Hazard Vulnerability Analysis

- Screen for risk, and plan for strategic use of limited resources.
- Focus on hazards that are likely to occur and have greatest impact (health and economic)
- HVA provides an objective planning tool to assist with this process.

Hazard Analysis

Determine Vulnerability

- Quantify Risk = Probability * Severity
- Probability = likelihood event will occur
- Severity = Magnitude – Mitigation, Preparedness and Response Efforts

Activity: Hazard Vulnerability Assessment, (Appendix 2)

Case Study - ATT

YUKON-KUSKOKWIM HEALTH CORPORATION
"Working Together to Achieve Excellent Health"

Water System Hazard Vulnerability Analysis (HVA) Deficiency Report

The highest ranking events for each category are listed below as deficiencies to be addressed. For Atmauluak, the highest three events for each category are listed and events with risk scores greater than 62%. An action plan will be developed based on the deficiencies cited below.

Category	High Risk Events	Risk Score
Natural Event	Extreme cold	83%
Natural Event	Wind storms	78%
Natural Event	Fire	52%
Technological Event	Fuel shortage, internal	83%
Technological Event	Electrical failure, external	72%
Technological Event	Alarm failure	61%
Equipment Event, Treatment	Heating equipment failure	83%
Equipment Event, Treatment	Lack of critical spare parts	78%
Equipment Event, Treatment	Filter failure	72%
Equipment Event, Treatment	Alarm components failure	63%
Equipment Event, Treatment	Electrical controls failure	64%
Equipment Event, Distribution	Heat trace failure	72%
Equipment Event, Distribution	Lift station pump failure	72%
Equipment Event, Distribution	Arctic pipe failure	61%
Human Event	Suppy shortage, fuel	89%
Human Event	Staff shortage	83%
Human Event	Supply shortage, water	61%

Case Study -ATT

High Risk Hazard Action Items

	TARGET AREA	PROJECT	FEASIBILITY	PARTS
1	Heating systems, boilers	Repair boiler and stock spare parts	High	a. Boiler gun assembly parts b. Aquastats, low water cut off, high/low limit c. 7" nipples (3), 12" pipe (3), 1" pipe, 8" pipe, 4" pipe (2), 12" pipe, closed nipples (2), unions (2), 90s (3), plugs (2) d. CF500, 1/4" pressure gauges (2), spare hot water generator pumps (2), Grundfos UMC 50-80 (circa ~1980), Grundfos UPS 1542
2	Heating systems, glycol	Remove glycol double check valve	High	a. ¾" 90s b. ¾" threaded copper pipe c. ¾" sweat (female to female) d. ¾" copper pipe, 2 feet
3	Heating systems, glycol	Air release valves	High	a. ½" taco air release valves (2)
4	Heating systems, glycol	Refill glycol in system	High	a. Glycol, drums (3)
5	Heating systems, lift station	Add glycol heat system to lift station	High	a. TBD b. Glycol, drum (1)
6	Heating systems, fuel shortage	Fix fuel site gauge	High	a. Solenoid valve
7	Heating systems, backup power	Install backup generator power	High	a. Batteries, 12 volt, minimum 1000 CCAs (2)
8	Electrical controls	Repair electrical panel and stock spare parts	High	a. Warrick controls 16HM B1B0 b. Uninterrupted power supply (UPS) for backup power to alarm panel
9	Water treatment equipment	Install flow switch for chlorine	High	a. FS4-3 MacDonald Miller flow switch
10	Spare parts, general	Stock critical spare parts at plant	High	a. LMI pump, model AA151490F1 b. Submersible well pump, Jacuzzi pump ½ hp, 230 volts c. Heating pumps (already described)
11	Lift station	Upgrade lift station	High	a. Auroroa/Hydromatic self-priming sewage & trash pump, model 30MPVL300MS-6 (1 or 2) b. Weather stripping for around the door
12	Protect source from extreme cold	Replace pipe at top of well with arctic pipe and define grade	High	a. Arctic pipe, 4" (or greater), 7' scrap piece
13	Water treatment equipment	Replace filter media	High	a. New filter media
14	Heating system, wastewater collection line	Replace electric heat tape on sewer line	External funding needed	N/A

