TILENGA PROJECT ESIA - APPENDIX E: Additional Project Description material

May 2018

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Embedded Mitigation List

Tilenga ESIA - Embedded Mitigation Mesures

Chapter Reference	Description of Embedded Mitigation	Project Compoment											Phase			
		Industrial Area (excluding CPF)	CPF	Well Pads	Production and Injection Network	Lake Water Abstraction System	Roads	Victoria Nile Ferry Crossing Facility	Masindi Vehicle Check Point	Bugungu Airstrip	Camps (Tangi, Bulisa and Bugungu)	Borrow Pits	Site Preperation and Enabling Works	Construction and Pre-Comissioning	Comissioning and Operations	Decomissioning
4.3	All fuels and hazardous materials will be stored within appropriate bunds and drip trays, providing appropriate containment, where practicable.	X	X	X	X	X	X	X	X	X	X		X	X	X	X
4.3	Chemicals and hazardous liquids will be supplied in dedicated tote tanks made of sufficiently robust construction to prevent leaks/spills. Dedicated procedures will be developed for fuel and hazardous material transfers and personnel will be trained to respond. Spill kits will be available at all storage locations.	X	X	X	X	X	X	X	X	X	X		X	X	X	X
4.3 and 4.8.1	Main refuelling facilities will be located within the Industrial Area, the camps and the Masindi Vehicle Check Point. Facilities will be located within a bunded areas with appropriate capacity (110% tank containment). The refuelling pumps will be equipped with automatic shut off and there will be dedicated procedures and spill kits available. Bunds will be designed to minimise ingress of surface water, facilities roofed where practicable and any contaminated water collected will be trucked off site for disposal.	X													X	
4.3	Flow meters will be integrated on all refuelling points to monitor usage. Sampling points will also be established to enable spot sampling of fuel composition.	X													X	
4.3	With the exception of the CPF which has a bespoke drainage arrangement detailed in Section 4.3.4.2, drainage arrangements for the permanent facilities will be as follows: • Potentially contaminated areas (i.e. fuel and chemical storage areas) will be provided with local effluent collection (sumps, kerbing and bunding) whereby the potentially contaminated water will be collected and removed by road tanker to a licenced waste disposal facility; and • Uncontaminated areas which will drain naturally to the environment via Sustainable Drainage System (SuDS) comprising filter drains and soakaways. The SuDS design is subject to further detailed design. Sampling points will be established for all potentially contaminated areas to enable samples to be collected for analysis.	X		X	X	X		X	X		X				X	
4.3 and 4.8.1	Lighting will be reduced to the minimum without impacting safety and security. Where feasible, the light will be directed inwards the facilities and will be of a warm / neutral colour so as to limit nuisance to the surrounding communities and to avoid attracting animals. There will be no night activities associated with this phase except in case of emergency.	X	X	X	X	X		X	X		X				X	
4.3	During operations, power will be provided by the CPF; there will be no back up generators.	X	X	X	X	X		X	X		X				X	
4.3.2	There will be a 15 m wide buffer from the perimeter security structure, which will be cleared of vegetation. Within the MFNP, the structure will be designed to prevent the ingress of animals entering the well pads and will comprise a bund wall structure.			X											X	
4.3.2	Where practicable, equipment will be located under shelters to prevent the ingress of rainwater.			X											X	
4.3.2	Each well pad will include an emergency pit with capacity for up to 50 cubic metres (m3) for use should there be an unplanned event i.e. blowout. The pit will be lined and covered to prevent rainwater ingress.			X											X	
4.3.3	The pipelines will comprise carbon steel with adequate corrosion allowance built into material specifications (wall thickness) to prevent leaks.				X										X	
4.3.3	An anticorrosion coating will be applied for external protection and a corrosion inhibitor will be injected for internal protection.				X										X	
4.3.3 and 4.9.6	The Production and Injection Network outside the Industrial Area will be buried at least 0.8m below the ground surface; markers will be used to denote the location (including the water abstraction pipeline in Lake Albert).				X										X	
4.3.4.1	International Civil Aviation Organization (ICAO) lighting and marking are required for structures over 45 m and as such both the radio mast and the elevated flare will have appropriate warning lighting	X													X	
4.3.4.2	There will be no routine flaring during normal operations.		X												X	
4.3.4.2	A flow meter will be integrated into the flare design to monitor flow and a sample point will be integrated to monitor composition.		X												X	
4.3.4.2	A Vapour Recovery Unit will be located at the CPF to process gases generated.		X												X	

