Appendix B–4

Pipeline Sytems WIST Needs Template

Pipeline Systems Sector Activities

Control center operations. Operations to monitor the pipeline system, advise system operators, and control system integrity.
Pumping station operations. Responsible for fuel movement, allocation, storage, and distribution.
Well head/drill site operations. Includes operations for fuel pumping, storage, and distribution near source wells.
Tank farm operations. Includes fuel storage, distribution, and maintenance at tank farms.
Construction. Operations include construction, maintenance, and repair, as well as the scheduling of these operations.
Hazardous material. Includes monitoring storage and transport of hazardous materials and any mitigation, reclamation, and reporting operations associated with their accidental release while within the pipeline system.
Surveillance. Includes inspections, monitoring, and maintenance.
Personnel safety. Any operation where safety and health risks to workers or others may be present.
Fuel barge operations. Includes barge docking, fuel movement by barge, and transfer to/from fuel barges.

Weather Needs for Pipeline System Operations

Weather Element	Threshold	Activity	Impacts	Action	Lead Time
Freezing Precipitation (ice)	Any	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Inoperative valves or valve failure from freezing, damage to valves or gauges during ice removal, disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage), pipeline sensor failure likely, possible disruption of construction or maintenance cycles, possible leaks or other pipeline failures, HAZMAT procedures may be initiated, public relations impacts, safety of personnel and equipment (accidents are likely due to icy conditions, proper clothing and monitoring of crews and equipment required), possible injury or death, buried pipeline inspections (digging out an inspection trench or bore hole) may be complicated by ice and frozen soil, construction and inspection delays likely, satellite/radio/cellular phone communications may be disrupted, communications and data distribution from pipeline sensors may fail during ice storms	Issue communication advisories and/or warnings to pipeline management and operators. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.). The pipeline scheduler will make arrangements with shippers and terminals/customers to accommodate any schedule disruptions. Initiate de-icing or anti-icing program for roads, walkways, valves, gauges, etc. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections, assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for icy conditions. Monitor crews and equipment. Reschedule, restrict, or suspend aerial and vehicle pipeline inspections based on weather safety. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks, sample the liquid for homogeneity and purity. Report any communication failure to NSC. Monitor communications outages and use alternative modes as necessary. Initiate backup contingencies for pipeline sensor data distribution.	12 hours
Frozen Precipitation (snow, inches)	Any to <8 inches	**Control Center Operations** : monitor, advise, control system integrity. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Inoperative valves or valve failure from freezing, damage to valves or gauges during snow removal, possible leaks or other pipeline failures, HAZMAT procedures may be initiated, possible disruption of construction or maintenance cycles, safety of personnel and equipment (proper clothing and monitoring of crews and equipment required), buried pipeline inspections (digging out an inspection trench or bore hole) may be complicated by ice and frozen soil, construction and inspection delays likely, public relations impacts	Issue advisories to pipeline management and operators. Initiate snow removal program (roads, walkways, valves, gauges, etc.). Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections, assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for snow and ice. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks, sample the liquid for homogeneity and purity.	12 hours
Frozen Precipitation (snow, inches)	≥8 inches	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Inoperative valves or valve failure from freezing, damage to valves or gauges during snow removal, disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage), pipeline sensor failure likely, possible disruption of construction or maintenance cycles, possible leaks or other pipeline failures, HAZMAT procedures may be initiated, public relations impacts, safety of personnel and equipment (accidents are likely on snow-covered walkways and roads, proper clothing and monitoring of crews and equipment required), possible injury or death, buried pipeline inspections (digging out an inspection trench or bore hole) may be complicated by ice and frozen soil, construction and inspection delays likely, satellite/radio/cellular phone communications may be disrupted, communications and data distribution from pipeline sensors may fail during heavy snow events	Issue communication advisories and/or warnings to pipeline management and operators. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.). The pipeline scheduler will make arrangements with shippers and terminals/customers to accommodate any schedule disruptions. Initiate snow removal and de-icing or anti-icing program for roads, walkways, valves, gauges, etc. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections, assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for icy conditions.	12 hours

