriately and stored in secondary containment berms.
- Empty fuel drums will be removed from site regularly.

Please refer to Dunedin’s Kahuna Property “Spill Prevention and Response Plan” in the event of a spill.

6 Signs and Labels

All drummed fuel will be clearly labeled in accordance with the Workplace Hazardous Materials Information System (WHMIS) which includes the name of the company and the type of fuel contained within. Signs will be erected at each fuel cache with the same information. “NO SMOKING” signs will be erected at each fuel cache and fuel storage area.

7 Inspections

The Camp Manager will be responsible for daily inspections of the fuel berms and the monitoring, tracking and recording of fuel inventories while operations are active. Secondary containment berms will be inspected for signs of punctures, failures, leaks, etc. Drums will be inspected for proper storage, leaking bungs, cracks and punctures. Any issues noted will be remediated immediately.

8 Spill Kits

A spill kit capable of addressing potential spills (based on type, location and volume of fuel cache) shall be located at each fuel cache, storage area and re-fueling station. Refer to the “Spill Prevention and Response Plan” for more information.



ENVIRONMENT AND WILDLIFE MANAGEMENT PLAN

Kahuna Property
Dunnedin Ventures Inc.

Original Version Submitted: November 2015
Revised Version Submitted: November 8, 2017

Prepared By: Andrew Berry, VP Operations
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Suite 1020-800 West Pender Street
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List of Revisions

Date	Section	Details
01-Nov-15		Original Submission
13-Oct-16	Internal Environmental Policy	Revised
13-Oct-16	General	Provided information on commitment to hire Aqigiq HTO members annually as wildlife monitors
13-Oct-16	Authorizations	Minor modifications/clarification, revised regulatory instruments
13-Oct-16	Wildlife Mitigation Measures	Rewritten to add more detail.
08-Nov-17	Environmental and Wildlife Management Plan	Reformatted document
08-Nov-17	Authorizations	Added KIA Right of Way Licence KVRW16F01
08-Nov-17	Applicable Legislation	Revised acts, regulations and guidelines
08-Nov-17	Training	Rewritten to add more detail
08-Nov-17	Wildlife Mitigation Measures	Rewritten to add more detail

1 Introduction

This Environmental and Wildlife Management Plan (EWMP) was submitted in 2015 and updated as of November 8, 2017 and applies specifically to the Kahuna Property. Dunnedin Ventures Inc. (Dunnedin) Kahuna Property is located between the communities of Rankin Inlet (Kangiqtiniq) and Chesterfield Inlet (Igluigaarjuk) in the Kivalliq Region of Nunavut.

This plan is designed to: identify potential impacts to the environment, wildlife and their habitat; outline mitigation measures to minimize adverse effects caused by potential impacts; and minimize wildlife and personnel interactions.

Exploration activities on the Kahuna Property are currently permitted under Indigenous and Northern Affairs Canada (INAC) Land Use Permit N2015C0019, Kivalliq Inuit Association (KIA) Land Use Licence KVL315B01 and Nunavut Water Board (NWB) Water Licence 2BE-KDP1722. Activities permitted include: rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, diamond drilling, reverse circulation (RC) drilling and bulk sampling.

1.1 Corporate Details

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1.2 Purpose and Scope

This Environmental and Wildlife Management Plan outlines Dunnedin's environmental policy and will be implemented to ensure that exploration activities on the Kahuna Property are operating in an environmentally responsible manner.

This plan includes:

- Dunnedin's Internal Environmental Policy,
- Applicable legislation and guidelines,
- Environmental protection measures,
- Predicted impacts to wildlife and mitigation measures,
- Potential impacts to aquatic life and mitigation measures,
- Archaeological site procedures.

This Environmental and Wildlife Management Plan applies to all activities conducted on the Kahuna Property on behalf of Dunnedin Ventures Inc. and should be used in conjunction with other property plans and best management practices. Other plans at the Kahuna Property include:

- Fuel Management Plan
- Emergency Response Plan
- Abandonment and Restoration Plan
- Field Safety Manual
- Spill Prevention and Response Plan
- Waste Management Plan

Dunnedin Ventures Inc. is responsible for the activities conducted on the Kahuna Property, including implementation and management of this plan.

1.3 Internal Environmental Policy

Dunnedin is committed to the protection of the environment during its exploration activities, through the application of the following principles.

- Deal proactively with environmental issues by identifying potential impacts and implementing preventative actions, measures to mitigate and effective contingency plans.
- Strictly adhere to and comply with all applicable environmental legislation, regulations and the Terms and Conditions of the Licences and Permits.
- Identify and evaluate all environmental aspects and possible impacts of exploration activities, and develop procedures for minimizing, as much as is reasonably achievable, the environmental impacts while carrying out these activities.
- Facilitate clear and effective communication of Dunnedin's environmental requirements to employees and contractors to encourage their participation and compliance.
- Provide effective training including orientation of terms and conditions of all licenses and permits, conduct internal assessment/inspections and periodically review procedures during weekly meetings.

1.4 Project Description

The Kahuna Property comprises 145 mineral claims encompassing 166,463 hectares of land located on NTS map sheets 0550/02, 0550/03, 0550/04, 0550/05, 0550/06, 0550/07, 055J/13, 055J/14, 055N/01 and 055N08. The southern boundary of the Property adjoins the north boundary of subsurface Inuit Owned Land (IOL) parcel RI-01, approximately 25 kilometres northeast of Rankin Inlet. The northeast corner of the property is located approximately 10 kilometres southeast of Chesterfield Inlet. The northwest corner of the property is located approximately 75 kilometres west of Chesterfield Inlet. The property has increased since 2015 from 29 mineral claims covering 33,810.8 Ha, to 109 mineral claims

covering 124,138.6 Ha. An additional 36 mineral claims staked in September 2017 and covering 42,324 Ha are pending approval from the Mining Recorders Office. The Property extends north, south, east and west between Latitudes 62°58' and 63°19' North and Longitudes 90°44' and 92°13' West (UTM coordinates: 6,983,000mN to 7,023,000mN and 539,000mE to 614,000mE, NAD83, Zone 15). A total of 82 mineral claims have surface rights covering 87,570 Ha that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15.

The Kahuna Property has a subarctic climate and is above the tree line with temperatures staying below freezing from late September to early June. The coldest months are December through March with average temperatures between -26°C and -31°C. The warmest months are July and August with average temperatures up to 9°C. The driest month is February with an average of 6mm of precipitation while the wettest month is August which can reach up to 43 mm of precipitation. Daylight hours vary greatly with 4 hours, 48 min of daylight on December 21st and 20 hours, 12 minutes daylight on June 21st. Wind speeds in the Rankin Inlet area are fairly high ranging from daily averages of 25 to 60 kilometres per hour throughout the year (weather.gc.ca).

The physiography of the Rankin Inlet area is one of low topographical relief (sea level to 300 metres above sea level) with occasional less recessive ridges and hills. Changes in the relief are largely caused by extensive glacial deposits including moraines, drumlins and glacial wash several tens of kilometres long and 50 to 100 metres in height. During the winter months, the terrain is a land of frozen snow and ice. Once the land has thawed in the summer months, the terrain is a huge expanse of exposed and moss-covered bedrock, glacial fluvial deposits and endless shallow lakes, swamps, rivers and streams, making cross land navigation at times very difficult.

1.5 Authorizations

Dunnedin Ventures Inc. will apply and comply with the terms and conditions of a number of authorizations in order to conduct exploration activities. Dunnedin's current permits and licences are as follows:

- Indigenous and Northern Affairs Canada: Class A Land Use Permit N2015C0019. This permit allows Dunnedin to conduct approved activities on those portions of Crown Land that falls within the companies claim boundaries. Permitted activities include: prospecting, till and rock sampling, diamond and reverse circulation drilling, trenching, ground geophysical surveys, bulk sampling and the establishment of an overland winter trail.
- Kivalliq Inuit Association: Class 1 Land Use Licence KVL315B01. This licence allows Dunnedin Ventures to conduct approved activities on Inuit Owned Lands (IOL), more specifically Surface Land Only Parcel CI-15. Permitted activities include: prospecting, till and rock sampling, diamond drilling, trenching, ground geophysical surveys, and bulk sampling. KIA Right of Way Licence KVRW16F01 has approved the establishment of an overland winter trail from Rankin Inlet to the property.

- Nunavut Water Board: Class B Water Licence 2BE-KDP1722. This licence is for the use of water during diamond drilling operations and the subsequent collection of waste water from the drilling operations in an approved drill sump.

Dunnedin Ventures Inc. is bound by the terms and conditions set out in the each of the licences and permits while conducting any of its permitted exploration activities.

An amendment application was submitted to NPC and NIRB in November 2017 to authorize a temporary field camp and fuel cache on Crown Lands under INAC Land Use Permit N2015C0019, and authorize domestic water use for the temporary camp under NWB Water Licence 2BE-KDP1722. The temporary camp will be used to support exploration activities authorized by Dunnedin's permits and licences.