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4.3.4.2	The drainage arrangement of the CPF will be designed to segregate clean and potentially contaminated effluent streams. The drainage for the CPF will be segregated as follows: • Continuously Contaminated Drains will collect hazardous fluids from process and utility equipment. All effluent collected in the closed drainage system will be returned back to the oil treatment trains. There will be no discharge to environment from the closed drains system; • Potentially Contaminated Drains will collect rainfall, wash-water or fire water that falls on paved process and equipment areas that could contain contaminants such as hydrocarbons, metals and solids. Drip pans and kerbs will be provided below every process or utility system that may potentially leak or overflow. Any drips or leaks will be routed to the open drain system via a sump. Roofing will be provided where practicable to prevent surface water ingress. During normal operating conditions, rainwater from potentially contaminated areas will be directed to an the oil water separator prior to discharge to environment in accordance with applicable discharge standards as presented in Chapter 10: Surface Water. When the oil-water separator is full, it will overflows to an associated storm basin via an overflow diverter which will act as a buffer. When the level in the separator falls, the water collected in the storm basin will be sent by storm water pumps back to the overflow diverter and on to the separator. The storm water basin will be sized to withstand a 1 in 100 year event. An oil in water analysers will be installed on the discharge point of the potentially contaminated drains to provide continuous monitoring of the discharge; and • Uncontaminated Drains will manage clean surface water from uncontaminated areas via suitably designed SuDS (network of filter drains and soakaways).		X													X	
4.3.4.2	A metering system will be integrated into the main power generation system package to enable the continuous monitoring of flow and composition. A sampling point will also be established to enable sampling of exhaust gas.		X													X	
4.3.4.2	For the CPF, equipment will be designed to achieve occupational noise level compliance of 85dBA at 1 metre (which is an industry accepted standard) where practicable.		X													X	
4.3.5	A flow meter will be installed and sample point established for ongoing monitoring purposes;					X										X	
4.3.5	Once operational, there will be restricted access either side of the pipeline location in Lake Albert.					X										X	
4.3.6	Drainage channels will be installed along the edges of the upgraded roads to prevent excessive runoff and cross drainage culverts will be installed, where appropriate. All drainage infrastructure will be designed taking into account the Uganda Ministry of Works and Transport - Road and Bridge Works Design Manual for Drainage (January 2010) (Ref. 4.2).						X									X	
4.7	The LARF will be implemented prior to the start of the Project and describes the legal and administrative framework, the land-use and land tenure of the Project Area, and provides guiding principles on valuation methodology, entitlements, resettlement action planning, and livelihood restoration.	X	X	X	X	X	X	X	X		X		X	X	X	
4.7	A Stakeholder Engagement Plan is already in place; this will ensure the community are informed both prior to the commencement of work on site, during the works on a regular basis and after. As stated above a Grievance Mechanism will be established for the local community to raise compliant and concerns relating to Project activities (i.e. dust, noise etc.).	X	X	X	X	X	X	X	X		X		X	X	X	
4.8.1	All site clearance activities will be undertaken in line with the Site Clearance Plan which will be developed by the Contractor(s) prior to commencing the Site Preparation and Enabling Works Phase to limit extent of vegetation clearance, wherever possible.	X	X	X		X	X	X	X	X			X			
4.8.1	Surface water will be managed via temporary sustainable drainage systems (SuDS) to manage flood and contamination risk. The requirements for construction SUDS will be adapted depending on the nature of the activities utilising the principles as outlined in Chapter 23: Environmental and Social Management Plan.	X	X	X	X	X	X	X	X	X			X	X		
4.8.1	Diesel generator(s) will be located in the Industrial Area for the provision of power and small diesel generator packages will be used for all other work sites to provide power for small items of equipment such as pumps/compressors.	X	X	X		X	X	X	X	X			X			
4.8.1	During site clearance, vegetation stripping will be undertaken using a phased approach to minimise sediment pollution from runoff.	X	X	X	X	X	X	X	X	X			X	X		
4.8.1	Buffer zones will be established to protect watercourses and habitats.	X	X	X	X	X	X	X	X	X			X	X		
4.8.1	Barriers and fences will be used to isolate work areas.	X	X	X	X	X	X	X	X	X			X	X		
4.8.1	Contaminated run off will be minimised by ensuring adequate storage facilities are in place for materials stockpiles, waste, fuels/chemicals/hazardous materials, vehicles/washing areas, parking facilities.	X	X	X	X	X	X	X	X	X			X	X		