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Atmautluak Action Plan

Water System Hazard Vulnerability Assessment

April 19, 2011

Other Suggested Action Items

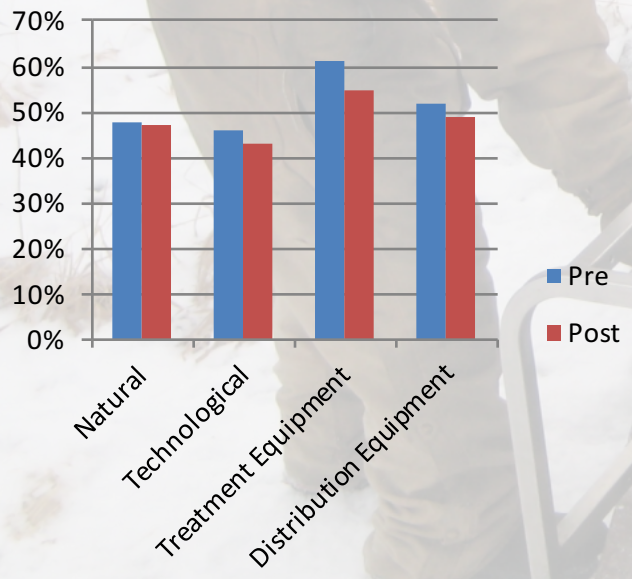
	TARGET AREA	PROJECT	FEASIBILITY	PARTS
1	Pressurized distribution system	Eliminate air compressor	High	a. 2" galvanized coupling for pressure tank

Recommendations for Village Improvements

	TARGET AREA	PROJECT	FEASIBILITY	RECOMMENDATIONS
1	High staff turnover	Improve retention of trained/skilled operators	High	a. Comparable operator pay b. Performance-based pay (training, certification, regulatory compliance)
2	Supply shortage	Keep critical water system supplies on hand to prevent interruption of services	High	a. Budget for necessary water plant supplies b. Maintain inventory of supplies for at least several months c. Develop par list
3	Fuel shortage	Maintain fuel level above minimum level	High	a. Maintain fuel supply at least at half of tank b. Develop operational policy to refill tank when it reaches the halfway mark

Case Study - ATT

Event Category	Pre Relative Threat	Post Relative Threat
Natural	48%	47%
Technological	46%	43%
Treatment Equipment	61%	55%
Distribution Equipment	52%	49%
	52%	49%



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Water System Hazard Vulnerability Analysis (HVA) Deficiency Report

The highest ranking events for each category are listed below as deficiencies to be addressed. For Atmauluak, the highest three events for each category are listed and events with risk scores greater than 62%. An action plan will be developed based on the deficiencies cited below.