1.6 Applicable Legislation and Guidelines

Exploration at the Kahuna Property will be conducted in accordance with Federal and Territorial Acts, Regulations, Guidelines and Recommendations including, but not limited to:

1.6.1 Federal

- Aeronautics Act
- Canada-Wide Standards for Dioxins and Furans (Canadian Council of Ministers of the Environment)
- Canada Wildlife Act
- Canadian Environmental Protection Act (Environment Canada)
- Department of Fisheries and Oceans Operational Statements and Guidelines
- Draft Fuel Storage and Handling Guidelines, April 2009, Indian and Northern Affairs Canada - Nunavut
- Fisheries Act (Fisheries and Oceans Canada; DFO)
- Guidelines for the Use of Explosives in or near Canadian Fisheries Waters (DFO)
- Guidelines for Spill Contingency Planning (INAC)
- Migratory Birds Convention Act and Migratory Birds Regulations
- National Fire Code of Canada (Federal)
- Nunavut Land Claims Agreement
- Public Health Act
- Species at Risk Act
- Territorial Lands Act
- Transportation of Dangerous Goods Act (Transport Canada)
- Workers' compensation Board
- Workplace Hazardous Materials Information System (WHMIS)

1.6.2 Territorial

- Caribou Protection Plan/Caribou Protection Measures

- Caribou and Muskox Protection Measures (Keewatin Land Use Plan)
- Draft Recommended Best Practices For The Storage And Handling Of Petroleum And Allied Petroleum Products on Federal Crown Lands in Nunavut
- Draft Nunavut Land Use Plan (DNLUP) (pending)
- Environmental Guidelines for the Burning and Incineration of Solid Waste
- Fire Prevention Act (Territorial)
- Nunavut Archaeological and Paleontological Sites Regulations
- Nunavut Environmental Protection Act
- Nunavut “Guideline for the General Management of Hazardous Waste”
- Nunavut Waters Act and Nunavut Surface Rights Tribunal Act
- Nunavut Wildlife Act
- The Mine, Health and Safety Act and Regulations (Nunavut)
- The NWT and Nunavut Safety Act, the Occupational Health and Safety Regulations

1.6.3 Municipal

- Municipal Solid Wastes Suitable for Open Burning Guidelines

2 Training

All employees and contractors of Dunnedin will be trained in the company’s internal policies, management plans, standard operating procedures and be made familiar with the Terms and Conditions of the project’s licences and permits. Every person arriving at Dunnedin’s Kahuna Property will undergo an orientation which includes information on health, safety, and environmental responsibilities and stewardship. Training will include, but not be limited to:

- Emergency Response Plan
- Spill Prevention and Response Plan
- Bear Safety
- General Safety
- Environmental Management Plan
- Environmental Baseline Monitoring
- Wildlife Mitigation Measures
- Field Safety Manual
- Fuel Management Plan
- Abandonment and Restoration Plan
- Waste Management Plan

All employees and contractors will receive Bear Safety Training. Bear safety information and material will be kept in a binder on site. The Government of Nunavut published the manual “Bear Safety-Reducing Bear-People Conflicts in Nunavut”. This document will be referred to in the safety orientation that all

personnel, contractors and consultants receive when they arrive at site. A copy of the manual will be kept at the camp office and in Vancouver in the head office.

3 Environmental Protection Measures

Environmental protection ultimately rests with the company having authorization from the environmental agencies to conduct exploration activities. Environmental awareness and a good knowledge of environmental protection measures help to avoid or reduce adverse exploration impacts. Field personnel and contractors must know and follow the applicable work conditions established by the environmental regulatory agencies.

Prior to annual exploration activities, community meetings will be held in Rankin Inlet and Chesterfield Inlet to discuss the proposed work plan and gain community feedback. Advice will be sought as to timing of activities, wildlife movements and suggested avoidance measures. Annual site visits for community representatives and leaders from Chesterfield Inlet and Rankin Inlet may be scheduled during field operations. In addition, Dunnedin has committed to contract wildlife monitors from Chesterfield Inlet or Rankin Inlet through the HTO to accompany annual field crews for the purpose of monitoring wildlife, providing advice on avoidance and to ensure the safety of field crews.

Dunnedin Ventures Inc. expects all personnel and contractors operating on its behalf will recognize and respect the rights of other land users.

Dunnedin Ventures through its permits and licences requires:

- That all personnel, contractors, consultants and visitors to the project area respect the land, the waters and the local wildlife.
- The rules, regulations, terms and conditions of the applicable laws, licences and permits are to be strictly adhered to.
- All garbage and litter to be removed from all field sites (including cigarette butts).
- No operations to be conducted within 300 metres of any privately owned structure (e.g. hunting cabins)

4 Wildlife Management

Dunnedin acknowledges that exploration programs have the potential to temporarily impact wildlife and wildlife habitat, and thus commits to adhere to monitoring and mitigation strategies as well as legislated avoidance. All terms and conditions of licences and permits will be strictly adhered to including specific recommendations for caribou protection measures.

Potential impacts to wildlife and wildlife habitat include displacement/avoidance from habitat, habituation/attraction to personnel and/or unintentional interactions/disturbance. It is recognized that the Lorillard and Qamanirjuaq herds are particularly important in the regional project area; Dunnedin will

work with stakeholders to develop strategies to minimize potential negative effects through a focused monitoring and mitigation measures.

This plan has been designed to address specific wildlife species (inclusive of caribou), species group and their critical habitats. Selected species, species groups and their critical habitats that are the focus of this Plan are;

- Those that occur within and immediately adjacent to the project site or along project flight paths during project operations,
- Those that are important harvestable species, and
- Those with special conservation Status.

The species or species groups of most concern are provided in Table 1:

TABLE 1: WILDLIFE SPECIES OF CONCERN

Species or Species Group
Barren-ground caribou - specifically, Qamanirjuaq and Lorillard herds
Muskox
Arctic fox (and their dens)
Wolf (and their dens)
Grizzly Bear (and their dens)
Wolverine (and their dens)
Polar Bear
Waterfowl and Waterbirds (and their nests)
Peregrine Falcon (and their nests)
Other Raptors (and their nests)

4.1 Predicted Impacts to Wildlife

The predicted impacts to wildlife due to the presence of the Kahuna Property include:

- Attracting wildlife,
- Habitat disturbance
- Unintentional disturbances

Wildlife can be naturally inquisitive and some species are attracted to areas that are occupied by humans due primarily by scents and smells. Dunnedin will discourage this by minimizing all waste and the proper storage of these attractants until such time they will be removed from the site. At no time will it be permitted by any personnel, contractors or consultants to feed or to use food products to entice wildlife closer to activities. Good housekeep practices will be implemented and all active work sites will be kept clean of all food waste and will be properly stored in sealed containers.

Habitat disturbance during exploration programs are temporary and as per the Abandonment and Restoration Plan, upon final closure the site will be reclaimed and restored to its original state. Dunnedin will act proactively to complete site reclamation and remediation immediately following the completion of the work (i.e. at drill sites, bulk sample sites, etc.). Habitat disturbance on the Kahuna Property will result to some extent from field camp, diamond drilling and bulk sample activities. The effects of habitat disturbance at drill sites are very temporary and in most cases it would be unlikely that an individual would be able to locate the previous season's drill collar or sump. Site activities performed, such as camp layout and drill setups, will be performed in a manner to limit their impact and footprint.

Despite best efforts and practices, unintentional contact and disturbances can occur. As an example, every effort will be made to avoid nest and den sites. However, should a field crew happen upon nests or dens, the coordinates will be recorded and the crew will immediately vacate the area. These areas will be avoided until they are no longer being inhabited and reported to the Government of Nunavut and the KIA. All unintentional disturbances, no matter what the nature, will be reported immediately and will be documented in the annual report.

4.2 Wildlife Mitigation Measures

4.2.1 General

Approaching and feeding wildlife is strictly prohibited. Dunnedin Ventures Inc. understands the impacts to wildlife through human interaction including harassment and disturbance and will insure its contractors and employees follow the terms and conditions as set out by the regulatory authorities. There are absolutely no exceptions to this rule. If wildlife are present in the area, all employees and contractors are to avoid any contact with wildlife.

Harassment and disturbance of wildlife is prohibited. If any employees and contractors are approaching a work site where migrating caribou, caribou cows and calves, muskoxen nurse groups or other wildlife are in the area, this work site will be avoided until the animals have moved on a distance of 2-5 kilometres from the site.

If employees and/or contractors encounter wildlife at any time, every effort should be made to stay out of sight of wildlife or redirect travel away from wildlife where possible, to avoid impact to the wildlife.

Firearms are carried by designated Wildlife Monitors for safety reasons. Firearms must be properly registered and stored in accordance with applicable legislation and will only be used by individuals with current permits. Firearms will only be used when there is a threat to human life and all other deterrent measures have failed. All firearm discharges must be documented and reported immediately to the Project Manager.

Hunting of wildlife, while conducting business on behalf of Dunnedin Ventures Inc., is strictly prohibited by all Dunnedin employees, contractors and consultants.

Low level aircraft and helicopter flights must make every effort to avoid areas which are crucial nesting and denning habitats. Helicopters will not land in any area where wildlife are present unless under an emergency situation. In the event of bad weather or an emergency, when low level flights are required, these instances will be recorded and reported to the KIA.