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4.8.1	Clean surface water will be diverted away from exposed soils with use of diversion drains and bunds.	X	X	X	X	X	X	X	X	X			X	X		
4.8.1	All dewatering from excavations or isolated work areas will be provided with appropriate level of treatment prior to discharge.	X	X	X	X	X	X	X	X	X			X	X		
4.8.1and 4.9.1	Implementation of a Dust Control Plan, which will include: o Measures to include the application of dust suppressants (including water), on potentially dust generating sources, including on site and off site roads used by Project vehicles and material stockpiles. o Water will be sprayed onto the roads and work sites to supress dust generation, where necessary. Water will be provided at the work sites and mobile water bowsers will be available to control dust generation, if required. o Activities likely to generate dust (e.g. drilling powders use and transfer) will be enclosed and dust catchers in place when practicable. o Trucks carrying potentially dusty material will be covered, to reduce fugitive dust emissions from the materials being transported. o Roads used by Project vehicles will be maintained, to the extent that this is possible, to reduce fugitive dust emissions associated with surface dust being disturbed by the passing of traffic. o Concrete batching materials to be stored in sealed silos with the batching area regularly watered down to supress dust emissions.	X	X	X	X	X	X	X	X	X			X	X		
4.8.1	Trees stripped of their branches will either be stacked alongside the track, or transported to pre-determined locations within the working area for disposal or reuse.	X	X	X		X	X	X	X	X			X			
4.8.1	The top soils will be removed to a required depth; material will be temporarily stored areas within designated areas.	X	X	X		X	X	X	X	X			X			
4.8.1	It is planned to reuse removed soil onsite wherever possible. Through detailed design, the Project will ensure the generation of excess material is minimised as far as practicable and reused, wherever possible.	X	X	X		X	X	X	X	X			X			
4.8.3	For the upgraded roads, it will be necessary to cordon off the road (while retaining pedestrian access, where practicable) before widening the road.						X						X			
4.8.3	All temporary land required associated with the construction of the roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor specifically for the roads.						X						X			
4.8.7	The additional boreholes will be installed during the Site Preparation and Enabling Works Phase and will be drilled to target deep water aquifer zones using water and bentonite	X	X	X		X	X	X	X	X			X			
4.8.7	All drill cuttings from borehole drilling activities will be collected and disposed of appropriately. Disposal methods will be pre-agreed with NEMA prior to commencement of activities	X	X	X		X	X	X	X	X			X			
4.8.7	Flow meters will be installed on all boreholes to measure flow, water level and quality.	X	X	X		X	X	X	X	X			X			
4.8.8	Unused material will be reused within the Project footprint or used to restore the borrow pits as much as practicable.											X	X			
4.8.8	Regular audits of the borrow pits and quarries will be conducted at the aforementioned sources to ensure compliance with Ugandan law.											X	X			
4.8.8	All borrow pits and quarries used by Project Proponents will be re-habilitated following completions of extraction in line with the Site Restoration Plan as developed by the Contractor.											X	X			
4.8.9	Working hours will be based on the normal work day in line with Ugandan law	X	X	X		X	X	X	X	X			X			
4.8.1 and 4.8.9	As per base case, there will be no routine nightshift activities associated with the Site Preparation and Enabling Works Phase, except in except in the case of an emergency event.	X	X	X		X	X	X	X	X			X			
4.8.9	Buses will be provided to transport workers living in nearby villages.	X	X	X		X	X	X	X	X			X			
4.8.10	The Project Proponents are aware of the need to employ water efficiency measures throughout the lifetime of the Project; they will consider water reduction measures, where feasible.	X	X	X		X	X	X	X	X			X			
4.8.10	The installation of boreholes across the Project Area is subject to the outcome of the Water Abstraction Feasibility Study currently being undertaken by the Project Proponents.	X	X	X		X	X	X	X	X			X			

