Expansion of Hong Kong International Airport into a Three-Runway System - SWIFT Log Sheet

Construction Phase - Submarine Pipeline and Underground Pipeline		SWIFT Chairman: Ian LINES SWIFT Secretary: Ho Fai LEUNG				ATKINS	
Hazard Ref.	What If	Hazard	Description of Consequence	Existing Safeguards		Recommendation	Remarks
				Engineering	Procedural		
1. Construction Activities Impact on Existing Submarine Pipelines							
1.1	Anchor drop/drag	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition (for rupture releases)	Shut down of valves and pumps. Rock amour is provided around the existing submarine pipelines.	Control of shipping. A marked (e.g. by buoys) safeguarding zone will be set up along the route of the submarine pipelines. Site inspection will be conducted to confirm the route of the existing submarine pipelines	Precaution measures should be established to request barges to move away during typhoons.	Increased shipping/barge activity associated with land reclamation activities (filling barges/dredging vessels etc) increases the risk to the existing submarine pipelines. Pipelines are 2m below seabed. Hazard to life from fuel spill is low.
1.2	Vessel sinking	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition (for rupture releases)	Shut down of valves and pumps. Rock amour is provided around the existing submarine pipelines.	A marked (e.g. by buoys) safeguarding zone will be set up along the route of the submarine pipelines.	An appropriate marine traffic management system should be established to minimize risk of ship collision, which could lead to sinking or dropped objects.	Increased shipping/barge activity associated with land reclamation activities increases the risk to the existing submarine pipelines. Pipelines are 2m below seabed. Hazard to life from fuel spill is low.
1.3	Accidental dropping of object/container onto existing submarine pipelines	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition (for rupture releases)	Shut down of valves and pumps. Rock amour is provided around the existing submarine pipelines.	-	-	Increased shipping/barge activity associated with land reclamation activities increases the risk to the existing submarine pipelines. Pipelines are 2m below seabed. Hazard to life from fuel spill is low.
1.4	Land reclamation activities impact/disturb existing submarine pipelines (reclamation activities get too close)	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition (for rupture releases)	Shut down of valves and pumps. Rock amour is provided around the existing submarine pipelines.	An exclusion zone of at least 50m on each side of the submarine pipeline will be imposed, where construction activity is not allowed. Seawall construction work at west end of North Runway will not begin until the pipeline diversion work is completed.	-	Hazards from construction of sea wall, dredging, etc. No reclamation activities should be undertaken any closer than at least 50m to the existing submarine pipelines. Route of existing submarine pipelines to be confirmed by site investigation.
1.5	Additional loading from reclaimed land causes disturbance of existing submarine pipelines	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition (for rupture releases)	Shut down of valves and pumps.	An assessment will be conducted to ensure that the disturbance will not affect the existing submarine pipelines.	-	No reclamation activities should be undertaken closer than at least 50m to the existing submarine pipelines. Route of existing submarine pipelines to be
1.6	Impact force by dynamic compaction of reclaimed land causes disturbance of existing submarine pipelines	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition (for rupture releases)	Shut down of valves and pumps.	-	-	Compaction of reclaimed land will not involve major impacts/pounding or dynamic loads, so this hazard is not applicable. No reclamation activities should be undertaken closer than at least 50m to the existing submarine pipelines. Route of existing submarine pipelines to be
2. Construction Activities at Pipeline Launch Site at West End of North Runway							
2.1	Construction activities associated with horizontal directional drilling (HDD) for new pipeline cause damage to existing pipelines (impact, vibration, dropped object, etc)	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	Shut down of valves and pumps.	-	-	Launch site chosen to be well away from existing fuel pipelines, therefore, this is not considered as a hazard
2.2	Error in connecting new submarine pipelines to existing pipelines at HKIA (flammable vapours, hot work, poor connection, close proximity of two pipelines)	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	All the fuel in the existing pipeline will be pumped out to the tank farm and the pipeline flushed with water before any connection work starts. If necessary, temporary protection to the service pipeline will be provided when the tie-in process for the isolated pipeline starts.	-	-	Existing pipeline will be pigged clean and hazardous vapours purged prior to any connection operations. Existing pipeline will then be blanked off (but kept available for a period of time in case of problems with the new pipelines).