Weather Needs for Pipeline System Operations

Weather Element	Threshold	Activity	Impacts	Action	Lead Time
				Monitor crews and equipment. Reschedule, restrict, or suspend aerial and vehicle pipeline inspections based on weather safety. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks, sample the liquid for homogeneity and purity. Report any communication failure to NSC. Monitor communications outages and use alternative modes as necessary. Initiate backup contingencies for pipeline sensor data distribution.	
Drifting Snow (inches)	≥8 inches	**Control Center Operations:** monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction**: scheduling, maintenance, repair. **Hazardous Material**: monitoring, mitigation, reclamation, reporting. **Surveillance**: inspections, monitoring, maintenance. **Personnel Safety**	Inoperative valves or valve failure from freezing, damage to valves or gauges during snow removal, disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage), pipeline sensor failure likely, possible disruption of construction or maintenance cycles, possible leaks or other pipeline failures, HAZMAT procedures may be initiated, public relations impacts, safety of personnel and equipment (accidents are likely on snow-covered walkways and roads, proper clothing and monitoring of crews and equipment required), possible injury or death, buried pipeline inspections (digging out an inspection trench or bore hole) may be complicated by ice and frozen soil, construction and inspection delays likely, satellite/radio/cellular phone communications may be disrupted, drifting snow may cause communications and data distribution failures from pipeline sensors	Issue communication advisories and/or warnings to pipeline management and operators. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.). The pipeline scheduler will make arrangements with shippers and terminals/customers to accommodate any schedule disruptions. Initiate snow removal and de-icing or anti-icing program for roads, walkways, valves, gauges, etc. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections, assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Initiate alternate construction/ maintenance work schedule. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for icy conditions. Monitor crews and equipment. Reschedule, restrict, or suspend aerial and vehicle pipeline inspections based on weather safety. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks, sample the liquid for homogeneity and purity. Report any communication failure to NSC. Monitor communications outages and use alternative modes as necessary. Initiate backup contingencies for pipeline sensor data distribution.	12 hours
Liquid Precipitation	Heavy	**Control Center Operations** : monitor, advise, control system integrity. **Construction:** scheduling, maintenance, repair. **Surveillance**: inspections, monitoring, maintenance. **Personnel Safety**	Safety of personnel and equipment, possible workplace injury or death (Accidents are likely on rain slick surfaces; proper clothing is required.), possible disruption of inspection, construction, or maintenance cycles, inspections of buried pipeline (digging out an inspection trench or bore hole) may be complicated by standing water, satellite/radio/cellular phone communications disruptions, possible failure of communications and data distribution from pipeline sensors during heavy precipitation	Issue advisories to pipeline management and operators. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for slick conditions. Reschedule/restrict aerial and vehicle pipeline inspections based on weather safety. Inspect floating tank roofs, sumps, and water impounds; drain/pump out if needed in preparation for the heavy rain. Issue communication advisories. Report communication failure to NSC. Monitor communications outages, utilize alternative modes. Initiate backup contingencies for pipeline sensor data distribution.	12 hours