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4.9.1	For power generation, centralised diesel generator package including back up facilities will be located at the Industrial Area Construction Support Base to service the construction and pre-commissioning activities within the Industrial Area. Dedicated generator packages of varying sizes will also be mobilised to provide the power requirements for the construction and pre-commissioning of at discrete locations including the Lake Water Abstraction System, well pads and pipeline installation sites. Separate independent packages will be mobilised with the drilling rig to service the power requirements for the drilling activities.	X	X	X	X	X								X		
4.9.1	With the exception of drilling and HDD construction activities there will be no permanent night time working in the MFNP;			X	X									X		
4.9.1	Pre-commissioning water (used for pipeline cleaning and hydrostatic tests) will be reused wherever practicable on multiple pipelines. The base case for management of hydrostatic test water is for the treated water to be left in situ until start up. Final disposal will be determined and selected depending the water quality and available discharge options. The base case for ESIA is that water left in the pipeline from hydrotesting will be disposed via the Produced Water Treatment Train and transferred back via the Production and Injection Network to the well pads for re-injection, subject to further technical assessment.				X									X		
4.9.1	Laydown areas at each of the well pad sites will be located within the footprint of the well pad; there will be no additional site clearance required outside the well pad footprint during the Construction and Pre-Commissioning Phase.			X										X		
4.9.5	All wells will be drilled using a Blow Out Preventer (BOP) system prior to entering hydrocarbons bearing reservoirs to prevent an uncontrolled release of hydrocarbons in the event that well control issues are experienced during drilling			X										X		
4.9.5	A down-hole safety valve (DHSV) will be fitted on all production wells crossing major fault lines.			X										X		
4.9.5	SBM will be transferred from the Liquid Mud Plant to the well pads via truck in dedicated sealed containers to reduce the risk of spillage during storage, handling and transportation operations	X		X			X							X		
4.9.5	Drilling muds will be reused, wherever possible.			X										X		
4.9.5	A Wellbore Surveying Management Strategy will be implemented to address the main challenges related to wellbore positioning and collision avoidance aspects.			X										X		
4.9.5	• Mud Products will comply with Uganda's Health, Safety and Environment Regulations. Only Chemicals ranked E or D in the OCNS (Oil Chemical National Scheme classification) will be allowed to be used; • All products for completion and drilling fluids will be free of chlorides; the upper limit will be 2% by weight; • All Products entering in the mixing of drilling, completion and cementing will be free of aromatic Hydrocarbon, the upper limit is fixed at 300 parts per million (ppm); and • No asphalt, no gilsonite, nor equivalent so called "black" products will be permitted in the drilling fluids and cementing formulations.			X										X		
4.9.5	Spent muds will be temporary stored in containers prior to removal by a vacuum truck, waste cuttings will collected via augers to the Roll-on Roll-off (Ro-Ro) skips (or equivalent) and transferred off the well pad for treatment and disposal.			X										X		
4.9.5	Disposal of drill cuttings will be in accordance with Ugandan Legislation and IFC Environmental Health and Safety (EHS).			X										X		
4.9.5	There will be no routine well testing after wells are completed			X										X		
4.9.6	Construction activities will be contained within the permanent RoW which will have a width of 30 m and is designed to accommodate the pipeline trench(s), stockpile areas, laydown, welding, and the movement of construction equipment alongside the trench(s).				X									X		
4.9.6	During construction and hydrotesting activities, there will be access restrictions to the RoW for safety reasons. Once complete there will be no restrictions to the public using the area (refer to Section 4.10.8).				X									X		
4.9.6	The length of open trenching at any given time will be minimised to approximately 1 km to allow wildlife and the local community safe passage				X									X		
4.9.6	The use of animal crossing structures such as bridges, culverts, and over crossings, along pipeline and access road RoW will be installed where necessary. At special points such as crossings, deep excavations and tie-in bell holes, safety fences will be installed to prevent human or animal ingress.				X									X		
4.9.6	Ditch plugs will be installed on all trenches to prevent the pooling of water in the trenches.				X									X		
4.9.6	Material from trenching activities will be stored within the pipeline RoW and used as backfill. Excess material will be reused on site where possible. Options for the reuse of uncontaminated excess subsoil material will be assessed during detailed engineering e.g. borrow pit restoration.				X									X		
4.9.6	When stringing pipeline in the MFNP, consideration will be given to minimising the amount of open trench time and where practicable maintaining pathways for wildlife to traverse.				X									X		

