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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

EXPLORATION/ REMOTE CAMP SUPPLEMENTARY QUESTIONNAIRE

Applicant: Mars Society **Licence No:** _____

(For NWB Use Only)

ADMINISTRATIVE INFORMATION

1. Environment Manager: Robert Zubrin Tel: 303-980-0890 Fax: 303-980-0753_E-mail: zubrin@aol.com
2. **Project Manager** Robert Zubrin Tel: 303-980-0890 Fax: 303-980-0753_E-mail: zubrin@aol.com
- 3.
4. Does the applicant hold the necessary property rights? yes
5. Is the applicant an 'operator' for another company (i.e., the holder of the property rights)? No. If so, please provide letter of authorization.
6. Duration of the Project

☐ One year or less Start and completion dates: April 2007- Sept. 2009
☒ Multi Year:

If Multi-Year indicate proposed schedule of on site activities
Start: April 2007 Completion: Sept. 2009

CAMP CLASSIFICATION

7. Type of Camp
☐ Mobile (self-propelled)
☐ Temporary
☒ Seasonally Occupied: summers
☐ Permanent
☐ Other: _____

8. What is the design, maximum and expected average population of the camp?
Design and maximum population = 9 people. Expected average = 7 people.

9. Provide history of the site if it has been used in the past. The site has been used as a research station by the Mars Society every summer since 2000, except for 2006, when we did not operate..

CAMP LOCATION

10. Please describe proposed camp location in relation to biogeographical and geomorphological features, and water bodies.

The camp is on a ridge overlooking the NW edge of Haughton crater. About 300 m NW of the camp there is a stream, from which we draw our water.

11. How was the location of the camp selected? Was the site previously used? Was assistance from the Regional Inuit Association Land Manager sought? Include maps and/or aerial photographs.

The site was selected during a scouting expedition to the island in 1999.

12. Is the camp or any aspect of the project located on:

<input checked="" type="checkbox"/> Crown Lands	Permit Number (s)/Expiry Date: N2003J0001 Expires June 21, 2008.
<input type="checkbox"/> Commissioners Lands	Permit Number (s)/Expiry Date: _____
<input type="checkbox"/> Inuit Owned Lands	Permit Number (s)/Expiry Date: _____

13. Closest Communities (direction and distance in km):

Resolute Bay, 150 km

14. Has the proponent notified and consulted the nearby communities and potentially interested parties about the proposed work?

Yes.

15. Will the project have impacts on traditional water use areas used by the nearby communities? No. Will the project have impacts on local fish and wildlife habitats? No

PURPOSE OF THE CAMP

16. ☐ Mining (includes exploration drilling)
☐ Tourism (hunting, fishing, wildlife observation, adventure/expedition, etc.)

(Omit questions # 16 to 21)

x Other Scientific research

17. Activities (check all applicable)

- ☐ Preliminary site visit
- ☐ Prospecting
- ☐ Geological mapping
- ☐ Geophysical survey
- ☐ Diamond drilling
- ☐ Reverse circulation drilling
- ☐ Evaluation Drilling/Bulk Sampling (also complete separate questionnaire)
- x Other: Testing planetary exploration techniques

18. Type of deposit (exploration focus): N/A

- ☐ Lead Zinc
- ☐ Diamond
- ☐ Gold
- ☐ Uranium
- ☐ Other: _____

DRILLING INFORMATION

19. Drilling Activities None

- ☐ Land Based drilling
- ☐ Drilling on ice

20. Describe what will be done with drill cuttings? N/A

21. Describe what will be done with drill water? N/A

22. List the brand names and constituents of the drill additives to be used? Includes MSDS sheets and provide confirmation that the additives are non-toxic and biodegradable. N/A

23. Will any core testing be done on site? No. Describe.

SPILL CONTINGENCY PLANNING

24. The proponent is required to have a site specific Spill Contingency Plan prepared and submitted with the application This Plan should be prepared in accordance with the *NWT Environmental Protection Act, Spill Contingency Planning and Reporting Regulations, July 22, 1998* and *A Guide to the Spill Contingency Planning and Reporting Regulations, June 2002*. Please include for review.