Weather Needs for Pipeline System Operations

Weather Element	Threshold	Activity	Impacts	Action	Lead Time
Flooding	Any	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Pipeline roadbed scoured or buried pipeline unearthed, pipeline damage from line stretch and foreign debris impact, disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage), pumping may be restricted or suspended, pipeline sensor failure likely, possible disruption of construction or maintenance cycles, possible leaks or other pipeline failures, HAZMAT procedures may be initiated, public relations impacts, safety of personnel and equipment (monitoring of crews and equipment required; accidents are likely with possible injury or death), buried pipeline inspections (digging out an inspection trench or bore hole) may be complicated by standing water	Issue advisories and/or warnings to pipeline management and operators. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.). The pipeline scheduler will make arrangements with shippers and terminals/customers to accommodate the schedule disruption. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections; check for bridge, trestles, pipeline roadbed integrity. Assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/ mitigation plan. Ensure proper authorities are notified. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for slick and flooded walkways and road surfaces. Reschedule. restrict, or suspend aerial and vehicle pipeline inspections based on weather safety. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks, sample the liquid homogeneity and purity. Drain or fill pipelines to decrease damage susceptibility, as appropriate.	24 hours
Thunderstorms with Lightning, Hail, or Tornadoes (proximity to route or operational area in miles)	within 5 miles	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction** : scheduling, maintenance, repair. **Hazardous Material:** monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Pipeline roadbed scoured or buried pipeline unearthed, pipeline damage from line stretch and foreign debris impact, disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage), pumping may be restricted or suspended, pipeline sensor failure likely, possible disruption of construction or maintenance cycles (Fuel tank construction/repair is very wind sensitive--large sail area.), possible leaks or other pipeline failures, HAZMAT procedures may be initiated, public relations impacts, safety of personnel and equipment (monitoring of crews and equipment required; accidents are likely with possible injury or death), satellite/radio/cellular phone communications disruptions, communications and data distribution from pipeline sensors may fail during thunderstorms (effects of tornadoes, lightning, hail)	Acquire wind advisories and/or warnings prior to and during barge operations and tank construction, maintenance, or repair. If conditions become unsafe, controllers will evacuate the building and go to the strategic back-up site (SBS). From the SBS controllers can monitor and operate the pipelines. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.) based on impact of lightning or tornado. The pipeline scheduler will make arrangements with shippers and terminals/customers to accommodate the schedule disruption. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections; check for bridge, trestles, pipeline roadbed integrity. Assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Initiate alternate construction/maintenance work schedule. Ensure proper clothing and footwear are worn. Restrict or suspend fueling operations. Reschedule, restrict, or suspend aerial and vehicle pipeline inspections based on weather safety. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks, sample the liquid homogeneity and purity. Issue communication advisories, report communications failure to NSC, monitor outages, utilize alternative modes. Initiate backup contingencies for sensor data distribution.	6 hours

Weather Needs for Pipeline System Operations

Weather Element	Threshold	Activity	Impacts	Action	Lead Time
Air Temperature (degrees F)	<32° with moisture	**Control Center Operations** : monitor, advise, control system integrity. **Construction**: scheduling, maintenance, repair. **Hazardous Material**: monitoring, mitigation, reclamation, reporting. **Surveillance**: inspections, monitoring, maintenance. **Personnel Safety**	Inoperative valves or valve failure from freezing, damage to valves or gauges during ice/snow removal, possible disruption of construction or maintenance cycles, possible leaks or other pipeline failures, HAZMAT procedures may be initiated, safety of personnel and equipment (proper clothing and monitoring of crews and equipment required)	Issue advisories to pipeline management and operators. Initiate snow removal program (roads, walkways, valves, gauges, etc.). Schedule additional system monitoring queries, assign additional crews/re-crews, as required. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Consider increasing the number of visual inspections and pipeline remote monitoring efforts. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for snow and ice. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks, sample the liquid homogeneity and purity. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan.	12 hours
	<-20°	**Construction**: scheduling, maintenance, repair. **Personnel Safety**	49 CFR 193.2137 sanctions for plastic pipes, safety of personnel and equipment (proper monitoring of crews and equipment required)	Advise operators of exposure danger. Monitor personnel and equipment. Enforce prohibition on plastic pipe.	12 hours
	≥100°	**Construction**: scheduling, maintenance, repair. **Personnel Safety**	Safety of personnel and equipment (proper monitoring of crews and equipment for heat stress required), 49 CFR 193.2137 sanctions for plastic pipes.	Advise operators of heat stress potential. Monitor personnel and equipment. Review and follow CFR restrictions on plastic pipe.	6 hours
	>150°	**Construction**: scheduling, maintenance, repair.	49 CFR 193.2137 sanctions for plastic pipes	Enforce prohibition on thermosetting plastic pipe.	12 hours
Soil Temperature (degrees F)	<32°	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction**: scheduling, maintenance, repair. **Hazardous Material**: monitoring, mitigation, reclamation, reporting. **Surveillance**: inspections, monitoring, maintenance. **Personnel Safety**	Possible pipeline motion/movement from ground heave (Ground heave is most prevalent during autumn freezes and spring thaws.), buried pipeline inspections (digging out the inspection trench or bore hole) may be complicated by frozen soil, construction and inspection delays likely, possible leaks or other pipeline failures, HAZMAT procedures may be initiated, public relations impacts, potential regulatory restrictions on gas lines under 49 CFR 193.2137 and 193.2065	Issue advisories to pipeline management and operators. Consider increasing pipeline remote sensing frequency or physical inspections. Schedule additional system monitoring queries, assign additional crews/re-crews, as required. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for snow and ice. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks, sample the liquid homogeneity and purity.	6 hours
Wind Chill (degrees F)	≤20°	**Control Center Operations** : monitor, advise, control system integrity. **Construction**: scheduling, maintenance, repair. **Personnel Safety**	Personnel exposure (hypothermia, frost bite), limited time outside for maintenance personnel, personnel safety procedures strictly enforced (buddy system, time outside limited and actively managed)	Limit personnel time outside. Increase available manpower. Insist that ground crews are clothed appropriately for cold weather; ensure that cold weather gear is available.	12 hours
Heat Index (degrees F)	≥105°	**Control Center Operations** : monitor, advise, control system integrity. **Construction**: scheduling, maintenance, repair. **Personnel Safety**	Personnel exposure (heat stroke/heat exhaustion), personnel safety procedures strictly enforced	Limit personnel time outside. Increase available manpower. Insist that ground crews are clothed appropriately for hot weather.	12 hours