2.3	Aircraft impact on drilling launch site operations	Aircraft impact	Aircraft crash	-	-	-	No activities at the launch site are more than about 10m in height above grade. This is well below the threshold height in the Regulations for this location, and so this is not considered to be a significant hazard.
2.4	Methane gas generated by vegetation inside the pipeline tunnels	Ignition of methane gas	Damage of the submarine pipeline and fuel leakage	-	-	-	It was agreed in the workshop that vegetation is not going to happen, so it is not a risk issue.
2.5	Car/vehicle crash impacting the existing pipelines during connection operations	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	Speed limit of 35 km/h will be imposed	-	-

Construction Phase - Submarine Pipeline and Underground Pipeline		SWIFT Chairman: Ian LINES SWIFT Secretary: Ho Fai LEUNG					ATKINS
Hazard Ref.	**What If**	**Hazard**	**Description of Consequence**	**Existing Safeguards**		**Recommendation**	**Remarks**
				Engineering	**Procedural**		
3. Construction Activities at Sha Chau							
3.1	Construction activities for new pipelines damage existing fuel pipelines	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	Shut down of valves and pumps.	-	-	Landfall for new pipelines is in rock on Sha Chau island well away from all existing fuel pipelines. Directional drilling should be highly accurate, and so no risk to existing fuel systems.
3.2	Error in connecting new pipelines to existing pipelines (flammable vapours, hot work, poor connection, close proximity of two pipelines)	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	-	Assess need for additional support for new pipelines on footbridge to jetty.	Should be relatively simple as provision for connection has already been made on the jetty. Some concern over whether existing footbridge to island is an adequate support for new pipelines.
3.3	Impact on jetty by barge (e.g. during pipeline pulling)	Jet fuel leakage from pipeline at jetty	Fuel spillage and potential subsequent ignition to cause pool fire	Existing protection is provided at the jetty (fenders).	-	-	-
3.4	Lightning	Jet fuel leakage	Fuel spillage and potential subsequent ignition to cause pool fire		Construction work has to be suspended during lightning.	-	Lightning forecast will be provided from the weather station at the airport.
4. Installation of Hydrant Pumps at Aviation Fuel Tank Farm							
4.1	Installation of hydrant pumps (and associated filters etc) damages existing fuel supply system (or storage tanks) (e.g. dropped object)	Jet fuel leakage at Aviation Fuel Tank Farm	Fuel spillage and potential subsequent ignition to cause pool fire	Fire-fighting equipment is installed around the tank farm (sprays, foam, etc)	Procedure is in place for modification work inside the aviation fuel tank farm	-	Connection should be relatively simple. Hydrant pumps are not very large and delivered from adjacent road so risks associated with dropping should be low.
4.2	Error in connecting new hydrant pump to existing system (poor connection, incorrect isolation, error in control systems, etc)	Jet fuel leakage at Aviation Fuel Tank Farm	Fuel spillage and potential subsequent ignition to cause pool fire	Fire-fighting equipment is installed around the tank farm (sprays, foam, etc)	A method statement will be prepared.	-	Connection should be relatively simple. Provision for additional hydrant pumps has already been made.