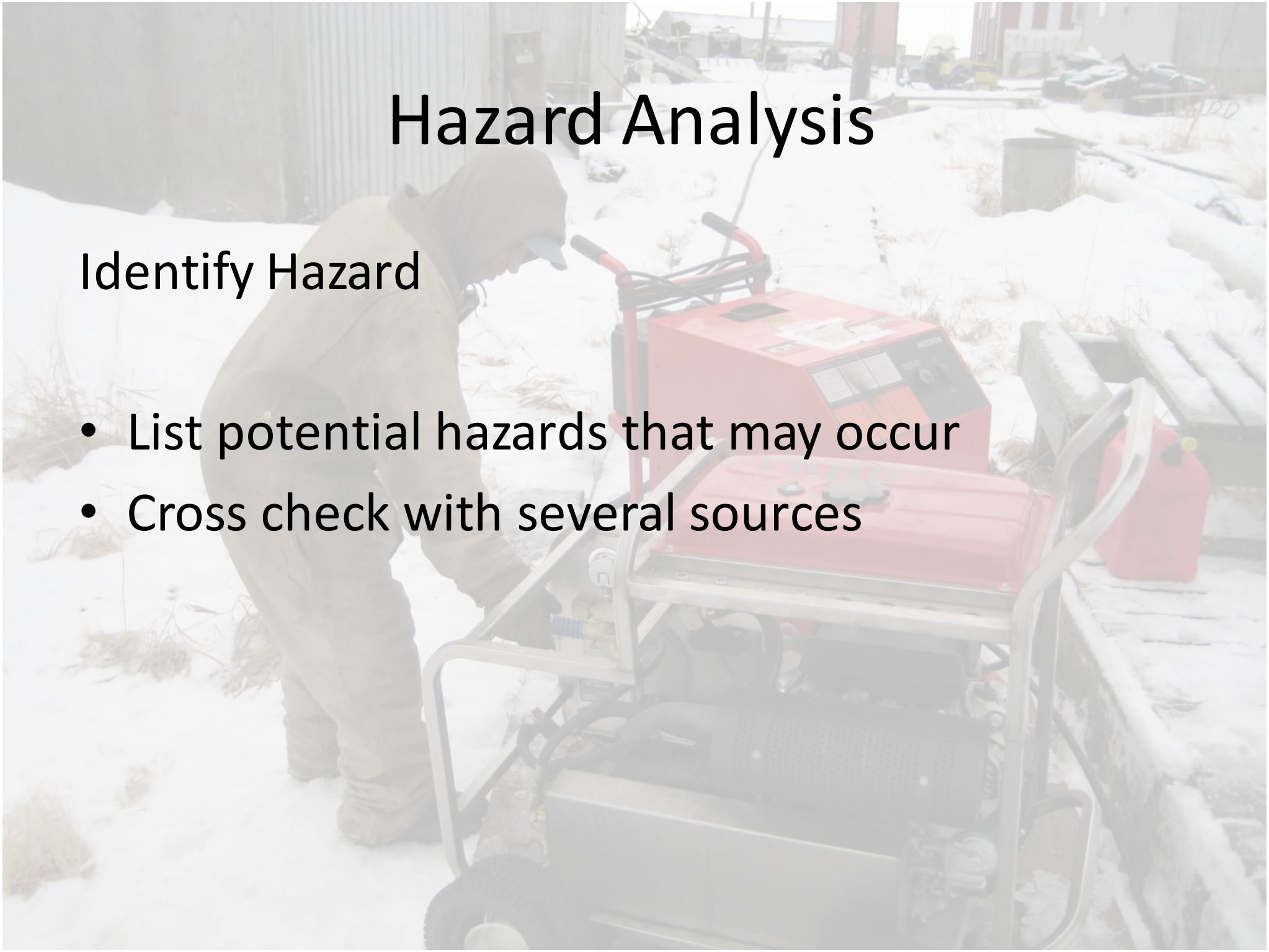
Category	High Risk Events	Pre Risk Score	Post Risk Score	Difference
Natural Event	Extreme cold	83%	78%	-5%
Natural Event	Wind storms	78%	78%	0%
Natural Event	Fire	52%	52%	0%
Technological Event	Fuel shortage, internal	83%	67%	-16%
Technological Event	Electrical failure, external	72%	72%	0%
Technological Event	Alarm failure	61%	50%	-11%
Treatment Equipment Event	Heating equipment failure	83%	83%	0%
Treatment Equipment Event	Lack of critical spare parts	78%	61%	-17%
Treatment Equipment Event	Filter failure	72%	61%	-11%
Treatment Equipment Event	Alarm components failure	63%	58%	-5%
Treatment Equipment Event	Electrical controls failure	64%	61%	-3%
Distribution Equipment Event	Heat trace failure	72%	72%	0%
Distribution Equipment Event	Lift station pump failure	72%	61%	-11%
Distribution Equipment Event	Arctic pipe failure	61%	61%	0%
		71%	65%	-6%


Questions?