Flight altitudes must be strictly observed and recorded and pilots are responsible for enforcing flying limits. Unless there is a specific requirement for low level flights, fixed wing aircraft and helicopters will maintain a minimum altitude of 610 metres above ground level in places where there are migrating caribou, caribou cows and calves, muskoxen nurse groups and other wildlife or; follow flight altitude restrictions in applicable INAC and KIA permits.

Helicopter pilots will be instructed that they are not to fly over wildlife in a way to cause them to change behavior, run or flee at any time, within or outside of migration. If such an interaction should occur incidentally, helicopter pilots will be instructed to divert and/or change altitude as quickly as safely practicable.

Nuisance wildlife is to be reported immediately. Proper food storage, the handling of food waste and removal from the field will mitigate wildlife encounters.

Wildlife Monitoring is an important component to the exploration program and all sightings of wildlife are to be recorded. Designated Wildlife Monitors, hired from the Aqigiq Hunters and Trappers Organization (HTO), are responsible for documenting wildlife sightings, responding to wildlife interactions and implementing mitigation measures. Wildlife Monitors will conduct height of land observations and note any observations made during helicopter flights to and from the work area. All personnel will be instructed to assist Wildlife Monitors in documenting the species sighted, date, time of sighting, GPS coordinates, number of species, age, gender, description of the animals' activity and any action taken. This information will be provided in the Annual Report to INAC, KIA and NIRB.

Dunnedin will observe all protection measures specified on both INAC and KIA administered lands.

4.2.2 Caribou

The Kahuna Property is within range of the Qamanirjuaq and Lorillard Caribou Herds, but outside critical migrating, calving and crossing areas. Regardless, special considerations are applied so as to avoid disturbance of migrating and calving herds. Dunnedin Ventures will cease activities when migrating caribou are present and/or follow caribou protection measures included in INAC or KIA permits.

Calving ground boundaries for the Qamanirjuaq and Lorillard Caribou Herds (as defined in the by Government of Nunavut and Draft Nunavut Land Use Plans) are approximately 65 kilometres and 100 kilometres from the property, respectively. Dunnedin Ventures does not conduct any activity within any past caribou calving areas or proposed new calving or post calving areas. The distance between the camp and the nearest designated caribou water crossing is approximately 100 kilometres to the southwest and

approximately 125 kilometres to the northwest (KIA Land Management Application, Draft Nunavut Land Use Plan 2016).

Flights & Landings

Helicopter flights will maintain a >300 metre altitude whenever reasonable. In areas where migrating caribou, caribou cows and calves, muskoxen nurse groups or other wildlife are present, helicopters are to maintain a minimum altitude of 610 metres and there will be no landings unless under an emergency situation. Helicopter and aircraft pilots are instructed to avoid caribou calving grounds on their way to or from the project area.

Work Activities

Activities such as driving of snowmobiles and ATV's, bulk sampling, mapping, prospecting and blasting will not be conducted when migrating caribou are present.

The Kahuna Property is not within any Caribou Protection Areas. In the event that caribou cows calve outside of the Caribou Protection Areas, Dunnedin shall suspend operations within the area occupied by cows and/or calves between May 15 and July 15.

In the event that caribou cows and calves are present, Dunnedin shall suspend blasting, overflights by aircraft at any altitude of less than 610 metres above ground level and the use of snowmobiles and ATV's outside of the immediate vicinity of the camp.

Drilling

During the migration of caribou, Dunnedin shall cease drill activities that may interfere with migration, such as the movement of equipment, until the migrating caribou have passed. A 2 kilometre buffer will be used as a measure of a safe distance for working in areas where migrating caribou are present. If migrating caribou come within 2 kilometre of any drill site, work activities will cease until the caribou have moved safely beyond the buffer.

In the event that caribou cows calve outside of the Caribou Protection Areas, Dunnedin shall suspend drilling operations within the area occupied by cows and/or calves between May 15 and July 15.

No drilling will be conducted within five (5) kilometres of a designated caribou crossing.

Migration

Absolutely no activities are to act as a block or in any way cause a diversion to migration of caribou. Activities that may interfere with migration, such as airborne geophysical surveys or movement of equipment, shall cease until the migrating caribou has passed.

Crossings

Between May 15 and September 1, no specified activities are to occur within 10 kilometres of a "designated caribou crossing" and no diamond drilling operations are to occur within 5 kilometres. There are no designated caribou crossings on the Kahuna Property or in areas currently being worked by Dunnedin Ventures Inc.

4.2.3 Bears and other predators

All human-bear interactions are to be reported immediately to the project manager, who will then contact the KIA, The Government of Nunavut-Department of Environment Wildlife Biologist, the Aqigiq HTO and the Kangiqliniq HTO.

A copy of the Bear Safety material will be available on site and at the offices of Dunnedin Ventures Inc. All employees and contractors will receive Bear Safety Training. Bear safety information and material will be kept in a binder on site. The Government of Nunavut published the “Bear Safe in Nunavut”. This document will be referred to in the safety orientation that all personnel, contractors and consultants receive when they arrive at site. A copy of the manual will be kept at the site headquarters and in the Vancouver head office (<http://www.gov.nu.ca/environment/information/resources>). If bears are present in the area, work will cease until the bears have safely moved out of the area.

All denning sites are to be avoided. If a den site is located, its UTM coordinates are to be recorded so that the den site can be avoided. The coordinates are forwarded to the appropriate regulatory authorities. Any exploration activities will cease immediately.

The following buffers are provided (by the Government of the Northwest Territories) for active dens between the den and all exploration activities between May 1 and July 15.

Wolves	800m buffer
Grizzly Bear	300m buffer
Wolverine	2km buffer
Fox	150m buffer

Species at Risk

Environment Canada and COSEWIC has indicated that there may be Species at Risk within the Kahuna Property. A list of the species at risk in Nunavut can be found in Schedule 1 of SARA (Species at Risk Act). The SARA registry can be found at www.sararegistry.gc.ca. Schedules of SARA are amended on a regular basis so it is important to periodically check the registry for updates. If any of the listed species are sighted on the Kahuna Property, the information will be recorded.

Bear incidents and/or interactions, and wolf or fox den sighting will be reported immediately to:

TABLE 2: BEAR SIGHTING/INCIDENT CONTACT LIST

Contact	Phone Number	Email
Vicki Sahanatien, GN Wildlife Deterrent Specialist	867-934-2191	Vsahanatien@gov.nu.ca
Craig Bearsall, KIA Environmental Technician	867-645-5754	cbearsall@kivalliqinuit.ca
Aqigiq HTO	867-898-9063	
Kangiqliniq HTO	867-645-2350	

4.2.4 Birds

Breeding birds are not to be disturbed. In areas where colonies of birds are observed, the flight levels will be restricted to a vertical distance of 1000 metres and a horizontal distance of 1500 metres from birds.

No eggs or nests are to be disturbed by any activities. If an employee or contractor comes across any active nests, they are to cease all activities immediately to ensure that the nest is not disturbed and to avoid further interaction. Coordinates are to be recorded on the wildlife sighting sheets. Work will not resume in the immediate vicinity until the nest is no longer occupied. Moving or disturbing the nest of a migratory bird is in contravention of the *Migratory Birds Convention Act*.

The Peregrine Falcon has been identified as a species of Special Concern by COSEWIC. If any nests are found, a buffer must be maintained. A 1.5 kilometre buffer is recommended for the Peregrine Falcon. Any nests discovered will be recorded and the GPS coordinates provided to the KIA, Government of Nunavut Department of Environment, the Kangiqliniq HTO and the Aqigiq HTO.

4.2.5 Aquatic Life

Work in and around water bodies must be done in such a manner as to not disturb any aquatic habitat or life. Mitigation measures and company rules related to aquatic life include:

- Fishing while conducting business on behalf of Dunnedin Ventures Inc. is strictly forbidden.
- No waste is to enter any body of water.
- Waterlines must be properly placed and screened in accordance with the “Freshwater Intake End-of-Pipe Screen Guideline” (DFO).
- The drill foreman is responsible for ensuring safe working conditions at the drill site which includes measuring ice thickness before moving heavy equipment across the ice or drilling from the ice surface.
- All sumps, fuel caches and camps must be located at least 31 metres from the high water mark of any body of water unless otherwise approved by the appropriate regulatory authority.

4.2.6 Noise Mitigation & Abatement

Noise quality on the Kahuna Property may be affected by helicopters, airplanes, drilling operations and generators which can disturb wildlife. Wildlife mitigation measures are outlined above in Section 4.2. In areas where migrating caribou, caribou cows and calves, muskoxen nurse groups or other wildlife are present, helicopters are to maintain a minimum altitude of 610 metres. At 610 metres above ground level, noise from the helicopter is anticipated to be minimal. In the event that caribou cows and calves are present, Dunnedin shall suspend blasting, drilling and the use of snowmobiles and ATV's outside of the immediate vicinity of the camp to abate noise levels.