4.3	Fire hazard due to pipeline welding activity	Jet fuel leakage at Aviation Fuel Tank Farm	Fuel spillage and potential subsequent ignition to cause pool fire	Fire-fighting equipment is installed around the tank farm (sprays, foam, etc)	FSD approval required on work procedure. Emergency response plan will be prepared. All construction work will be monitored by staff from AFSC.	-	-
5. Construction Activities Associated with Extension of Fuel Hydrant System							
5.1	Construction activities for new hydrant system damage existing fuel pipelines or hydrant system (3rd party interference (e.g. digging), vehicle impact, etc)	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	-	Location of all existing hydrant networks should be clearly identified prior to any construction works.	There are no identified pipeline crossover locations, and no relevant construction activities identified as being undertaken close to the existing hydrant system (other than connections on north side of North runway). Note that the Midfield area hydrant system and the underground pipelines running to it are not part of the 3rd runway project and so are regarded as 'existing' pipelines for the purposes of the 3rd runway EIA, which hence only needs to consider the construction of the hydrant system for the 3rd runway and the two tunnels across the North runway, none of which will be close to any existing fuel pipelines. The proximity of the new hydrant pipeline along the South Perimeter Road to the adjacent existing underground jet fuel supply pipelines was noted (e.g. mechanical digger risk), although it is noted that construction of this pipeline is currently underway and so this is not relevant for the purposes of the EIA.
5.2	Error in connecting new hydrant system/pipelines to Aviation Fuel Tank Farm or to existing hydrant system	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	FSD approval required on work procedure. Emergency response plan will be prepared. All construction work will be monitored by staff from AFSC.	-	-

Construction Phase - Submarine Pipeline and Underground Pipeline		SWIFT Chairman: Ian LINES SWIFT Secretary: Ho Fai LEUNG					
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5.3	Ground movement during tunnel construction work	Rupture of underground pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	-	During construction of the road tunnel, north runway will be closed and air traffic will be diverted to 3rd runway, this may increase aircraft accident. NATS to review aviation procedure if there needs to be any change	Potential hazard from construction of tunnels across North runway. However, tunnel locations will be well away from any existing fuel pipelines, and so no risk.

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Operation Phase - Submarine Pipelines/Underground Pipelines/Aviation Fuel Hydrant System		**SWIFT Chairman: Ian LINES** **SWIFT Secretary: Ho Fai LEUNG**					
Hazard Ref.	**What If**	**Hazard**	**Description of Consequence**	**Existing Safeguards**		**Recommendation**	**Remarks**
				Engineering	**Procedural**		
1. Submarine Pipelines							
1.1	Corrosion (example due to water accumulated at low point or exposed section at the jetty)	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	Cathodic protection of pipelines. Leak detection based on flow rate comparison will be provided. Remote isolation valve shut down function will be provided.	Pipelines will be pigged to check for corrosion.	A similar coating standard will be applied to the new submarine pipelines as for the existing pipelines.	Note that water may accumulate at the low points of the pipelines leading to corrosion. Note that any leak may be somewhat constrained within bedrock.
1.2	Material defect	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	Conduct hydraulic test during testing and commissioning. Leak detection based on flow rate comparison will be provided. Remote valve shut down function will be provided	-	-	Note that any leak may be somewhat constrained within bedrock.
1.3	Construction defect	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	Conduct hydraulic test during testing and commissioing. Bentonite acts as lubricant during pipe pulling to reduce stresses on pipeline and hence minimise chance of a defect. Leak detection based on flow rate comparison will be provided. Remote isolation valve shut down function will be provided	-	Pigging should be used to check the integrity of the pipeline during T&C.	Note that any leak may be somewhat constrained within bedrock.
1.4	Earthquake	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	Leak detection based on flow rate comparison will be provided. Remote isolation valve shut down function will be provided	-	-	Hong Kong is not in a region where earthquakes are likely to be sufficiently severe to cause damage to the submarine pipelines.
1.5	Anchor drop/drag	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	-	-	The new pipelines are about 60m below the seabed, and therefore this hazard is not applicable.
1.6	Vessel sinking	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	-	-	The new pipelines are about 60m below the seabed, and therefore this hazard is not applicable.
1.7	Accidental dropping of container	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	-	-	The new pipelines are about 60m below the seabed, and therefore this hazard is not applicable.
1.8	Fishing activity	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	-	-	The new pipelines are about 60m below the seabed, and therefore this hazard is not applicable.
1.9	Vessel impact at jetty	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	ESD button is provided to close isolation valves and pumps.	New submarine pipeline coming out the Sha Chau and through the footbridge may need to be fenced off to prevent external damage, AAHK to consider	-	Could be caused by adverse weather, navigational error or loss of vessel manoeuvrability.