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4.9.6	The pipe laying and backfill activity is to be conducted as soon as practicable after the trench excavation utilising standard pipe laying cranes and earthmoving equipment.				X									X		
4.9.6	The Production and Injection Network RoW will be restored in line with the Site Restoration Plan as developed by the Contractor specifically for the RoW.				X									X		
4.9.6	Prior to starting HDD activities a risk assessment will be undertaken to identify the necessary design of the HDD tunnels including appropriate tunnelling and slurry management practice to control groundwater ingress and minimise slurry loss from the tunnel into surrounding aquifers/surface waters.				X									X		
4.9.6	The temporary land required for the HDD Construction Areas roads will be restored following construction in line with the Site Restoration Plan as developed by the Contractor.				X									X		
4.9.7	Any residues and wastes generated from pre-commissioning activities will be managed in accordance with the site Waste Management Plan	X	X	X	X	X								X		
4.9.7	For any chemical usage [with respect to pre-comissioning], a thorough Chemical Risk Assessment will be undertaken and lowest toxicity chemicals will be used wherever possible;	X	X	X	X	X								X		
4.9.7	Pre-commissioning water (used for pipeline cleaning and hydrostatic tests) will be reused wherever practicable on multiple pipelines.				X									X		
4.9.9	The site manpower requirements will be in compliance with all relevant provisions of Ugandan law.	X	X	X	X	X								X		
4.9.9	The Project will aim to achieve a large proportion of Ugandan nationals in the workforce.	X	X	X	X	X								X		
4.9.11	A Road Safety and Transport Management Plan will be developed prior to commencing the Construction and Pre-Commissioning Phase.	X	X	X	X	X								X		
4.9.11	All transportation will be compliant with applicable road transport regulations. In the Project Area, routine transportation operations will normally only occur in day light. Deliveries of equipment and the movement of people will be scheduled in convoys, where practicable	X	X	X	X	X								X		
4.9.11	All construction vehicles/equipment will be kept on site when not in use.	X	X	X	X	X								X		
4.9.12	The base case for Tilenga is that there will be no night driving. However, night driving may be permitted in exceptional circumstances and with internal derogation where it is deemed safe and practicable to do so.	X	X	X	X	X								X		
4.9.12	Drivers will be required to have a break every 2 hours of driving.	X	X	X	X	X								X		
4.9.13	[Decommisioning of Masindi] All wastes will be removed and disposed of at dedicated waste treatment facilities in accordance with the Waste Management Plan. A detailed Decommissioning Plan will be developed for the works during the Site Preparation and Enabling Works Phase of the Project.								X					X		
4.9.14	Decommissioning work at the Buliisa Camp, Bugungu Camp and 17 ha of the Tangi Camp will be undertaken at the end of the Construction and Pre-Commissioning Phase. The land will be restored in line with the Site Restoration Plan as developed by the Contractor.										X			X		
4.9.15	At the end of the Construction and Pre-Commissioning Phase the C1 road will be restored in accordance with a Site Restoration Plan by the Contractor.						X							X		
4.10.3	Commissioning tests will be undertaken using feedstock oil, natural gas, methanol and chemicals. All commissioning fluids will be managed either at CPF or transferred off site for disposal..	X	X	X	X	X									X	
4.10.5	A dedicated Pipeline Integrity Management System will be implemented during the Commissioning and Operations Phase. This will include regular preventative maintenance including operational pigging, intelligent pigging and inspection campaigns to monitor the status of pipelines.				X										X	
4.10.5	The chemicals used for polymer injection will be subject to detailed environmental risk assessment prior to use taking into account all chemical /biological properties and the specific requirements for early oil recovery use.			X											X	
4.10.6	Given that the Project Area is located within the EARS, the Project Proponents will establish a Passive Seismic Network programme, of seismograph stations in the area to enable detection of naturally occurring seismic events	X	X	X	X	X									X	
4.10.6	The Project Proponents will undertake analysis of archive images from Interferometric Synthetic Aperture Radar (InSAR) for ground movement data in the Project Area.	X	X	X	X	X									X	
4.10.7	The ferry will operate for 8 hours a day and will be dedicated to Project use only. There will be no ferry movements during night time hours except in exceptional circumstances and with internal derogation.							X							X	
4.10.8	The permanent RoW will be kept clear of trees, deep rooting vegetation, poles, structures and graves. Regular monitoring will be undertaken, which will include removal of vegetation overgrowth and uprooting tree seedlings.				X										X	
4.10.8	There will be no permanent access restrictions to the pipeline RoW.				X										X	