Hazard Analysis

Identify Hazard

- List potential hazards that may occur
- Cross check with several sources



Hazard Analysis

- Probability of Occurrence
- Potential Impact – Magnitude
- Preparedness & Response Efforts

Activity: Profiling a Hazard, (Appendix 1)

Emergency Preparedness

Emergency Response Plan

- Contains General Information About Your System
- Flexible All-Hazard Response Tool

Emergency Preparedness

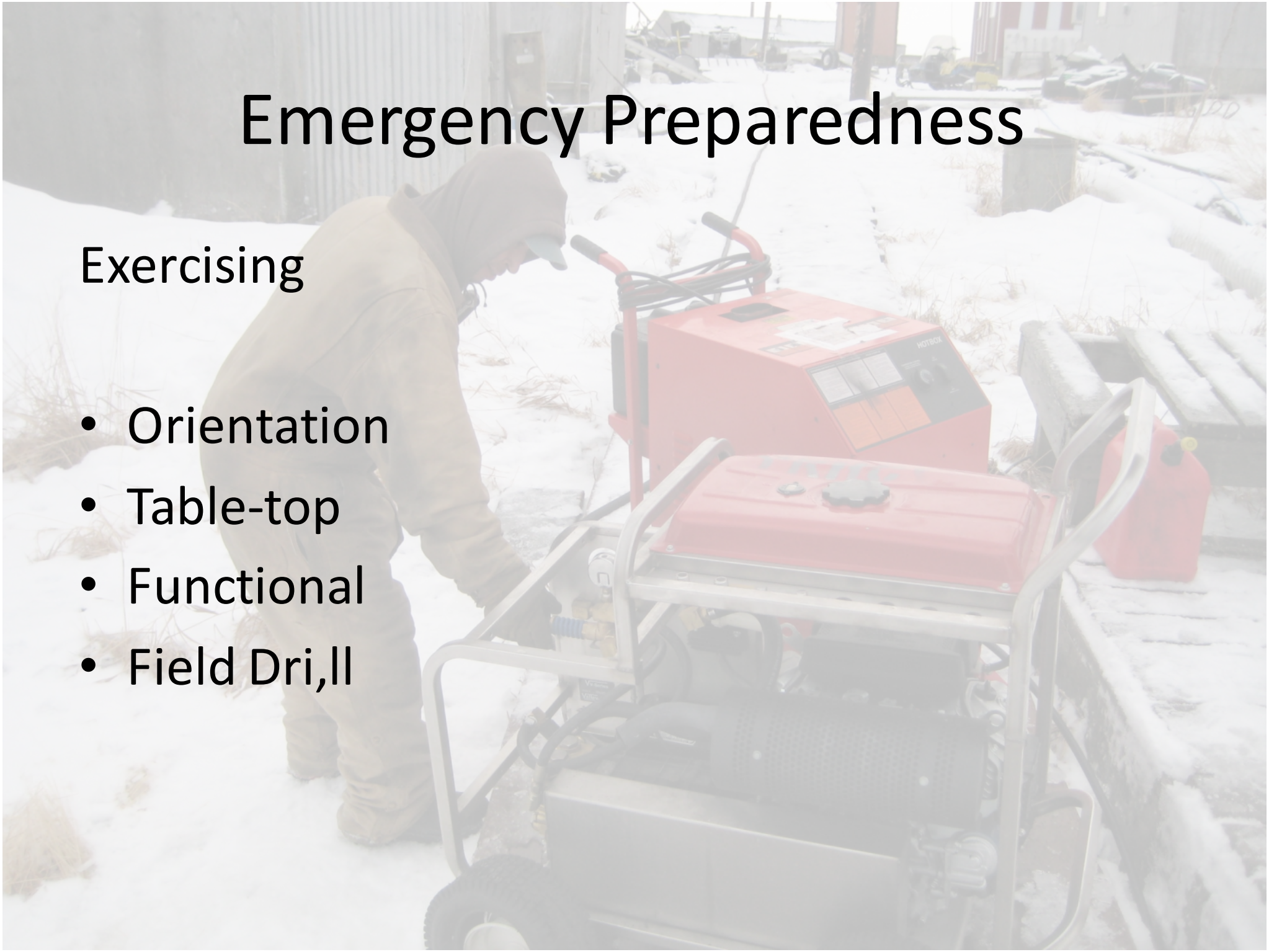
Event Specific Action Plans

- High risk events
- Walk through entire system
- Special Steps

Emergency Preparedness

Exercising

- Orientation
- Table-top
- Functional
- Field Dri,ll



Hazard Mitigation

- Preventative Maintenance
- Critical Spare Parts

Response

- Alert and Notification
- Warning
- Protect People and Property
- Provide for the Public Welfare
- Restore