1.10	Pipelines on the bridge at the jetty not properly supported or protected	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire	-	Assess need for additional support for new pipelines on footbridge to jetty.	-	-
1.11	Jet fuel leakage into the annular space between the tunnel and the new pipeline	Jet fuel leakage from pipeline	Fuel leak and potential ignition	Annular space will be largely filled with Bentonite as lubricant.	-	-	-
2. Underground Pipelines							
2.1	Third party interference	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	ESD button is provided to close isolation valves and pumps.	-	Markers showing the alignment of pipeline should be provided. Detailed briefing should be given to any third party construction workers before commencing any construction work.	-
2.2	Corrosion	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	Cathodic protection is in place. ESD button is provided to close isolation valves and pumps.	One section of hydrant system is pressure checked for leakage each night.	-	See also concerns regarding stray currents.
2.3	Material defect	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	ESD button is provided to close isolation valves and pumps.	One section of hydrant system is pressure checked for leakage each night.	-	-

Operation Phase - Submarine Pipelines/Underground Pipelines/Aviation Fuel Hydrant System		SWIFT Chairman: Ian LINES SWIFT Secretary: Ho Fai LEUNG					
Hazard Ref.	**What If**	**Hazard**	**Description of Consequence**	**Existing Safeguards**		**Recommendation**	**Remarks**
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2.4	Construction defect	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	ESD button is provided to close isolation valves and pumps.	One section of hydrant system is pressure checked for leakage each night.	-	-
2.5	Subsidence	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	-	-	Regular checking of whether any subsidence occurs along the underground pipeline.	Atkins to discuss with AAHK (Wyllie) about monitoring settlement/subsidence on existing airport terminal
2.6	Earthquake	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	-	-	-	Hong Kong is not in a region where earthquakes are likely to be sufficiently severe to cause damage to the underground
2.7	Dynamic loading due to aircraft landing on runway	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	-	-	Engineering study required to confirm to no significant loads will be applied to pipelines.	Pipeline will be deep below the runway, and the runway itself provides protection against any loads being transferred to underground pipelines.
2.8	Different settlement rate between existing and new reclamated land (connecting existing pipeline to the new pipeline)	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	-	-	Regular checking of whether any subsidence occurs along the underground pipeline.	-
2.9	Abnormal pressure surge (e.g. if all hydrants stop at the same time)	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	The engineering design of the hydrant system will take the pressure surge factor into account	-	New pressure surge calculations are required because of the changed characteristics of the hydrant network.	The pressure surge is considered not an issue for the existing hydrant system
2.10	Stray current due to airport express rail	Pipeline corrosion leading to jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	Insulation system has been provided in the existing airport express railway network, but it may be degrading over time leading to increased stray currents.	-	-	Currently the issue is being followed up by Airport Authority with MTRC.
2.11	Aircraft crash	Jet fuel leakage from pipeline	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	-	Movement of aircraft is strictly controlled by the Control Tower in the airport.	-	Standard procedures should minimise the risk.
2.12	Increased pressure hazards (if increased pressure required in system to provide 9-10 bar at furthest point of 3rd runway hydrant system)	Underground pipeline bursting	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	-	-	There is a need to check that appropriate pressure drop calculations have been undertaken for the new system	-
3. Hydrant Pit							
3.1	Rupture of hydrant riser pipework	Jet fuel release from hydrant riser pipework	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve	-	-	Safeguards for all hydrant events include: flags to show location of active hydrant, dead man's switch/lanyard, fire extinguishers, fail safe nature of hydrant, ESD buttons which close all isolation valves and pumps, fire service on scene within minutes, rapid communication between fueller and Control Centre, etc (all to be verified against current guidance for HKIA). Note that fuelling regularly takes place with passengers on board, especially for short turn arounds. Passengers are requested to stay in seats without seatbelts, airbridge(s) are available for evacuatuion, evacuation shutes could be used if necessary/appropriate.