Only one 55 gallon fuel drum is open at a time. Before it is opened it is placed on an absorbent mat that is on top of an impermeable mat. There is an empty drum, a hand pump, and a supply of additional absorbent mats nearby. Should any fuel spill, it will be caught on the absorbent mat and absorbed. The absorbent mat can then be disposed of in a burn barrel. Should the spill be too large for the absorbent mat, it will be caught on the impermeable mat. The residual spilt fuel can then be either pumped back into the empty drum or soaked up with a second absorbent mat. In six years of operations, we have not damaged the environment with any fuel spills.

25. How many spill kits will be on site and where will they be located?

There will be four kits. One is located in the immediate vicinity of our fuel drums. The other three are located in the station, some 30 m away.

26. Please describe the types, quantities, and method of storage of fuel and chemicals on site, and provide MSDS sheets.

(20) 55 gallon Kerosene drums

(10) 55 gallon gasoline drums

(10) standard propane bottles.

WATER SUPPLY AND TREATMENT

27. Describe the location of water sources.

The station is located on a ridge about 300 m southeast of a stream, which serves as its source of water.

28. Estimated water use (in cubic metres/day):

x	Domestic Use: <u>0.16</u>	Water Source: <u>the stream</u>
<input type="checkbox"/>	Drilling: _____	Water Source: _____
<input type="checkbox"/>	Other: _____	Water Source: _____

29. Describe water intake for camp operations? Is the water intake equipped with a mesh screen to prevent entrapment of fish? (see *DFO 1995, Freshwater Intake End-of-Pipe Fish Screen Guideline*) Describe:

We acquire our water by sending someone down to the stream with an ATV with a trailer, and six plastic jerry cans. A bilge pump, equipped with a screen, is used to pump water into the cans. There are no fish in the stream.

30. Will drinking water quality be monitored? Yes. What parameters will be analyzed and at what frequency?

We will test for coliform bacteria every week.

31. Will drinking water be treated? Yes. How? With bleach.

32. Will water be stored on site? Yes. Our tank holds about 40 gallons.

WASTE TREATMENT AND DISPOSAL

33. Describe the characteristics, quantities, treatment and disposal methods for:

☒ Camp Sewage (blackwater)

_____human solid waste will be burned in a burn barrel. Urine will be stored for shipment to Resolute Bay and disposal there._____

☒ Camp Greywater

_____The gray water is discharged on the side of the ridge southeast of the station, in the direction opposite of the creek._____

☒ Solid Waste

_____burned in a burn barrel

☒ Bulky Items/Scrap Metal

_____Shipped to Resolute bay for disposal_____

☒ Waste Oil/Hazardous Waste

_____waste oil is burned in a burn barrel_____We have no hazardous waste._____

☒ Empty Barrels/Fuel Drums

_____shipped to Resolute Bay for disposal_____

☒ Other:

_____Residue from the burn barrel is bagged and shipped to Resolute Bay for disposal._____

34. Please describe incineration system if used on site. What types of wastes will be incinerated?
We bag our waste and burn it in a burn barrel with the help of a cup of kerosene every day.

35. Where and how will non-combustible waste be disposed of?
It will be shipped to Resolute Bay. If in a municipality in Nunavut, has authorization been granted?
Yes. The amount of our waste is quite small, and we deliver it to the South Camp Inn, our logistics support, for disposal as a small fraction of their ordinary waste disposal.

36. Describe location (relative to water bodies and camp facilities) dimensions and volume, and freeboard for all sumps (if applicable).

The station discharges a sump containing about 120 liters (0.12 cubic meters) per day of gray water. The gray water is discharged on the side of the ridge southeast of the station, in the direction opposite of the creek. There is no black water discharge, as solid human waste is incinerated and urine is shipped out.

37. Will leachate monitoring be done? N/A. What parameters will be sampled and analyzed, and at what frequency?

OPERATION AND MAINTENANCE

38. Have the water supply and waste treatment and disposal methods been used and proven in cold climate? Yes. We have used it for 6 years at this location. What known O&M problems may occur? What contingency plans are in place?

We have a backup device that can be used to obtain water by melting snow using the waste heat from our power generator.