4.3 Archaeology

No work will occur in any area where a known archeological site has been located. If any employee or consultant finds an archeological site, work must cease immediately, the GPS coordinates are recorded and the finding is reported immediately to the Project Manager who in turn will report its location to the Department of Culture and Heritage (Government of Nunavut), INAC and KIA. Handling of any archeological artifact is strictly prohibited.

5 Internal Inspections

Internal inspections are to be completed by the Project Manager or it's designate on a regular basis. In addition to this, daily inspections of the individual work, storage and staging areas allows for a timely response to potential impacts affecting the surrounding environment. All employees and contractors are responsible for maintaining a clean and safe workplace.

Some points to consider from a Land Use Inspector or a community visitors point of view: When flying to the work site.

- Is there any garbage lying around?
- Has any garbage flown away and can be seen lying on the tundra?
- Are items stored in a neat and tidy manner?

Drips and Leaks

- While walking around the work sites, keep aware of potential sites for leaks or drips.
- In areas of potential leaks, place a drip pan or a collection device underneath the area.
- In areas where potential leaks and drips may occur, keep absorbent pads easily accessible.
- Report all leaks and drips to the Project Manager.

Fuel Storage areas

- Make sure that the fuel drums are stored according to code and best practices.
- Keep the fuel storage site tidy and neat.
- Visually inspect the fuel storage area on a regular basis to ensure there are no leaking or damaged drums and that all barrels are stored in the 3:00 and 9:00 o'clock position.



ABANDONMENT AND RESTORATION PLAN

Kahuna Property
Dunedin Ventures Inc.

Original Version Submitted: November 2015
Revised Version Submitted: November 8, 2017

Prepared By: Andrew Berry, VP Operations
Dunedin Ventures Inc.
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1. Introduction

This Abandonment and Restoration Plan (ARP) was submitted in 2015 and updated as of November 8, 2017 and applies specifically to the Kahuna Property. Dunnedin Ventures Inc. (Dunnedin) Kahuna Property is located between the communities of Rankin Inlet (Kangiqtiniq) and Chesterfield Inlet (Igluigaarjuk) in the Kivalliq Region of Nunavut (Appendix A).

Exploration activities on the Kahuna Property are currently permitted under INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01, KIA Land Use Licence KVR16F01 and NWB Water Licence 2BE-KDP1722. Activities permitted include: rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, diamond drilling, reverse circulation drilling and bulk sampling.

This Abandonment and Restoration Plan should be used in conjunction with other property plans and best management practices. Other plans at the Kahuna Property include:

- Fuel Management Plan
- Emergency Response Plan
- Environmental and Wildlife Management Plan
- Field Safety Manual
- Spill Prevention and Response Plan
- Waste Management Plan

1.1 Corporate Details

Dunnedin Ventures Inc.
Suite 1020-800 West Pender Street
Vancouver, British Columbia, V6C 2V6
Tel: (604) 646-8351
Fax: (604) 646-4526
www.dunnedinventures.com

1.2 Project Description

The Kahuna Property comprises 145 mineral claims encompassing 166,463 hectares of land located on NTS map sheets 0550/02, 0550/03, 0550/04, 0550/05, 0550/06, 0550/07, 055J/13, 055J/14, 055N/01 and 055N08 (Appendix A). The southern boundary of the property adjoins the north boundary of subsurface Inuit Owned Land (IOL) parcel RI-01, approximately 25 kilometres northeast of Rankin Inlet. The northeast corner of the property is located approximately 10 kilometres southeast of Chesterfield Inlet. The northwest corner of the property is located approximately 75 kilometres west of Chesterfield Inlet. The Property extends north, south, east and west between Latitudes 62°58' and 63°19' North and Longitudes 90°44' and 92°13' West (UTM coordinates: 6,983,000mN to 7,023,000mN and 539,000mE to

614,000mE, NAD83, Zone 15). A total of 82 mineral claims have surface rights covering 87,570 Ha that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15.

The exploration program planned and proposed for 2018 will consist of rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, diamond drilling, reverse circulation drilling and bulk sampling.

An amendment application has been submitted to NPC and NIRB to authorize a temporary field camp and fuel cache on Crown Lands under INAC Land Use Permit N2015C0019, and authorize domestic water use for the temporary camp under NWB Water Licence 2BE-KDP1722. The temporary camp will be used to support exploration activities authorized by Dunnedin's permits and licences.

2. Schedule

The program will start in mid to late February with an overland haul of equipment and supply's on Dunnedin's permitted overland winter trail from Rankin Inlet to the property using Caterpillar Challengers and cargo sleds. Equipment and supplies for Dunnedin's new field camp and the 2018 diamond drilling program will be staged on Crown Lands at the site of the proposed new camp location approximately 40 kilometres northeast of Rankin Inlet and 50 kilometres southwest of Chesterfield Inlet. Camp construction will commence in late February upon arrival of the camp supplies. The drill program will operate from mid-March to mid-May. Ground based prospecting and sampling activities will follow in mid-June once the land is free from snow and the property surface is fully accessible. A seasonal shutdown will take place at the completion of exploration activities for the year, at the end of September. Drill sites will be remediated upon removal of the drill rig and restored by the end of each field season.

The final abandonment and restoration of the camp site will begin once the program is complete and no further work is warranted. Subject to periodic renewals, all work described in this plan will be completed prior to the date of expiry of the land use permits and water licences authorizing work. Empty fuel drums will be removed from site regularly and backhauled to an approved facility for proper disposal. Once a fuel cache is retired, a thorough inspection will be conducted. Any contamination will be cleaned up according to the Spill Prevention and Response Plan and debris will be removed from the site.

3. Infrastructure and Work Sites

3.1 Temporary Field Camp

Rankin Inlet was used as a base of operations for the summer 2017 program. To mitigate daily helicopter transits to and from Rankin Inlet, and for safety reasons associated with winter work conditions, Dunnedin is seeking authorization for a temporary field camp located centrally on the

Kahuna Property and proximal to high priority exploration targets. The camp will operate seasonally from March through September.

More than 10 different locations were investigated as potential sites for the new field camp. Members of the Chesterfield Inlet HTO provided assistance and recommendations for the final site selection. The recommended location for Dunnedin's temporary field camp is on Crown Lands approximately 40 kilometres northeast from Rankin Inlet and 50 kilometres southwest from Chesterfield Inlet at 575,975mE and 6,990,875mN in Zone 15, UTM NAD83.

Dunnedin's temporary field camp will accommodate up to 20 people and will be comprised of:

- 1 - Kitchen Tent
- 1 - Office Tent
- 1 - Dry Tent
- 1 - Core Logging Tent
- 1 - Utility Tent
- 1 - Toilet Facility (Pactos)
- 7 - Crew Accommodations (1 tent will house the First Aid Attendant and First Aid Equipment)
- 1 - Generator Shack
- 1 - Portable Fuel-Fired Incinerator
- 2 – 5m x 20m Arctic Grade Containment Berms

Structures will consist of a combination of WeatherPort vinyl tents, canvas prospectors' tents and small plywood structures. All fuel storage and usage areas will be located at least 31 metres from any water body or drainage course.

At the end of the 2018 field season, the WeatherPort vinyl tents and plywood structures will be left standing and ready for use for Dunnedin's 2019 field program. All canvas tent covers will be removed from tent frames during the fall and winter shut down period. The camp will be fully closed and dismantled upon completion of all exploration activities. The site will then be reclaimed and restored to its original state.

3.2 Fuel Caches

Dunnedin's existing permits and licences include authorization for 3 fuel caches that together contain an aggregate of 75 drums (205L each) of jet fuel and 120 drums of diesel fuel. Dunnedin requests an increase in the amount of fuel to be cached on the Kahuna Property to support the field camp, the proposed 2018 winter drill program and the summer 2018 exploration program. The majority of fuel to be cached on the property will be transported via Challenger and cargo sled during winter months on the overland winter. Additional fuel may be delivered to site via helicopter during the summer months.

A main fuel cache will be established on the east side of the new field camp facilities at 576065mE 6990845mN UTM Zone 15, UTM NAD83. Fuel to be cached on the site will include:

- 150 – 205 L drums of diesel
- 150 – 205 L drums of jet fuel
- 10 – 205 L drums of gasoline
- 20 – 100 lb. cylinders of propane

Temporary supply caches of less than nine drums will be located at drill sites and bulk sampling sites to maintain operations of diamond drilling equipment and bulk sampling equipment, respectively.

Fuel Caches will be established and operated in accordance with Dunnedin’s Fuel Management Plan and Spill Prevention and Response Plan.

- All fuel drums will be stored in secondary containment berms.
- All secondary containment berms will be capable of holding 110 percent of the volume of the largest fuel reservoir that is housed within the secondary containment.
- All secondary containment will be of sufficient height and depth to hold any potential spill or failure.
- Secondary containment berms will be made of material (Arctic Grade) that is sufficiently durable to withstand Nunavut’s climate and the natural terrain.
- Secondary containment berms will be equipped with hydrocarbon filtration systems (rain drains) to safely remove water that is collected inside the berms.
- Secondary containment berms will be inspected daily during operations.
- Within the secondary containment berms, fuel drums will be stored in rows on their sides with bungs facing at the 3:00 and 9:00 position.
- Propane cylinders will be stored standing up and away from any potential sources of ignition.
- All drums, tanks and hoses will be regularly inspected for leaks.
- All fuel storage sites will be located a minimum of 31 metres from the normal high-water mark of any water body and will be inspected regularly.
- Spill Kits will be placed and will be easily identifiable with clear signage at each fuel storage site.
- “NO SMOKING” signs will be erected at each fuel storage area.
- Smoking, open flame and any potential sources of ignition are prohibited within 31 metres of any fuel storage site.
- Empty fuel drums will be removed from site regularly.