3.2	O-ring or gasket fail at pit valve	Jet fuel release from pit valve	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	Two fire extinguishers are provided in each dispenser	-	-
3.3	Poppet seal fail (once pilot valve is opened)	Jet fuel release from pit valve	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	Two fire extinguishers are provided in each dispenser	-	-

Operation Phase - Submarine Pipelines/Underground Pipelines/Aviation Fuel Hydrant System		SWIFT Chairman: Ian LINES SWIFT Secretary: Ho Fai LEUNG					
Hazard Ref.	**What If**	**Hazard**	**Description of Consequence**	**Existing Safeguards**		**Recommendation**	**Remarks**
				Engineering	**Procedural**		
3.4	Hydrant coupler failure at connections	Jet fuel release from hydrant coupler	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	Two fire extinguishers are provided in each dispenser	-	-
3.5	Hydrant Coupler failure at hose	Jet fuel release from hydrant coupler	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	Two fire extinguishers are provided in each dispenser vehicle	-	-
3.6	Hydrant coupler failure due to vehicle impact	Jet fuel release from hydrant coupler	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	1. Warning flag is provid next to hyrant pit when a hydrant coupler is connected to the pit valve 2. Two fire extinguishers are provided in each dispenser vehicle	-	-
3.7	Spill from dispensing vehicle	Jet fuel release from dispensing vehicle	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	Two fire extinguishers are provided in each dispenser	-	-
3.8	Hydrant dispenser moves off inadvertently by driver whilst the hose still connected or vehicle rolls	Jet fuel release from aircraft vent	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided. 4. Brake interlock system is provided in the hydrant dispenser vehicle	Two fire extinguishers are provided in each dispenser	-	-
3.9	Hydrant dispenser moves off whilst the hose still connected or vehicle rolls due to high wind	Jet fuel release from aircraft vent	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	Two fire extinguishers are provided in each dispenser	-	-
3.10	Aircraft vent failure	Jet fuel release from aircraft vent	Fuel spillage and potential subsequent ignition to cause pool fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	Two fire extinguishers are provided in each dispenser	-	-
3.11	Engine fire at hydrant dispenser	Ignition of jet fuel	Potential fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	Two fire extinguishers are provided in each dispenser	-	-
3.12	Hydrant/dispenser struck by lightning	Ignition of jet fuel	Potential fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	If a red lightning warning is issued, all fueling operation has to be suspended	-	If a red lightning warning is issued, the operator will release the deadman switch and stay inside the cab/go to terminal station
3.13	Thermal stress on pipeline due to 'closed in' jet fuel	Thermal expansion of jet fuel	Fuel spillage and potential subsequent ignition to cause pool fire	Emergency shut down button is provided	-	-	-

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3.14	Vehicle impact to hydrant pit	Jet fuel release from hydrant coupler	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	1. Emergency shut down button is provided near the pit valve. 2. Lanyard is provided to close the hydrant pit in case of emergency. 3. Deadman switch is provided.	1. Warning flag is provid next to hyrant pit when a hydrant coupler is connected to the pit valve 2. Two fire extinguishers are provided in each dispenser vehicle	-	-
3.15	Dirt in the hydrant system	Fuel line blockage in aircraft	Aircraft engine system fails and potential aircraft crash	Filters will be provided at aviation fuel tank farm.	-	-	-
3.16	Accidents involving fuel bowser	Jet fuel release during bowser operations	Fuel spillage and potential subsequent ignition to cause pool fire/jet fire	-	-	-	There will be some bowser operations in the expansion area (e.g. defuelling a plane), but bowser operations are not part of the scope for the EIA.
4. Hydrant Pump							
4.1	Mechanical seal failure	Jet fuel leakage from hydrant pump	Fuel spillage and potential subsequent ignition to cause pool fire	Sprinkler, foam and other fire fighting systems in place at the fuel farm. All electrical systems within the tank farm are ignition proof.	-	-	-
4.2	Failure to manually breathe out air from filter, with air accumulated and compressed	Jet fuel heat up by compressed air	Explosion of fuel filter and subsequent escalation to a large fire	-	Suitably trained/experienced staff.	-	-
4.3	Undersize of motor causing pump overheating	Jet fuel leakage	Fuel spillage and potential subsequent ignition to cause pool fire	Sprinkler, foam and other fire fighting systems in place at the fuel farm. All electrical systems within the tank farm are ignition proof.	-	-	All new pumps will have characteristics similar to the existing pumps, and so there should be no issues with some components being wrongly sized.
