A. GLOSSARY

Application Rate – Refers to the volume of sprayed product divided by the surface area covered by the spray and is usually expressed in liters/hectare or gallons/acre.

Branch – ICS organizational level based on functional or geographic responsibility. A Branch is below a Section and above a Division or Group in an ICS organization chart.

Broken Ice – An operating environment where a body of water has incomplete coverage of ice. Broken ice varies from less than 10% coverage to greater than 90% coverage. Oil spill response operations in broken ice is generally limited to less than 70% coverage.

Buddy System – An arrangement in which persons are paired for mutual safety or assistance.

Calm Water – An operating environment where the sea state is usually less that 1 foot and currents are less than 0.8 knots. Includes waters that are very sheltered from wind and waves or very small bodies of water. This is the least demanding operating environment for water borne oil spills.

Cold Zone – A zone in the site layout of a spill response. The Cold Zone is also called the Support Zone and is free of oil contamination. Support facilities, staging areas, warm-up trailers, and command posts are located in the Cold Zone.

Competent Person – An individual with the skill, knowledge, practical experience and training to enable him/her to assess the risks arising from work activities involving substances hazardous to health.

Coverage Rate – Refers to the surface area covered by the spray divided by the length of time required to spray it. It is usually expressed in hectares/hour or acres/hour.

Decant – To remove free-water from an oil/water mixture by drawing the water off the bottom of the oil/water interface.

Decontamination Plan – A plan approved by the Unified Command for the removal of oil contamination from personnel and equipment.

Demobilization Plan – A plan approved by the Unified Command for the orderly and timely demobilization of resources no longer needed in the oil spill response.

Division – ICS organizational level based responsibility for a defined geographic area or function. A Division is usually assigned to a specific area, such as the Gulf of Alaska Division or the Yukon River Division. A Division is below a Branch and above a Task Force or Strike Team.

Dispersant – A chemical formulation containing surface active agents (surfactants) that lowers the surface tension between oil and water and facilitates the breakup and dispersion of oil into the water column in the form of finely divided droplets to allow for natural biodegradation.

Emulsification – A process by which oil forms an emulsion or "mousse" consisting of many small droplets of water incorporated into the oil.

Encounter Rate – For dispersant applications, refers to the area of oil that can be sprayed in a specific time. This can be calculated as the ship or aircraft spraying speed multiplied by the width of the spray deposits on the surface. For mechanical recovery applications, it is area of oil that is contained in a specific time. This is calculated as the width of the boom opening times the speed of advance.

Fast Water – An operating environment where the sea state is usually less that 1 foot but the current exceeds 0.8 knots. Fast Water includes rivers, streams and marine waters with moderate to strong tidal currents.

Flash point – The temperature at which a liquid gives off sufficient vapor to ignite in the presence of an open flame.

Geotextile – A manufactured fabric material, usually woven from Polyester or Polypropylene, used in earth construction projects. Geotextile is oleophilic and will act as a passive recovery material, while allowing water to pass through the fabric. Geotextile can be used to protect a beach or soil from oil contamination at oil recovery locations.

Group – ICS organizational level-based responsibility for a particular function, such as Non-mechanical Operations Group, Wildlife Recovery Group, or Shoreline Protection Group. A Group is below a Branch and above a Task Force or Strike Team.

Hot Zone – A zone in the site layout of a spill response. The Hot Zone is also called the Exclusion Zone and is where oil contamination is found. The Hot Zone perimeter is established by the Safety Officer. Site safety assessment and site entry criteria are applied to the Hot Zone in order to prevent the spread of contamination, and to ensure the health and safety of responders and the public.

Incident Commander – The individual responsible for the management of all incident operations.

Intermediate Storage – Secondary or tertiary storage for oil, recovered liquids, and oily solid wastes collected from a recovery operation. Storage devices that receive wastes from primary storage or other intermediate storage devices, such as a rigid tank that is filled from a vacuum truck or a tank truck filled from a portable tank.

Marsh – A wetland operating environment that is considered sensitive to disturbance from oil spill response activities. Marshes are low-lying, waterlogged land that are poorly drained and difficult to cross on foot or vehicle. Care must be take in oil spill operations to minimize the disturbance of marshes and prevent introducing oil below the surface.

Mousse – An emulsified mixture of water in oil. Mousse typically has a thick consistency compared with fresh oil, and can incorporate up to 75 percent water into the oil, increasing apparent oil volume by up to four times. Colours can range from red, orange or tan to dark brown. Mousse can be easily confused with algal scum collecting in convergence lines, algae patches, or kelp. See also emulsification.