Dunnedin will endeavor to consume the majority of the cached fuel by the end of each season. Please refer to the “Fuel Management Plan” and “Spill Prevention and Response Plan” for more information.

3.3 Drill Sites

Reclamation of diamond drill or reverse circulation drill sites will be completed immediately following the completion of the drill hole and withdrawal of the drill rig from site. Prior to the mobilization and setup of the drill, site pictures will be taken to document the original state of the site. Site photos will also be taken following the completion of the drill hole. All debris and refuse will be removed

from the drill site prior to leaving the drill target. Casing will either be removed or will be cut off at ground level. A picket will be placed in the abandoned drill hole at completion documenting the hole number, azimuth, dip and end of hole depth.

3.4 Bulk Sample Sites

Equipment and supplies will be transported overland by Caterpillar Challenger hauling sleds to the proposed bulk sample sites during the winter months. Transporting the equipment from site to site during the winter conditions allows for overland travel without disturbing or impacting the underlying ground and vegetation beneath the snow cover. Moving equipment during the summer months will require the support equipment to be dismantled for slinging by helicopter.

Photos will be taken to document the area of the bulk sample site before any ground disturbance has taken place. Site photographs will also be taken upon completion and reclamation.

Excavated material will be segregated into separate piles of vegetation, humus, topsoil and till comprising boulder, sand and gravel. Once the bulk sample has been extracted, the stockpiled material will be returned in reverse order; i.e. the sand, gravel and boulder till will be placed at the bottom of the trench followed by the stockpiled layers of topsoil, humus and surface vegetation. The trench site will be hand re-contoured (as best as possible in frozen conditions) to mimic the original landscape. Winter sites will then be covered by a blanket of stockpiled snow. Additional contouring and reclamation will be completed during the summer months, as needed.

4. Seasonal Shutdown

4.1 Buildings and Content

Dunedin's temporary field camp will be subject to seasonal shutdowns. When work is anticipated for the subsequent year, wood structures and wood floors will be kept secured. The canvas tents will be removed from site for drying and storage. Vinyl Weatherhaven sleeping tents and the incinerator will remain in place for the winter. Wooden bed frames will be turned upside down and secured to the wooden floors for over-winter storage. The generator may be removed from site for servicing and storage. Water system pumps, tanks, pipes and hoses will be drained and stored inside to protect them over winter. Gas pumps may be removed from site for servicing and storage. All fuel lines between diesel stoves and their corresponding fuel tanks will be disconnected. Fuel tanks will be removed from their stands, valves turned off, and bungs secured and then placed in secondary containment for storage.

4.2 Fuel Caches and Chemical Storage

At the end of every field season, an inspection and inventory will be completed at each active fuel cache site. Photographs will document the state of the fuel cache upon seasonal shutdown. Empty drums will be removed from the site and returned to Rankin Inlet, any half barrels of fuel will be stored

standing at an angle to prevent the accumulation of rain and snow from accessing the fuel. Full fuel drums will be stored on their sides with the bungs in the 3' and 9' o'clock position. Should damaged drums be encountered, fuel will be transferred to a good drum and the damaged drum identified and removed from circulation. Any spills identified will be treated as per the Spill Prevention and Response Plan. All chemicals, including cleaning products, will be stored in a sealed building for the winter.

4.3 Waste

Combustible Waste: All combustible waste will be incinerated in accordance with the Nunavut Environmental Guideline for the Burning and Incinerator of Solid Waste. Untreated wood and large pieces of cardboard will be burned in a controlled open burn in compliance with the Municipal Solid Wastes Suitable for Open Burning Guidelines. Ash generated from the on-going incineration will be stored in sealed metal 205L drums and removed from site regularly for disposal at an authorized facility.

Grey Water Sumps: Grey water sumps will be inspected and covered securely for the winter. A grease trap installed on kitchen drains ensures food grease and solids do not enter the sump. Stakes will be placed around the sump so that it is easily identifiable when the camp is opened up again each year. The grey water sump will be located at least 31 metres away from a water body.

Black water: The camp will use Pacto toilet facilities. Bags containing waste will be incinerated. Ash generated from black water incineration will be stored in designated, sealed metal 205L drums and removed from site for proper disposal. During seasonal shutdown, the Pacto toilets will be cleaned and the building secured for the winter.

Non-Combustible, Recyclable and Hazardous Waste: All non-combustible, recyclable and hazardous wastes will be packaged in appropriate containers, labelled and backhauled to Rankin Inlet and shipped south to an authorized disposal facility.

Please refer to the "Waste Management Plan" for additional information on waste management.

4.4 Drill Sites

Drill sites will be remediated upon completion of drilling and all debris will be collected and removed. Photographs will be taken before and after completion of the drilling activities. Once the drill is removed from the site, a picket will be placed at the collar location identifying the hole number, azimuth, dip and end of hole depth.

4.5 Bulk Sample Sites

Bulk sample sites will be remediated upon completion of bulk sampling activities and will be inspected before seasonal shutdowns. Photographs will document the state of the bulk sample site following reclamation.

4.6 Contamination Cleanup

Soil that has become contaminated will be treated following Dunedin's Spill Prevention and Response Plan and procedures. Before and after photos will be taken to document the contamination and the clean-up procedures implemented. All documentation associated with any spill will be attached as part of the Annual Report submitted to NWB, KIA, INAC and NIRB.

4.7 Inspection and Documentation

A complete inspection will be conducted of all areas prior to seasonal shutdown. Photographs will be taken to document conditions at the various work sites and inventories will be conducted. All appropriate agencies (KIA, INAC, NIRB, NWB, and WSCC) will be contacted and notified that exploration operations have ceased for the year.

5. Final Abandonment and Restoration

5.1 Buildings and Content

All buildings will be dismantled and removed. All wooden structures including floors will either be burned in a controlled open burn in compliance with the Municipal Solid Wastes Suitable for Open Burning Guidelines or removed. The burning of the tent floors and waste lumber will only proceed with the approval from the appropriate regulating authorities. As required, impacted sites may be re-seeded with indigenous species to encourage re-vegetation.

5.2 Equipment

All equipment used on site including diamond and reverse circulation drill and bulk sampling equipment will be dismantled and removed from the project area.

5.3 Fuel Caches and Chemical Storage

All fuel containers will be removed from site and fuel cache locations will be thoroughly inspected. Any signs of contamination will be cleaned up and debris will be removed. Contaminated soil will be handled as per the "Spill Prevention and Response Plan". Final site photographs will be taken and submitted in the final closure report.

All chemicals will be removed from site. Areas where chemicals have been stored will be inspected to ensure that there has been no contamination. Any contamination from chemicals found will be treated as per the "Spill Prevention and Response Plan".

5.4 Waste

Combustible Waste: All combustible waste will be incinerated according to the "Environmental Guidelines for the Burning and Incineration of Solid Waste" and the "Canada-Wide Standards for Dioxins

and Furans” by the Canadian Council of Ministers of the Environment. Untreated wood and large pieces of cardboard will be burned in a controlled open burn in compliance with the Municipal Solid Wastes Suitable for Open Burning Guidelines. The drum containing ash generated from the on-going incineration will be removed from site for authorized disposal.

Grey Water Sump: Upon final closure the grey water sump will be inspected and then backfilled and restored to the pre-existing natural contours of the land.

Black water: Upon final closure, Pacto toilets will be cleaned and removed from camp. The plywood structure housing the latrine facilities will be burned in a controlled open burn in compliance with the Municipal Solid Wastes Suitable for Open Burning Guidelines.

Non-Combustible, Recyclable and Hazardous Waste: All non-combustible, recyclable and hazardous wastes will be packaged in the appropriate containers and backhauled to Rankin Inlet for proper disposal.

Please refer to the “Waste Management Plan” for additional information on waste management.

5.5 Sumps

All drill sumps will be inspected and will be back filled and re-contoured as required. Photographs of each drill site sump will be included in the final closure report.

5.6 Drill Sites

The drill will be dismantled into its main components as per the drilling contractor procedure, packaged and secured along with its ancillary equipment and rods. The drill will be flown out by the drilling contractor.

All drill sites will be inspected immediately following the completion of the drill hole and removal of the drilling equipment. Photographs will document the state of the drill hole site before and after the drilling activities. During the final year of operations, all of the drill sites will be inspected for contamination, debris and any further ground disturbance. Any contamination will be treated as per the “Spill Prevention and Response Plan”. Photographs will be submitted in the final closure report.

5.7 Bulk Sample Sites

During the final year of operation, all of the bulk sample sites will be re-visited and inspected for contamination, debris and signs of settling and ground disturbance. Any contamination will be treated as per the “Spill Prevention and Response Plan”. All debris will be removed and photographs will document the state of these sites at final closure and submitted along with the final closure report.