4.4	Minor leak in fuel farm which escalates	Fire affecting the hydrant pump	Fuel spillage and potential subsequent ignition to cause pool fire	Sprinkler, foam and other fire fighting systems in place at the fuel farm. All electrical systems within the tank farm are ignition proof.	-	-	-

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Operation Phase - Airside Vehicle Filling Station		**SWIFT Chairman: Ian LINES** **SWIFT Secretary: Ho Fai LEUNG**					ATKINS
Hazard Ref.	**What If**	**Hazard**	**Description of Consequence**	**Existing Safeguards**		**Recommendation**	**Remarks**
				Engineering	**Procedural**		
1. Petrol/Diesel Road Tanker							
1.1	Tanker failure due to corrosion	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in fire)	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.2	Tanker failure due to construction defect	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.3	Tanker failure due to material defect	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.4	Tanker failure due to external impact (struck by other vehicle)	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.5	Hose misconnection due to human error	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.6	Hose rupture due to tanker drive away inadvertently	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.7	Hose rupture due to tanker being moved away by high wind	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.8	Hose failure (e.g. rupture)	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.9	Failure of coupler at delivery hose	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.10	Loading pipework overpressurisation due to misoperation	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in fire)	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.11	Road tanker overturn due to high wind	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause pool fire (and potential explosion of tanker if engulfed in	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.12	Road tanker at filling station struck by lightning	Ignition of petrol/diesel	Potential fire/explosion	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.13	Engine fire at road tanker	Ignition of petrol/diesel	Potential fire/explosion	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.14	Tanker struck by aircraft	Ignition of petrol/diesel	Potential fire/explosion		Tankers is not allowed to cross active taxiways.	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
1.15	Vehicle crash into fuel dispensor	Ignition of petrol/diesel	Potential fire/explosion	Emergency valve will be shut down automatically	As per existing 3 filling stations Speed limit is 35 kmh will be imposed	-	-
2. Underground Pipework							
2.1	Pipework failure due to corrosion	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
2.2	Pipework failure due to construction defect	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
2.3	Pipework failure due to material defect	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
2.4	Pipework failure due to third party interference	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire	-	-	-	Airside is a restricted area and any construction inside the area will have to be reviewed and approved by the AAHK.
3. Underground Storage Tank							
3.1	Tank failure due to corrosion (e.g. due to stray current)	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire and	-	-	-	Stray currents could be an increasing significant issue. This issue is being investigated.
3.2	Tank failure due to construction defect	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire and	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
3.3	Tank failure due to material defect	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire and	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.

Operation Phase - Airside Vehicle Filling Station		SWIFT Chairman: Ian LINES SWIFT Secretary: Ho Fai LEUNG					
Hazard Ref.	What If	Hazard	Description of Consequence	Existing Safeguards		Recommendation	Remarks
				Engineering	Procedural		
3.4	Tank failure due to earthquake	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire and	-	-	-	Hong Kong is not in a region where earthquakes are likely to be sufficiently severe to cause damage to a buried
3.5	Tank failure due to subsidence	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire and explosion	-	-	-	Tanks are large and so subsidence is not considered to be a significant issue. No evidence of subsidence at existing 3 filling stations.
3.6	Tank failure due to third party interference	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire and	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
3.7	Overfilling of storage tank by road tanker	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire and	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.
3.8	Failure of safety relief valve	Petrol/diesel release into atmosphere	Spillage of petrol/diesel and potential subsequent ignition to cause fire and	-	-	-	The design, construction and operation of the new airside vehicle filling station will be same as the existing stations.