Open Water – An operating environment where the sea state can reach 6 feet and moderate waves and white caps may occur. Includes open waters that are not sheltered from wind and waves. This is the most demanding operating environment for water borne oil spills.

Operations Section – ICS organizational category responsible for all operations directly applicable to the primary mission of the incident.

Operations Section Chief – The individual responsible for executing all field operations approved by the Unified Command. The Operation Section Chief reports directly to the Incident Commander.

Payload – Refers to the total amount of dispersant carried by the aircraft or ship.

Preapproval – The state of being accepted for use as a spill treatment agent in a particular location without further bureaucratic authorization procedures under the conditions set forth by the responsible authorities.

Preauthorization – Same as preapproval.

Primary Storage – The initial storage for oil, recovered liquids, and oily solid wastes collected directly from a recovery operation. The initial storage once the oil, oily liquid, or oily solid waste is picked-up, such as a mini-barge associated with a skimming vessel or a portable tank associated with a shore-side recovery tactic.

Protected Water – An operating environment where the sea state can reach 3 feet and small waves and white caps may occur. Protected Waters have limited sheltered from wind and waves. Protected Water falls between Open Water and Calm Water in the classification scheme.

Safety Officer – A member of the Command Staff responsible for monitoring and assessing safety hazards or unsafe situations, and for developing measures to ensure personnel safety.

Sheen – A very thin layer of oil (less than 0.003 millimeters in thickness) floating on the water surface. Sheen is the most commonly-observed form of oil during the later stages of a spill. Depending on thickness, sheens range in color from dull brown for the thickest sheens to rainbows, grays, silvers, and near-transparency in the case of the thinnest sheens. Natural sheens can result from biological processes.

Site Safety Plan – A plan prepared by the Safety Officer and approved by the Unified Command that establishes safety procedures and practices for the incident.

Slick – Oil spilled on the water, which absorbs energy and dampens out surface waves, making the oil appear smoother (or slicker) than the surrounding water.

Solid Ice – An operating environment where a body of water has complete coverage of ice. Spill response activities may occur on Solid Ice only after it is determined that the ice is of sufficient thickness to safely support response personnel and equipment.

Sortie – Refers to each dispersant application run.

Spreading – The thinning out of an oil slick onto the surface of water.

Staging Area – Location where incident personnel and equipment are available for tactical deployment. Can serve as a check-in location for equipment and personnel reporting to the incident.

Staging Area Manager – The individual responsible for overseeing and managing the Staging Area. The Staging Area Manager reports to the Operations Section Chief.

Streamers – A narrow line of oil, mousse, or sheen surrounded on both sides by clean water. Streamers result from the combined effects of wind, currents, and/or natural convergence zones. Heavier concentrations are often present in the centre, with progressively lighter sheen along the edges. Streamers are also often called "fingers", "ribbons", or "windrows".

Strike Team – An ICS operations team that consists of the same kind and type of resources with common communication and leader.

Supervisor – The individual responsible for the command of a Division or Group.

Tar ball – Oil weathered into a pliable ball up to approximately 30 cm. Sheen may or may not be present.

Task Force – A group of resources with common communications and a leader assembled for a specific mission.

Tundra – An operating environment that is considered sensitive to disturbance from oil spill response activities. Tundra has permanently frozen subsoil. Tundra is often waterlogged land that is poorly drained and difficult to cross on foot or vehicle. Care must be take in oil spill operations to minimize the disturbance of tundra that can cause melting of the subsurface ice and permanent damage to the ecosystem.

Unified Command – A command team that allows all parties responsible for the incident to manage the incident by establishing a common set of objectives and strategies. This is accomplished without relinquishing agency responsibility, authority, or accountability. The Unified Command is comprised of the Responsible Party Incident Commander, Federal On-Scene Coordinator, and State On-Scene Coordinator and may also include a Local On-Scene Coordinator.

Unified Plan – The State/Federal contingency plan for Alaska, officially titled Alaska Federal/State Preparedness Plan for Response to Oil & Hazardous Substance Discharges/Releases (Unified Plan).

Warm Zone – A zone in the site layout of a spill response. The Warm Zone is also called the Contamination Reduction Zone and is where decontamination activities occur. The Warm Zone allows for an orderly transition from the Hot Zone to the Cold Zone. Workers shed contaminated clothing and equipment and personnel are decontaminated in the Warm Zone.

Waste Management Plan – A plan approved by the Unified Command that establishes waste management practices and procedures for the incident.