Weather Needs for Pipeline System Operations

Weather Element	Threshold	Activity	Impacts	Action	Lead Time
Cooling or Heating Degree-Days	Vairable	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction** : scheduling, maintenance, repair.	Fuel management impacts (Based on prediction of cooling and heating degree days, fuel demand can vary dramatically. Proper fuel types can be readied for distribution based on customer demand. Although this is principally a petroleum industry concern, it also affects management of pipeline fuel distribution.)	Issue advisories to pipeline management and operators. Reallocate resources to respond to changes in client/customer demand, if feasible.	Current data, as needed
Visibility (statute miles)	<1/4 mile	**Control Center Operations** : monitor, advise, control system integrity. **Tank Farm Operations** : storage, distribution, maintenance. **Fuel Barge Operations** : docking, fuel movement. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Restricted or suspended movement of barge and tanker traffic from/to off-shore drill sites to/from coastal pumping facilities, restricted or suspended surveillance of pipelines by air or truck, disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage), pumping may be restricted or suspended, safety of personnel and equipment (monitoring of crews and equipment required), accidents are likely with possible injury or death, possible disruption of construction or maintenance cycles	Issue advisories to pipeline management and operators. Modify, restrict, or suspend barge and tanker operations. Reallocate resources to respond to increased client/customer demand, if feasible. Reschedule, restrict, or suspend aerial and vehicle pipeline inspections based on weather safety. Check integrity of pipelines, tanks and valves. Check liquid level in tanks; sample the liquid homogeneity and purity.	12 hours
Winds, Speed and Direction (speed in miles per hour)	>60 mph	**Control Center Operations** : monitor, advise, control system integrity. **Tank Farm Operations** : storage, distribution, maintenance. **Fuel Barge Operations** : docking, fuel movement. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Restricted or suspended movement of barge traffic from/to off-shore drill sites to/from coastal pumping facilities, disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage), pumping may be restricted or suspended, pipeline sensor failure likely, possible disruption of construction or maintenance cycles (Fuel tank construction/repair is very wind sensitive--large sail area.), possible leaks or other pipeline failures, HAZMAT procedures may be initiated, public relations impacts, safety of personnel and equipment (Accidents are likely with possible injury or death, monitoring of crews and equipment is required.)	Acquire wind advisories and/or warnings prior to and during barge operations and tank construction, maintenance, or repair. Issue advisories and/or warnings to pipeline management and operators. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.) based on impact of high winds. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections; check for bridge, trestles, pipeline roadbed integrity. Assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears.	12 hours
	>200 mph	**Construction** : facility regulations.	Facility design must conform to wind restrictions in 49 CFR 193.2067	Modify, restrict, or suspend tank construction, maintenance, or repairs. Restrict or suspend fueling operations. Reschedule, restrict, or suspend aerial and vehicle pipeline inspections based on weather safety. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks; sample the liquid homogeneity and purity.	
				Ensure construction compliance with all applicable requirements as spelled out in the CFR.	12 hours