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4.11	A review of relevant studies, if necessary, will be undertaken during the Commissioning and Operations Phase to confirm that the planned decommissioning activities utilise good industry practices and are the most appropriate to the prevailing circumstances and future land use.	X	X	X	X	X	X	X			X					X
4.11	The Project Proponents will obtain all relevant approvals and authorisations for all decommissioning activities from the GoU departments responsible at the time.	X	X	X	X	X	X	X			X					X
4.11	In general, the following principles will be adopted where practicable and will be subject to detailed assessment prior to decommissioning: • Above ground infrastructure will be removed to 0.5 m below ground level and backfilled and vegetated; • Access roads may be left in place depending upon the subsequent use of the land; • Shallow foundations for infrastructure may be excavated, demolished and disposed of; • Where piled foundations exist, these may be excavated to a depth of 1 m below the existing ground level and removed; • Excavations resulting from the removal of foundations will be backfilled; • It is expected that pipelines will be cleaned, capped and let in situ, to prevent disturbing the reinstated habitats; and • Where the environment assessment identifies it is acceptable, in some locations pipeline sections may be cleaned, reclaimed and re-used.	X	X	X	X	X	X	X			X					X
4.11	During the Decommissioning Phase the following assumptions are applicable regarding supporting facilities: •• Water will be supplied from dedicated abstraction boreholes; • Localised effluent collection facilities will be provided for chemical storage, hazardous materials storage, liquid waste storage, tanks, and fuelling facilities. Such containment will include impermeable areas, kerbing, bunding and drip trays as appropriate; • Drainage systems will remain until sites are free of contamination. SuDS will also manage flood risk during this phase of work; • No discharge of water used for decommissioning activities will be discharged to the environment; • Sewage will be treated by existing wastewater treatment plants (WWTPs) and discharged in accordance with wastewater treatment standards as presented in Chapter 10: Surface Water or collected and transferred to suitably licensed treatment facilities for processing and disposal; • Lighting will be reduced to the minimum without impacting safety and security. The light will be directed inwards the facilities and will be of a warm / neutral colour so as to limit nuisance to the surrounding communities and to avoid attracting animals. There will be no night activities associated with this Phase except in case of emergency; • A Construction Support Base will be constructed within the Industrial Area for use during the Decommissioning Phase; • For power generation, a centralised diesel generator package including back up facilities will be located at the Construction Support Base to service the decommissioning activities within the Industrial Area. Dedicated generator packages of varying sizes will also be mobilised to provide the power at discrete locations including the Lake Water Abstraction System, well pads and pipeline decommissioning sites; and • Waste will be segregated and managed in accordance with a Waste Management Plan.	X	X	X	X	X	X	X			X					X
4.11	Depending on the final land use agreed with the Ugandan authorities, all or part of the site may need to be rehabilitated. In such circumstances, the Project Proponents will also develop a monitoring programme for completion criteria to verify that the sites are being returned to the agreed representative state.	X	X	X	X	X	X	X			X					X
4.13	A Waste Management Plan will be developed and maintained to cover the duration of the Project; and will address the anticipated waste streams, likely quantities and any special handling requirements. The Project Proponent's will implement a waste tracking system to ensure traceability of all wastes removed off site.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
4.13	Prior to transfer offsite to a licensed waste treatment facility, waste materials will be segregated and stored in appropriate containers to prevent: • Accidental spillage or leakage; • Contamination of soils and groundwater; • Corrosion or wear of containers; • Loss of integrity from accidental collisions or weathering; • Theft; and • Odour and scavenging by animals.	X	X	X	X	X	X	X	X	X	X		X	X		
4.13	The existing camps have operating WWTPs. Sewage produced from the camps will be treated at the WWTPs in compliance with regulatory requirements (refer to Chapter 10: Surface Water). Sewage from other Project Areas (e.g. road work sites) will be collected and transferred to WWTPs and/or suitably licensed treatment facilities for processing and disposal. All sewage sludge will be removed periodically from WWTPs and transferred off site for disposal.	X	X	X	X	X	X	X	X	X	X		X	X		
4.13	A flow meter will be integrated at the discharge point of the WWTPs to record to all discharges and a sample point will be established to collect spot samples for analysis.	X									X		X	X		
4.13	For the Masindi Vehicle Check Point, waste will be collected and transferred to an approved waste treatment facility for recycling, treatment, recovery and/or disposal.								X							