Waste Management Specialist – An individual with the skill, knowledge, practical experience and training to enable him/her to assess the character of a waste or hazardous material and determine the proper handling and disposal methods.

Weathering – The chemical and physical changes that occur once oil has spilled, including spreading, evaporation, dissolution, photo-oxidation, dispersion, biodegradation, and emulsification.

Windrows – Oil or sheen oriented in lines or streaks in the direction of the wind. Windrows typically form early during a spill when the wind speed is at least 10 knots (5.1 meters per second). Sheen is the form of spilled oil that most frequently windrows.

B. ACRONYMS & ABBREVIATIONS

ACC – Alaska Chadux Corporation

ACS – Alaska Clean Seas

ADDS – Airborne Dispersant Delivery System

ADEC – Alaska Department of Environmental Conservation

ADFG – Alaska Department of Fish and Game

ADNR – Alaska Department of Natural Resources

APSC – Alyeska Pipeline Service Company

ARRT – Alaska Regional Response Team

ASTM – American Society for Testing and Materials

ATV – All Terrain Vehicle

BPXA – BP Exploration Alaska

CISPRI – Cook Inlet Spill Prevention and Response Inc.

CPAI – ConocoPhillips Alaska Inc.

CPC – Chemical Protective Clothing

C-Plan– Contingency Plan

DOC – US Department of Commerce

DOI – US Department of the Interior

DOR – Dispersant-to-oil ratio

EPA – US Environmental Protection Agency

FLIR – Forward Looking Infrared

FOSC – Federal On-scene Coordinator

FRP – Facility Response Plan

GIS – Geographic Information System

GRD – Geographic Resources Database

GPS – Global Positioning System

GRS – Geographic Response Strategy

H2S – Hydrogen Sulfide Gas

IAP – Incident Action Plan

IC – Incident Commander

ICS – Incident Command System

IMT – Incident Management Team

IPIECA – International Petroleum Industry Environmental Conservation Association

IPEC – Intergrated Petroleum Environmental Consortium

ISB – In-situ Burning

LEL – Lower Explosive Limit

LOSC – Local On-scene Coordinator

MSDS – Material Safety Data Sheet

NAVSUPSALV – Navy Supervisor of Salvage

NCP – National Contingency Plan

NMFS – National Marine Fisheries Service, US Department of Commerce

NOAA – National Oceanic and Atmospheric Administration, US Department of Commerce

NTV – Non-tank Vessel

OSHA – Occupational Safety and Health Administation

OSRO – Oil Spill Response Organization

PFD – Personal Flotation Device

PPE – Personal Protection Equipment

PRAC – Primary Response Action Contractor

RP – Responsible Party

RPS – Response Planning Standard

SAM – Staging Area Manager

SAR – Search and Rescue

SEAPRO – Southeast Alaska Petroleum Resource Organization

SERVS – Ship Escort Response Vessel Service

SMART – Special Monitoring of Applied Response Technologies

SOSC – State On-scene Coordinator

SPCC Plan – Spill Prevention Containment and Control Plan

SSC – Scientific Support Coordinator

STAR – Spill Tactics for Alaska Responders

UC – Unified Command

USCG – US Coast Guard

USFWS – US Fish and Wildlife Service

VRP – Vessel Response Plan

C. ESTIMATING AMOUNT OF SPILLED OIL

SPILL VOLUME ESTIMATION

Oil in or on Soils

- It is difficult to estimate the amount and extent of subsurface pollution from hydrocarbons spilled and trapped in soil.
- Hydrocarbons in soil may exist in three phases:
  - As vapors within the pore spaces
  - As residual liquid attached to or trapped between soil particles
  - As dissolved components of oil in moisture surrounding soil particles
- Generally, oil retention increases with: decreasing grain size, poorer sorting of soils, and increasing oil viscosity.
- Oil retention of initially water-saturated soils is generally lower than initially dry soils.
- The "retention capacity" factor for different types of soils provides an estimate of volume of liquid retained per unit pore volume. The following are rules of thumb for retention capacity of soil types:

	Silt	Sand	Gravel
Crude Oil & Other Persistent Oils	12% - 20%	4% - 13%	0% - 5%
Diesel	7% - 12%	2% - 8%	0%- 2%
Gasoline	3% - 7%	1% - 5%	0% - 1%

Oil on Ice and Snow

- Field experience and data from actual spills indicate that oil-holding capacities of ice and snow range as high as 1,600 barrels per acre.
- Equations for estimates:

  $V\ (bbl) = (4.14 \times 10^5) \times A\ (mi^2) \times t\ (in.)$

  $V\ (bbl) = 647 \times A\ (acres) \times t\ (in)$

  $V\ (bbl) = (1.48 \times 10^{-2}) \times A\ (ft^2) \times t\ (in.)$

  $V\ (gal) = 42 \times V\ (bbl)$

  V = Volume of oil spill

  A = Area of oil slick or contaminated zone

  t = Thickness of oil slick or contaminated zone (with snow, t = equivalent oil thickness)

Oil on Water

- Oil Color
  - Sheen (silver-gray): Use 10^{-6} inch as average thickness
  - Iridescent (blue green): Use 10^{-4} to 10^{-5} inch as average thickness
  - Blue-black (aged, wind-blown): Use 10^{-2} to 10^{-3} as average thickness

- Blue-black (fresh/equilibrium conditions): Use 10^{-1} inch as average thickness
- Emulsion (brown/ "chocolate mousse"): Use 10^{-1} inch as average "oil" thickness (actually 2 to 3 x 10^{-1} inch with 50% to 70% water).

- Equations for estimates:

  V (bbl) = 4.14 x 10^5 A (mi^2) x t (inches)

  V (bbl) = 647 A (acres) x t (inches)

  V (bbl) = 1.48 x 10^{-2} A (ft^2) x t (inches)

  V (gal) = 0.624 A (ft^2) x t (inches)

  V = Volume of oil spill

  A = Area of slick at thickness t

  t = Thickness of oil slick

Encounter Rate Calculations

- Calculations used to estimate the amount of oil moving past in a stream, entering a collection boom, or in a windrow/patch of oil.

  EnR (gpm) = 37 x W (ft) x V (ft/sec) x t (in)

  EnR (bbl/hr) = 53.33 x W (ft) x V (ft/sec) x t (in)

  EnR (bbl/day) = (1.28 x 10^3) x W (ft) x V (ft/sec) x t (in)

  W = Width of oil swath

  V = Velocity in feet per second (1 knot = 1.68 ft/sec)

  t = Thickness of oil slick

ESTIMATING SPILL SOURCE VOLUMES AND FLOW RATES

Leak Rate Calculations

One drop/second = 1 gallon per day

Thin stream breaking to drops = 24 gallons per day

Small stream (about 1/8 inch) = 84 gallons per day

Large stream (about 1/4 inch) = 936 gallons per day

A simple rule of thumb is to divide 10,000 by the number of seconds it takes to fill a five-gallon pail.

Estimates for Capacity

- Pipeline per linear foot
  - For volume in gallons per foot: square the inside diameter (in inches) and multiply by 4 percent (0.04)
  - For volume in barrels per foot: square the inside diameter (in inches) and divide by 1,000
  - To find the volume of a pipeline in barrels per mile: square the inside diameter (in inches) and multiply by 5.13

- For vertical cylindrical tanks:

  V (gal) = 0.0034 d (in.) x d (in.) x h (in.)

  V (gal) = 5.88 D (ft) x D (ft) x H (ft)

  d = diameter in inches

  D = diameter in feet

  h = height of liquid in inches

  H = height of liquid in feet

NOTES:

The National Oceanic and Atmospheric Administration publishes an observer's guide that contains more information on estimating oil spill volumes.

Information in this Appendix was taken from the Alaska Clean Seas Technical Manual Vol. 1.

D. LEGEND OF ICONS USED ON MOST ALASKA GRS MAPS

STRATEGY ICONS

The following symbols are used in Geographic Response Strategies in Alaska.

- Paved Road
- Improved Gravel Road
- Un-improved Gravel Road
- ATV Trail
- Hiking Trail
- Bridge
- Landing Strip
- Small Gravel Strip
- Helicopter Landing Zone
- Staging Area
- Dock
- Boat Ramp
- USGS Navigation Light Marker
- Direction True North
- Restricted Access, contact Unified Command before entering
- Buildings
- Cabin
- Camping
- Water Depths, fathoms & tenths
- Rocks Awash at Low Tide
- Eddy
- Eagles Nest
- Seal Haulout
- Reef
- Mariculture Pens
- Marsh
- Sand Bar
- Salmon Spawning Stream
- Nesting
- Keeper Beach
- Seabird Colony
- Exclusion Zone
- Snare Boom
- Sorbent Boom
- Tidal-seal Boom
- Calm-water Boom
- Protected-water Boom
- Protected-water Boom/Flood Tide
- Open-water Boom
- Open-water Boom/Flood Tide
- Fast-water Boom
- Dam
- Gate
- Anchor
- Skimmer
- Equipment
- Mooring
- Bears in Area, guards needed