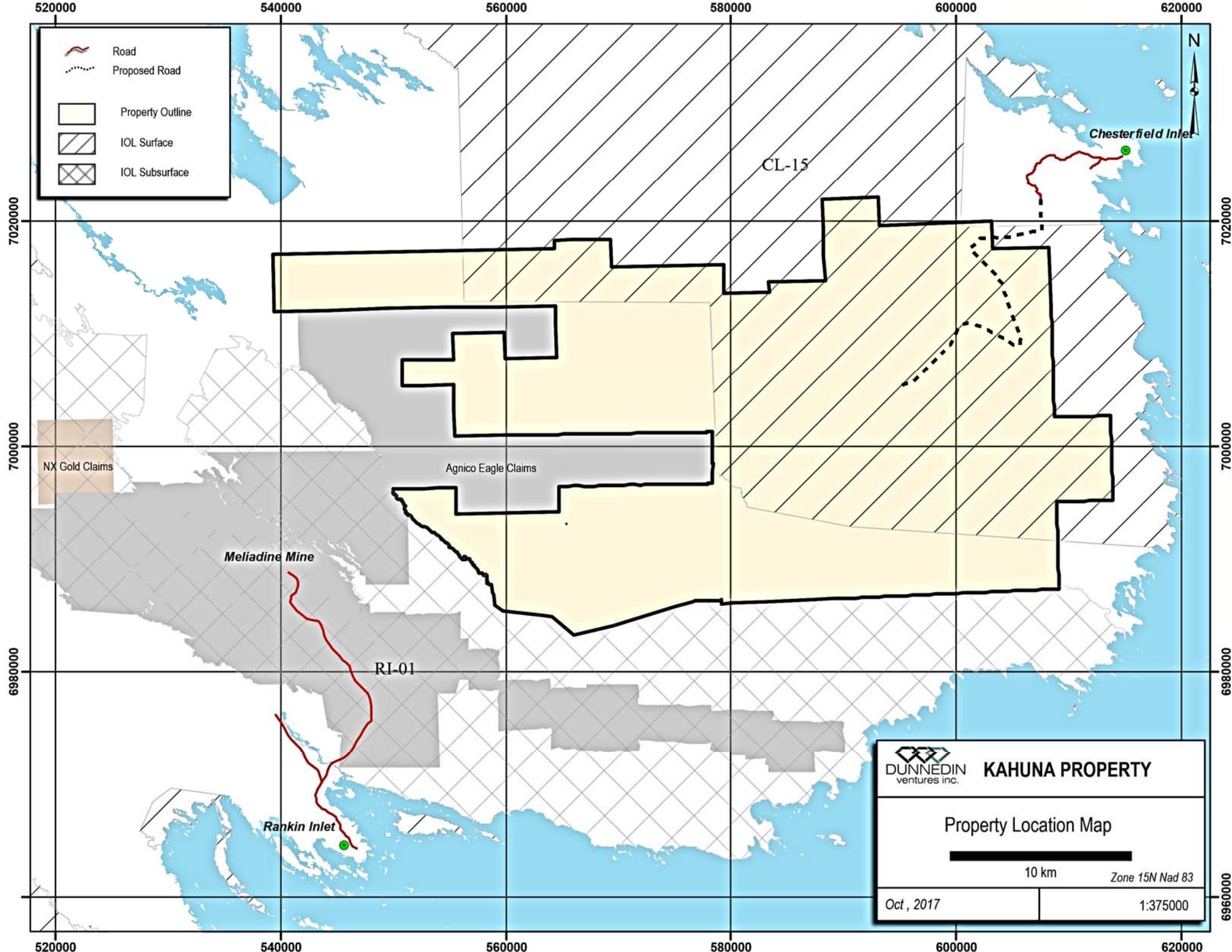
5.8 Contamination Cleanup

Any contamination resulting from Dunnedin's exploration activities will be treated according to Dunnedin's Spill Prevention and Response Plan.

5.9 Inspection and Documentation

A complete inspection will be conducted of all the work site areas. Photographs will be submitted in the final closure report documenting the conditions at each work site.

APPENDIX A: MAPS



	Road
	Proposed Road
	Property Outline
	IOL Surface
	IOL Subsurface

KAHUNA PROPERTY	
Property Location Map	
<i>Zone 15N Nad 83</i>	
Oct, 2017	1:375000



EMERGENCY RESPONSE PLAN

(PLACE VISIBLY AT ALL WORK STATIONS)

The procedures herein are intended to provide personnel on the **Kahuna Property** with a clear stepwise approach to respond to human health and safety emergencies.

This document provides important contact information for a range of community, medical and transportation services that may be mobilized in the event of an incident.

2018 Exploration Program

The Kahuna Property field camp has a Level 3 First Aid Attendant on site and is equipped with a Level 3 First Aid facility.

For emergency purposes the field camp site is equipped with an office based HSE Internet + Voice telephone, an Iridium hand held satellite telephone, Garmin InReach device and a VHF radio base station. All work crews carry a VHF hand held radio, Garmin InReach device and a GPS. Iridium phones and hand held radios are stationed at the drill rig and the drill site core shack.

A Bell 206 L4 Long Ranger (or similar) helicopter is based on site and is equipped with VHF radio for communication with ground crews that also carry an Iridium satellite phone for emergency communications.

In the event OF AN EMERGENCY:

1. Immediately contact the First Aid Attendant by radio

- Identify yourself and your location
- The nature of the incident and the injuries,
- Number of people involved and any other important details.
- The helicopter pilot will transport the First Aid Attendant to the emergency.

The First Aid Attendant is the Responsible Person on site.

Once notified, the Responsible Person (or Alternate) will be responsible to determine what further actions are necessary. They will stabilize the patient and if necessary, prepare them for transportation to the Rankin Inlet Health Centre.

2. Determine if medical evacuation is required.

Considerations: Nature/seriousness of injury, weather, daylight.

If medical evacuation is required:

Contact Kivalliq Health Centre in Rankin Inlet by satellite phone

867-645-8300

- Contact Kivalliq Health Centre in Rankin Inlet to inform them of the situation and give them an ETA (estimated time of arrival) for the incoming patient.
- Transport sick or injured personnel to Rankin Inlet by helicopter.



- Liaise with Rankin Inlet medical / emergency personnel who will mobilize other emergency services, as required.

3. Other Important Service Contacts

Once the emergency response procedures have been implemented, the Camp Manager should contact the appropriate agencies or companies and update them on the situation.

CONTACT	LOCATION	TELEPHONE
Rankin Inlet RCMP	Rankin Inlet	867-645-0123
Chesterfield Inlet Health Centre	Chesterfield Inlet	867-898-9968
Workers Safety and Compensation Com.	Emergency Number	800-661-0792
Great Slave Helicopters	Yellowknife	867-873-2081
Dunnedin Ventures Inc.	Vancouver	604-646-8351

4. Kahuna Property Location

LOCATION	Latitude (North)	Longitude (West)	Easting	Northing	NAD 83 Zone
FIELD CAMP	63°02' 22"	91° 29' 52"	575975	6990875	15

The minimum and maximum latitude/longitude coordinates of the property are as follows:

Minimum Latitude: 62° 58' N

Minimum Longitude: 90° 44' W

Maximum Latitude: 63° 19' N

Maximum Longitude: 92° 13' W

5. Nearest Hospitals and Health Centres:

The nearest health centre are located in Rankin Inlet and Chesterfield Inlet, NU. The field camp is located approximately 40 kilometres from Rankin Inlet and 50 kilometres from Chesterfield Inlet.



WASTE MANAGEMENT PLAN

Kahuna Property
Dunnedin Ventures Inc.

Submitted: November 8, 2017
Effective Date: November 8, 2017

Prepared By: Andrew Berry, VP Operations
Dunnedin Ventures Inc.
Suite 1020-800 West Pender Street
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1 Introduction

This Waste Management Plan (WMP) shall be in effect from November 8, 2017 and has been specifically prepared for the Kahuna Property. The property is located between the communities of Rankin Inlet (Kangiqtiniq) and Chesterfield Inlet (Igluigaarjuk) in the Kivalliq Region of Nunavut. Dunnedin Ventures Inc. (Dunnedin) has submitted an application for a Nunavut Waste Generator Number.

The purpose of this Waste Management Plan is to provide procedures for the collection, storage, transportation and disposal of wastes while minimizing adverse effects on the environment. A copy of this plan will be kept in the office at site and at the head office in Vancouver. Copies of this plan may be obtained from Dunnedin.