Chapter Reference	Description of Embedded Mitigation	Project Compoment											Phase			
		Industrial Area (excluding CPF)	CPF	Well Pads	Production and Injection Network	Lake Water Abstraction System	Roads	Victoria Nile Ferry Crossing Facility	Masindi Vehicle Check Point	Bugungu Airstrip	Camps (Tangi, Bulisa and Bugungu)	Borrow Pits	Site Preperation and Enabling Works	Construction and Pre-Comissioning	Comissioning and Operations	Decomissioning
4.13	Sewage produced from the camps and other Project Areas will be treated at the WWTPs located at the camps in compliance with regulatory requirements (refer to Chapter 10: Surface Water). Wastewater from the well pads will be collected and transferred by tanker to the nearest WWTPs.	X	X	X	X	X	X	X			X		X	X		
4.13	For the Masindi Vehicle Check Point, sewage will either be treated by a wastewater treatment plant on site and discharged in accordance with the wastewater treatment standards presented in Chapter 10: Surface Water or transferred to the Masindi sewage treatment plant for processing (depending on capacity and approval).								X				X	X		
4.13	During the Commissioning and Operations Phase waste will be stored and processed at the IWMA located south of Victoria Nile. There will be no waste management facility located north of the Victoria Nile within the MFNP.	X	X	X	X	X		X						X		
4.13	For the well pads, Victoria Nile Ferry Crossing Facility and the Lake Water Abstraction System, sewage will be collected and transferred to suitably licensed treatment facilities for processing and disposal.			X		X		X						X		

Example Material Safety Data Sheets

ScienceLab.com
Chemicals & Laboratory Equipment

Health	3
Fire	2
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Acetic acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetic acid

Catalog Codes: SLA3784, SLA1438, SLA2101, SLA3604, SLA1258

CAS#: 64-19-7

RTECS: AF1225000

TSCA: TSCA 8(b) inventory: Acetic acid

CI#: Not applicable.

Synonym: Acetic acid; glacial acetic acid

Chemical Name: Acetic Acid, Glacial

Chemical Formula: C2-H4-O2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetic acid	64-19-7	100

Toxicological Data on Ingredients: Acetic acid: ORAL (LD50): Acute: 3310 mg/kg [Rat]. 4960 mg/kg [Mouse]. 3530 mg/kg [Rat]. DERMAL (LD50): Acute: 1060 mg/kg [Rabbit]. VAPOR (LC50): Acute: 5620 ppm 1 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, mucous membranes, skin, teeth. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated

or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 463°C (865.4°F)

Flash Points: CLOSED CUP: 39°C (102.2°F). OPEN CUP: 43°C (109.4°F).

Flammable Limits: LOWER: 4% UPPER: 19.9%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials, of metals.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Reacts with metals to produces flammable hydrogen gas. It will ignite on contact with potassium-tert-butoxide. A mixture of ammonium nitrate and acetic acid ignites when warmed, especially if warmed.

Special Remarks on Explosion Hazards:

Acetic acid vapors may form explosive mixtures with air. Reactions between acetic acid and the following materials are potentially explosive: 5-azidotetrazole, bromine pentafluoride, chromium trioxide, hydrogen peroxide, potassium permanganate, sodium peroxide, and phorphorus trichloride. Dilute acetic acid and dilute hydrogen can undergo an exothermic reaction if heated, forming peracetic acid which is explosive at 110 degrees C. Reaction between chlorine trifluoride and acetic acid is very violent, sometimes explosive.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Flammable liquid. Corrosive liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. If the product is in its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product is in its liquid form: Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Absorb with an inert material and put the spilled material in an appropriate waste disposal. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
\Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Synthetic apron. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves (impervious).