Weather Needs for Pipeline System Operations

Weather Element	Threshold	Activity	Impacts	Action	Lead Time
Hurricane with Winds, High Sea State, Tidal Surge, or Flooding	Any	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Fuel Barge Operations** : docking, fuel movement. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Pipeline roadbed scoured or buried pipeline unearthed, pipeline damage from line stretch and foreign debris impact, restricted or suspended movement of barge traffic from/to off-shore drill sites to/from coastal pumping facilities (due to high winds, seas, tides), disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage), pumping may be restricted or suspended, pipeline sensor failure likely, possible disruption of construction or maintenance cycles, possible leaks or other pipeline failures, HAZMAT procedures may be initiated, public relations impacts, safety of personnel and equipment (monitoring of crews and equipment required; accidents are likely with possible injury or death)	Acquire hurricane advisories and/or warnings prior to and during barge operations and tank construction, maintenance, or repair. Issue advisories and/or warnings to pipeline management and operators. If conditions become unsafe at the control center, controllers will evacuate the building and go to the strategic back up site (SBS). From the SBS controllers can monitor and operate the pipe lines and will return to the primary control center when conditions are safe. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.) based on impact of hurricane. The pipeline scheduler will make arrangements with shippers and terminals/customers to accommodate the schedule disruption. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Increase pipeline surveillance; check for bridge, trestles, pipeline roadbed integrity. Assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears. Ensure proper clothing and footwear for slick and flooded walkways and road surfaces. Restrict or suspend fueling operations. Reschedule, restrict, or suspend aerial and vehicle pipeline inspections based on weather safety. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks; sample the liquid homogeneity and purity. Drain or fill pipelines to decrease damage susceptibility, as appropriate.	12 - 24 hours
Seas (wave height in feet)	≥12 feet	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations:** fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Fuel Barge Operations** : docking, fuel movement. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Seafloor pipeline damaged or destroyed; buried pipeline unearthed, damaged or destroyed; pipeline damage from line stretch, foreign debris impact, and corrosion from damaged coating; restricted or suspended movement of barge traffic from/to off-shore drill sites to/from coastal pumping facilities due to high seas; disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage); pumping may be restricted or suspended; pipeline sensor failure likely; possible disruption of construction or maintenance cycles; possible leaks or other pipeline failures; HAZMAT procedures may be initiated; public relations impacts; safety of personnel and equipment (monitoring of crews and equipment required; accidents are likely with possible injury or death)	Acquire seas advisories and/or warnings prior to and during barge operations and off-shore drill site construction, maintenance, or repair. Issue advisories and/or warnings to pipeline management and operators. The pipeline scheduler will make arrangements with shippers and terminals/ customers to accommodate the schedule disruption. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.) based on impact of seas. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections; check pipeline integrity. Assign additional crews/re-crews, as required. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Ensure proper clothing and footwear for slick and flooded walkways and exposed shipboard surfaces. Initiate alternate construction/ maintenance work schedule. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks; sample the liquid homogeneity and purity. Drain or fill pipelines to decrease damage susceptibility, as appropriate.	24 hours