This Waste Management Plan should be used in conjunction with other property plans and best management practices. Other plans at the Kahuna Property include:

- Abandonment and Restoration Plan
- Emergency Response Plan
- Environmental and Wildlife Management Plan
- Field Safety Manual
- Fuel Management Plan
- Spill Contingency Plan

1.1 Corporate Details

Dunnedin Ventures Inc.
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Vancouver, British Columbia, V6C 2V6
Tel: (604) 646-8351
Fax: (604) 646-4526
www.dunnedinventures.com

1.2 Project Description

The Kahuna Property comprises 145 mineral claims encompassing 166,463 hectares of land located on NTS map sheets 0550/02, 0550/03, 0550/04, 0550/05, 0550/06, 0550/07, 055J/13, 055J/14, 055N/01 and 055N08. The southern boundary of the property adjoins the north boundary of subsurface Inuit Owned Land (IOL) parcel RI-01, approximately 25 kilometres northeast of Rankin Inlet. The northeast corner of the property is located approximately 10 kilometres southeast of Chesterfield Inlet. The northwest corner of the property is located approximately 75 kilometres west of Chesterfield Inlet. The Property extends north, south, east and west between Latitudes 62°58' and 63°19' North and Longitudes 90°44' and 92°13' West (UTM coordinates: 6,983,000mN to 7,023,000mN and 539,000mE to 614,000mE, NAD83, Zone 15). A total of 82 mineral claims have surface rights covering 87,570 Ha that are within, or partially within, the boundaries of surface Inuit Owned Land parcel CI-15.

Exploration activities on the Kahuna Property are currently permitted under INAC Land Use Permit N2015C0019, KIA Land Use Licence KVL315B01 and NWB Water Licence 2BE-KDP1722.

The exploration program planned and proposed for 2018 will consist of diamond drilling, rock, till and soil sampling, prospecting and geological mapping, ground geophysical surveying, bulk sampling and reverse circulation drilling.

An amendment application has been submitted to NPC and NIRB to authorize a temporary field camp and fuel cache on Crown Lands under INAC Land Use Permit N2015C0019, and to authorize domestic water use for the temporary camp under NWB Water Licence 2BE-KDP1722. The temporary camp will be used to support exploration activities authorized by Dunedin's existing permits and licences.

The temporary field camp will accommodate up to 20 people and will be comprised of: 1 kitchen tent, 1 office tent, 1 dry tent, 1 utility tent, 1 core logging tent, 7 supplementary sleep tents, a Pacto latrine facility, a portable fuel-fired incinerator and a small generator shed. The structures will consist of a combination of WeatherPort vinyl tents, canvas prospectors' tents and small plywood structures. These camps will be fully closed and dismantled completely once exploration activities cease. The sites will then be reclaimed and restored to their original state. Full details regarding the temporary field camp can be found in the "2018 Work Plan".

1.3 Applicable Legislation and Guidelines

Waste management at the Kahuna Property will be conducted in accordance with Federal and Territorial Acts, Regulations, Guidelines and Recommendations including, but not limited to:

1.3.1 Federal

- CCME Environmental Codes of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products
- Canada-Wide Standards for Dioxins and Furans (Canadian Council of Ministers of the Environment)
- Canadian Centre for Occupational Health and Safety Act
- Canadian Environmental Protection Act
- Fisheries Act
- Guidelines for Spill Contingency Planning (INAC)
- International Air Transport Association (IATA) Regulations
- National Fire Code of Canada
- Northern Land Use Guidelines
- Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations
- Territorial Lands Act
- Transportation of Dangerous Goods Act
- Workplace Hazardous Materials Information System (WHMIS)

1.3.2 Territorial

- Environmental Guideline for the Management of Contaminated Sites
- Environmental Guideline for the General Management of Hazardous Waste
- Environmental Protection Act
- Nunavut Environmental Guidelines for the Burning and Incineration of Solid Wastes
- Municipal Solid Wastes Suitable for Open Burning Guidelines
- Fire Prevention Act

- Mine Health and Safety Act and Regulations
- Nunavut Occupational Health and Safety Regulations
- Nunavut Waters Act and Nunavut Surface Rights Tribunal Act
- Public Health Act
- Safety Act

2 Waste Management

2.1 Definition of Wastes

At the Kahuna Property, waste is a term used to describe materials that are no longer wanted or are unusable for their original intended purpose. Hazardous waste is defined as “a contaminant which is a dangerous good that is no longer used for its original purpose and is intended for recycling, treatment, disposal or storage” (Guideline for the General Management of Hazardous Waste, 2010). Hazardous wastes often require specific management measures to ensure the health and safety of the workers and environment.

2.2 Waste Sources

A summary of the predicted types of wastes (hazardous and non-hazardous) to be generated on the Kahuna Property from exploration activities and camp operations is provided in the tables below.

TABLE 1: NON-HAZARDOUS (INERT) WASTES

Waste Type	Examples	Estimated Quantity Generated
Sewage	Human waste	~ 0.05 m ³ /day
Camp greywater	Water from kitchen and sinks, showers	<3 m ³ /day
Combustible solid waste	Food wastes, paper, untreated wood (sent to incinerator daily)	~ 0.05 m ³ /day
Incinerator ash	Ash from the incinerator	Negligible
Drill cuttings	From Diamond Drilling operations	0.5 m ³ /day
Non-combustible solid waste - Scrap Metal	Empty drums nails/screws	~5 empty drums/day
Non-combustible solid waste – Plastics/Glass	Bags, bottles, packaging, Bottles, jars	~ 0.05 m ³ /day
Non-combustible solid waste - Equipment	Pumps, motors, fans, heaters, screens	Unknown/ Negligible
Non-combustible solid waste - Rubber Products	Tires, floor mats	Unknown/ Negligible
Waste oil	Used oil – hydraulic and motor oil	~ 0.001 m ³ /day
Contaminated soils	Contaminated soil/snow/water	Unknown

TABLE 2: HAZARDOUS WASTES

Waste Type	Examples	Uses	Estimated Quantity Used
Petrochemicals - Diesel		Generators, Tent heating	~2 drums/day
Petrochemicals - Jet Fuel	Jet A or Jet B	Helicopter	~2-3 drums/day
Petrochemicals - Gasoline		Skidoos	~0.1 drums/day
Petrochemicals - Oil	Hydraulic, motor	Generators, skidoos	~ 0.001 m ³ /day
Solvents	Cleaning products	Cleaning	Negligible
Electronics	Computers, transformers	Camp operations	Negligible
Light bulbs	Regular bulbs, compact fluorescent tubes	Lighting	Unknown
Batteries	Dry cell batteries, lead-acid based batteries	GPS, computers, satellite phones, generators	Unknown

2.3 Waste Management Activities

The Waste Management Plan for the Kahuna Property is designed to ensure the proper handling, storage, transportation, recycling, treatment and disposal of hazardous wastes to reduce the potential impacts waste could have on the environment and workers health and safety (Guideline for the General Management of Hazardous Waste, 2010). To reduce the amount of waste generated, materials will be used efficiently. Wastes created will be sorted and classified according to its specific characteristics and handled appropriately.

These waste management practices have been proven in cold climates.

2.4 Waste Reuse and Recycling

To reduce the amount of waste generated, Dunnedin will engage in reusing and recycling materials whenever possible. Metal and wood will be repurposed to its full extent. Scrap metal will be removed from the property regularly and shipped south to an authorized metals recycling facility. Recyclable glass and plastics will be segregated accordingly and will be removed from the property regularly and shipped south to an authorized recycling facility.

3 Waste Classification and Disposal Plan

3.1 Hazardous Wastes

All hazardous waste materials will be collected in sealed and appropriately labeled containers and stored in secondary containment. All hazardous wastes will be removed from the property regularly for recycling or authorized disposal. Hazardous wastes will be transported in accordance with the Transportation of Dangerous Goods (TDG) and International Air Transport Association (IATA) regulations. Refer to the “Fuel Management Plan” for policies and procedures dictating the safe transport, storage and handling of fuels

and other hazardous materials. Refer to the “Spill Contingency Plan” for the policies and response procedures to be followed in the event of a spill.

3.1.1 Used Oil

Waste oil from generators, pumps, vehicles or other equipment will be collected and stored in sealed and labeled 20 litre pails or sealed and labeled 205L drums. All waste oil pails and drums will be removed from the property regularly and will be transported south to an authorized hazardous waste disposal facility.

3.1.2 Hydraulic Fluid

Waste hydraulic fluids will be collected and stored in sealed and labeled 20 litre pails or sealed and labeled 205L drums. Waste hydraulic fluids pails or drums will be removed from the property regularly and will be transported south to an authorized hazardous waste disposal facility.

3.1.3 Contaminated Fuels

Contaminated and waste fuels will be collected and stored in sealed and labeled 205L drums. All contaminated and waste fuels will be removed from the property regularly and will be transported south to an authorized waste disposal facility.

All drummed fuels will be stored in secondary containment berms, in organized horizontal rows, with bungs tightly secured and oriented at 3:00 and 9:00 o'clock positions to mitigate moisture inflow. All drummed fuels will be clearly labeled in accordance with the Workplace Hazardous Materials Information System (WHMIS) which includes the name of the fuel provider, the date the drum was filled and the type of fuel contained within. Drummed jet fuel has a one year drum life after which it must be retested to confirm that it remains compliant with the requirements of the Canadian General Standards Board specified for Aviation Turbine Fuel. All efforts will be made to use jet fuel prior to the expiry date specified on the individual drums. In the event that the drum is not used prior to the expiry date the fuel will be tested and recertified so as to avoid designation as waste fuel.