ABANDONMENT AND RESTORATION

39. Provide a detailed description of progressive and final abandonment and restoration activities at the site.

We ship out all our waste every season. No junk is left on site. No alternations to the terrain have been done, and none are anticipated. The only permanent item is the station structure itself. At the end of our program, we will either take this down, or, if the authorities prefer, we will donate it to the Nunavut Territory so it can continue to be used by Inuit hunters as a winter emergency shelter.

BASELINE DATA

40. Has or will any baseline information be collected as part of this project? Provide bibliography.

- ☐ Physical Environment (Landscape and Terrain, Air, Water, etc.)
- ☐ Biological Environment (Vegetation, Wildlife, Birds, Fish and Other Aquatic Organisms, etc.)
- ☐ Socio-Economic Environment (Archaeology, Land and Resources Use,
- ☐ Demographics, Social and Culture Patterns, etc.)
- x Other: _The project is primarily concerned with using the site to test human planetary exploration techniques._Here is a bibliography of some of our publications.

V. Pletser, P. Lognonne, M. Diamant, V. Ballu, V. Dehant, P. Lee, and R. Zubrin, "Subsurface Water Detection on Mars by Active Seismology: Simulation at the Mars Society Arctic research Station," Conference on the Geophysical Detection of Water on Mars, 2001.

R. Zubrin, "The Flashline Mars Arctic Research Station: Dispatches from the First Year's Mission Simulation," AIAA 2002-0993 40th AIAA Aerospace sciences Meeting and Exhibit, Reno, NV January 14-17, 2002

V. Pletser, R. Zubrin, and K. Quinn, "Simulation of Martian EVA at the Mars Society Arctic Research Station," presented to World Space Congress, Houston, Texas, October, 2002. (attached)

R. Zubrin, "Mars on Earth," Tarcher Penguin, New York, 2003 (book)

W. J. Clancey "Principles for integrating Mars Analog Science, Operations, and Technology Research," Workshop on analog Sites and Facilities for the Human Exploration of the Moon and Mars," Colorado School of Mines, Golden, CO May 21-23, 2003

L. Wynn et al, "The Geophysical Study of an Earth Impact Crater as an Analogue for Studying Martian Impact Craters," On to Mars 2, Frank Crossman and R. Zubrin editors, Apogee Publishers, Burlington, Ontario, 2005

S. Sklar and S. Rupert, "A Field Methodology Approach Between and Earth Based Remote Science Team and a Planetary-Based Field Crew," AAS 06-260, Mars Analog research, edited by Jonathan Clarke, Univelt, San Diego, 2006.

REGULATORY INFORMATION

41. At a minimum, you should ensure you have a copy of and consult the documents below for compliance with existing regulatory requirements:

- ✓ ARTICLE 13 – *NCLA -Nunavut Land Claims Agreement*
- ✓ NWNSRTA – *The Nunavut Waters and Nunavut Surface Rights Tribunal Act, 2002*
- ✓ *Northwest Territories Waters Regulations, 1993*
- ✓ NWB - Water Licensing in Nunavut - Interim Procedures and Information Guide for Applicants
- ✓ NWB - Interim Rules of Practice and Procedure for Public Hearings
- ✓ RWED – *Environmental Protection Act, R-068-93- Spill Contingency Planning and Reporting Regulations, 1993*

- ✓ RWED A Guide to the Spill Contingency Planning and Reporting Regulations, 2002
- ✓ NWTWB - Guidelines for Contingency Planning
- ✓ *Canadian Environmental Protection Act, 1999 (CEPA)*
- ✓ *Fisheries Act, RS 1985 - s.34, 35, 36 and 37*
- ✓ DFO - Freshwater Intake End of Pipe Fish Screen Guideline
- ✓ NWTWB - Guidelines for the Discharge of Treated Municipal Wastewater in the NWT
- ✓ Canadian Council for Ministers of the Environment (CCME); Canadian Drinking Water Quality Guidelines, 1987
- ✓ Public Health Act - Camp Sanitation Regulations
- ✓ Public Health Act - Water Supply Regulations
- ✓ *Territorial Lands Act and Territorial Land Use Regulations*; Updated 2000