Weather Needs for Pipeline System Operations

Weather Element	Threshold	Activity	Impacts	Action	Lead Time
Tsunami, Tidal Surge	Any	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Fuel Barge Operations** : docking, fuel movement. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Seafloor pipeline damaged or destroyed; buried pipeline unearthed, damaged or destroyed; pipeline damage from line stretch, foreign debris impact, and corrosion from damaged coating; disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage); pumping may be restricted or suspended; pipeline sensor failure likely; possible disruption of construction or maintenance cycles; possible leaks or other pipeline failures; HAZMAT procedures may be initiated; public relations impacts; safety of personnel and equipment (monitoring of crews and equipment required; accidents are likely with possible injury or death)	Acquire seas advisories and/or warnings prior to and during barge operations and off-shore drill site construction, maintenance, or repair. Issue advisories and/or warnings to pipeline management and operators. The pipeline scheduler will make arrangements with shippers and terminals/customers to accommodate the schedule disruption. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.) based on impact of tidal surge. Consider the effects of sea-floor topography and leak/pipe failure location for remediation or reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. Schedule additional inspections; check pipeline integrity. Assign additional crews/re-crews, as required. If required, initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Ensure proper clothing and footwear for slick and flooded walkways and exposed shipboard surfaces. Initiate alternate construction/ maintenance work schedule. Postpone any work that can wait. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks; sample the liquid homogeneity and purity. Drain or fill pipelines to decrease damage susceptibility, as appropriate.	24 hours
Earthquakes (any land motion, land slides, avalanches, etc)	Any	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Pipeline roadbed scoured, buried, damaged or destroyed; buried pipeline unearthed, damaged or destroyed; pipeline damage from line stretch and foreign debris impact likely; disruption of fuel delivery resulting in fuel management emergency procedures (re-allocation, transfer delays, re-routing, unscheduled storage); pumping may be restricted or suspended; pipeline sensor failure likely; possible disruption of construction or maintenance cycles; possible leaks or other pipeline failures; HAZMAT procedures may be initiated; public relations impacts; safety of personnel and equipment (Accidents are likely with possible injury or death, monitoring of crews and equipment is required.)	Issue advisories to pipeline management and operators. Schedule additional system monitoring queries, assign additional crews/re-crews, as required. Initiate fuel management contingency plans (re-route, store, cancel transfers, etc.) based on impact of land motion. The pipeline scheduler will make arrangements with shippers and terminals/customers to accommodate the schedule disruption. Consider the effects of topography and leak/pipe failure location for remediation and reclamation. Increase the number of visual inspections and pipeline remote monitoring efforts. If HAZMAT incident occurs, initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks; sample the liquid homogeneity and purity.	12-24 hours
Atmospheric Transport & Diffusion	Any	**Control Center Operations** : monitor, advise, control system integrity. **Personnel Safety**	Release of vapors and toxins to the environment from a leak or pipeline failure may have catastrophic results, safety of personnel and equipment (Accidents are likely with possible injury or death, monitoring of crews and equipment is required.)	Acquire output from an (the) atmospheric transport & diffusion model depicting the horizontal and vertical distribution of toxins or vapors. Issue advisories and/or warnings to pipeline management and operators. Initiate HAZMAT spill reaction/mitigation plan. Ensure proper authorities are notified. Check integrity of pipelines, tanks, and valves. Check liquid level in tanks; sample the liquid homogeneity and purity.	1 - 3 hours
Air Quality (characterization or code)	Poor, red	**Control Center Operations** : monitor, advise, control system integrity. **Personnel Safety**	Safety of personnel and equipment (monitoring of crews and equipment required)	Issue advisories to pipeline management and operators. Initiate alternate construction/maintenance work schedule. Postpone any work that can wait until the weather clears.	12 hours

Weather Needs for Pipeline System Operations

Weather Element	Threshold	Activity	Impacts	Action	Lead Time
Space Weather (e.g., solar flares)	Any	**Control Center Operations** : monitor, advise, control system integrity. **Pumping Station Operations** : fuel movement, allocation, storage, distribution. **Well-head/Drill Site Operations** : pumping, storage, distribution. **Tank Farm Operations** : storage, distribution, maintenance. **Construction** : scheduling, maintenance, repair. **Hazardous Material** : monitoring, mitigation, reclamation, reporting. **Surveillance** : inspections, monitoring, maintenance. **Personnel Safety**	Possible disruptions of satellite, radio, and cellular phone communications; communications and data distribution from pipeline sensors may fail during solar storms (Leaks or pipeline failures may be detected without a method to relay the sensed information to the pumping station, tank farm. or control center.); safety of personnel and equipment (monitoring of crews and equipment required); possible disruption of construction or maintenance cycles	Issue advisories to pipeline management and operators. Report communication failure to NSC and advise them of the solar flares. Monitor communications outages, utilize alternative modes of communications. Initiate backup contingencies for pipeline sensor data distribution.	12 hours