3.1.4 Solvents

Whenever possible, non-toxic alternatives will be used in place of petroleum based solvents. Waste solvents will be sealed in their original containers and stored in the hazardous waste storage area. Those containers will be removed from the property regularly and transported to an approved disposal facility.

3.1.5 Contaminated Snow and Ice

All contaminated water, ice and snow will be cleaned up immediately and contained in sealed and appropriately labelled 205L drums and stored in secondary containment berms. Drums containing contaminated water, ice or snow will be removed from site regularly and transported to an approved disposal facility. Please refer to the “Spill Contingency Plan” for additional procedures for spills resulting with contaminated water, snow and ice.

3.1.6 Contaminated Soils

All contaminated soils will be cleaned up immediately and contained in sealed and appropriately labelled 205L drums and stored in secondary containment berms. Drums containing contaminated soils will be removed from site and transported to an approved disposal facility or pending the appropriate

authorizations, contaminated soils may be remediated by soil farming. Please refer to the “Contingency Plan” for additional procedures for spills resulting with contaminated soils.

3.1.7 Used Rags and Sorbents

Used rags and sorbent pads will be incinerated on site in a duel chamber, forced-air incinerator. Granular sorbents will be placed in sealed and labeled containers and stored in the hazardous waste storage area and will be removed from regularly and transported to an authorized disposal facility.

3.1.8 Empty Drums and Hazardous Materials Containers

After use, all fuel drums will be drained of residual contents. These contents will be and aggregated into 205L waste fuel drums. All empty drums and hazardous materials containers will be stored in a designated area. Empty drums will be removed from site regularly and transported south to be returned to the supplier for recycling or to an authorized facility for disposal.

3.1.9 Waste Batteries

Dry cell batteries (AAA to D cell, 6 or 9 volt) will be collected in a designated container and backhauled to an approved recycling facility.

Waste lead acid batteries will be packaged in accordance with TDG Regulations and will be removed from site regularly. All waste lead acid batteries will be transported south for disposal at an authorized facility.

3.1.10 Aerosol Cans

Empty aerosol cans will be stored in a designated and appropriately labelled container and will be backhauled for proper disposal.

3.1.11 Fluorescent Bulbs and Tubes

If possible, waste fluorescent bulbs and tubes are packaged in their original container and backhauled to an accredited facility. Fluorescent bulbs and tubes are considered hazardous if broken. Broken bulbs/tubes are: collected in a sealed drum; labeled and shipped to a registered hazardous waste receiver.

3.2 Inert Non-Combustible Solid Wastes

3.2.1 Drill Cuttings

Drill cuttings will be collected in a sump or in a naturally occurring low lying depression proximal to the drill target and at least 31 metres from the high water mark of nearby water sources.

3.2.2 Tires and Other Rubber Materials

Tires and other rubber materials that cannot be patched or repurposed will be backhauled for proper recycling/disposal.

3.2.3 Scrap Metal

Scrap metal will be repurposed as much as possible. Scrap metal will be removed from the property regularly and shipped south to an authorized metals recycling facility.

3.2.4 Glass

All waste glass will be stored in a sealed and clearly marked container. Waste glass will be removed from site regularly and shipped south for recycling at an authorized facility.

3.2.5 Electronics

Electronics and electrical equipment will be collected in a container. Waste electrical equipment will be removed from site regularly and shipped south for disposal or recycling at an authorized facility.

3.2.6 Vehicles and Other Mechanical Equipment

Broken vehicles and mechanical equipment that is unserviceable and no longer functioning will be removed from site and transported south for refurbishing or disposal at an authorized facility.

3.3 Inert Combustible Solid Wastes

All Inert Combustible Solid Wastes will be incinerated in a dual chamber, fuel fired, forced-air incinerator in accordance with the Nunavut Environmental Guidelines for the Burning and Incineration of Solid Waste and Canada-Wide Standards for Dioxins and Furans. Ash generated from the on-going incineration will be stored in sealed 205 L drums. Ash drums will be removed from site regularly and transported south for disposal at an authorized facility.

3.3.1 Food Waste and Packaging

Food waste and packaging will be incinerated in accordance with the Nunavut Environmental Guidelines for the Burning and Incineration of Solid Wastes. Ash generated from the on-going incineration of food waste and packaging will be stored in sealed 205 L drums. Ash drums will be removed from site regularly and transported south for disposal at an authorized facility.

3.3.2 Paper and Cardboard

Paper and cardboard will be incinerated in accordance with the Nunavut Environmental Guidelines for the Burning and Incineration of Solid Wastes. Ash generated from the on-going incineration of paper and cardboard will be stored in sealed 205 L drums. Ash drums will be removed from site regularly and transported south for disposal at an authorized facility.

3.3.3 Waste Lumber

Unusable waste lumber will be incinerated in accordance with the Nunavut Environmental Guidelines for the Burning and Incineration of Solid Wastes. Ash generated from the on-going incineration of waste lumber will be stored in sealed 205 L drums. Ash drums will be removed from site regularly and transported south for disposal at an authorized facility. Untreated, larger pieces of lumber will be burned in a controlled open burn in compliance with the Municipal Solid Wastes Suitable for Open Burning Guidelines.

3.4 Sewage

The field camp will use either Pacto toilets or outhouse latrine facilities. If Pacto toilets are used, bags containing black water waste will be incinerated in accordance with the Nunavut Environmental Guidelines for the Burning and Incineration of Solid Wastes. Ash generated from the incineration of Pacto wastes will be sealed in designated 205 L drums and labelled accordingly. Ash drums will be removed from

site regularly and transported south for disposal at an authorized facility. In the event outhouses are used, outhouse holes will be treated with lime and infilled with the soil originating from the site.

4 Site Facilities

4.1 Hazardous Waste Storage Area

All hazardous waste materials will be stored in secondary containment adjacent to the main fuel cache at Dunnedin's temporary field camp. The hazardous waste storage area will be a minimum of 31 metres from the normal high water mark of any water body and such that there is no possibility of a potential spill entering any water body. All hazardous wastes will be sealed and labelled in containers and stored in the hazardous waste storage area until they can be backhauled for recycling or authorized disposal.

Secondary containment berms will be equipped with Spilfyter RailMat 3 ply hydrocarbon absorbent fabric (or similar) and Rain Drain hydrocarbon filters for water drainage. Secondary containment structures will be capable of holding 110 percent of the volume of the largest fuel reservoir that is housed within the secondary containment. These structures will be of sufficient height and depth to hold any potential spill or failure and will be made of material that is sufficiently durable to withstand Nunavut's climate and the natural terrain. Secondary containment structures will comply with all applicable federal and territorial laws, regulations and guidelines.

4.2 Incinerator

The field camp proposed for the Kahuna Property will utilize a portable, fuel fired, dual chamber, forced-air incinerator for the disposal of combustible solid wastes. All combustible waste will be incinerated in accordance with the Nunavut Environmental Guideline for the Burning and Incineration of Solid Waste and Canada-Wide Standards for Dioxins and Furans. Ash generated from the on-going incineration will be stored in sealed metal 205 L drums and removed from site regularly to be transported south for recycling or disposal at an authorized facility

4.3 Sump

Waste water from the field camp will be discharged to a grey water sump. A grease trap and screens will be installed on the kitchen drain to ensure grease and food solids do not enter the sump. The discharge pipe into the sump will be inaccessible to wildlife. The grey water sump will be located at least 31 metres away from a water body.

Drill cuttings will be collected in an excavated sump or a naturally occurring low lying depression, proximal to the drill target and at least 31 metres from the high water mark of nearby water sources.

5 Training

Site and job-specific training will be provided to all personnel who are required to handle waste materials. Dunnedin will have a Level 3 First Aid Attendant on site during operations. The Camp Manager is required to oversee the handling of hazardous wastes and must have valid First Aid and WHMIS. On site management are responsible for the transportation of hazardous wastes and have Transportation of Dangerous Goods (TDG) certification. All employees and contractors will receive training in Fuel Management, Waste Management and Spill Response, as outlined in the Kahuna Property Fuel Management Plan, Waste Management Plan and Spill Prevention and Response Plan.

Personnel responsible for operating or maintaining the incinerator will receive hands on training to ensure the equipment is operated safely and efficiently in accordance with the Nunavut Environmental Guidelines for the Burning and Incineration of Solid Wastes.

6 Inspection and Monitoring

Inspections of the hazardous waste storage area and other waste storage facilities to ensure the hazardous waste inventory is up to date, secondary containment is in place and in good condition, and that spill kits are fully stocked will be conducted weekly. Daily monitoring of the hazardous waste storage area and the contained wastes will include an assessment of the condition of waste receptacles and storage containers, checking for any damaged or leaking containers or berms, and ensuring that waste is collected and stored in the correct containers and safely placed in the storage area. Waste inspections will be completed in conjunction with the fuel storage inspections outlined in the Kahuna Property “Fuel Management Plan.” Any leaks or spills will be treated as outlined in the Kahuna Diamond Property “Spill Prevention and Response Plan.”

The Project Supervisor is responsible for supervising the monitoring and inspection program, and keeping a detailed inventory of all hazardous wastes on site.