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 STEL: 15 (ppm) [Australia] TWA: 25 STEL: 27 (mg/m3) [Australia] TWA: 10 STEL: 15 (ppm) from NIOSH TWA: 25 STEL: 37 (mg/m3) from NIOSH TWA: 10 STEL: 15 (ppm) [Canada] TWA: 26 STEL: 39 (mg/m3) [Canada] TWA: 25 STEL: 37 (mg/m3) TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) [United States] [1999] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 25 (mg/m3) from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent, vinegar-like, sour (Strong.)

Taste: Vinegar, sour (Strong.)

Molecular Weight: 60.05 g/mole

Color: Colorless. Clear (Light.)

pH (1% soln/water): 2 [Acidic.]

Boiling Point: 118.1°C (244.6°F)

Melting Point: 16.6°C (61.9°F)

Critical Temperature: 321.67°C (611°F)

Specific Gravity: 1.049 (Water = 1)

Vapor Pressure: 1.5 kPa (@ 20°C)

Vapor Density: 2.07 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.48 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Easily soluble in cold water, hot water. Soluble in diethyl ether, acetone. Miscible with Glycerol, alcohol, Benzene, Carbon Tetrachloride. Practically insoluble in Carbon Disulfide.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, metals, acids, alkalis.

Corrosivity:
Highly corrosive in presence of stainless steel(304). Slightly corrosive in presence of aluminum, of copper. Non-corrosive in presence of stainless steel(316).

Special Remarks on Reactivity:
Reacts violently with strong oxidizing agents, acetaldehyde, and acetic anhydride. Material can react with metals, strong bases, amines, carbonates, hydroxides, phosphates, many oxides,cyanides, sulfides, chromic acid, nitric acid, hydrogen peroxide, carbonates. ammonium nitrate, ammonium thiosulfate, chlorine trifluoride, chlorosulfonic acid, perchloric acid, permanganates, xylene, oleum, potassium hydroxide, sodium hydroxide, phosphorus isocyanate, ethylenediamine, ethylene imine.

Special Remarks on Corrosivity: Moderate corrosive effect on bronze. No corrosion data on brass

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3310 mg/kg [Rat]. Acute dermal toxicity (LD50): 1060 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5620 1 hours [Mouse].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, mucous membranes, skin, teeth.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May affect genetic material and may cause reproductive effects based on animal data. No human data found.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Extremely irritating and corrosive. Causes skin irritation (reddening and itching, inflammation). May cause blistering , tissue damage and burns. Eyes: Extremely irritating and corrosive. Causes eye irritation, lacrimation, redness, and pain. May cause burns, blurred vision, conjunctivitis, conjunctival and corneal destruction and permanent injury. Inhalation: Causes severe respiratory tract irritation. Affects the sense organs (nose, ear, eye, taste), and blood. May cause chemical pneumonitis, bronchitis, and pulmonary edema. Severe exposure may result in lung tissue damage and corrosion (ulceration) of the mucous membranes. Inhalation may also cause rhinitis, sneezing, coughing, oppressive feeling in the chest or chest pain, dyspnea, wheezing, tachypnea, cyanosis, salivation, nausea, giddiness, muscular weakness. Ingestion: Moderately toxic. Corrosive. Causes gastrointestinal tract irritation (burning and pain of the mouth, throat, and abdomen, coughing, ulceration, bleeding, nausea, abdomial spasms, vomiting, hematemesis, diarrhea. May Also affect the liver (impaired liver function), behavior (convulsions, giddines, muscular weakness), and the urinary system - kidneys (Hematuria, Albuminuria, Nephrosis, acute renal failure, acute tubular necrosis). May also cause dyspnea or asphyxia. May also lead to [illegible] coma and death. Chronic Potential Health Effects: Chronic exposure via ingestion may cause blackening or erosion of the teeth and jaw necrosis, pharyngitis, and gastritis. It may also behavior (similar to acute ingestion), and metabolism (weight loss). Chronic exposure via inhalation may cause asthma and/or bronchitis with cough, phlegm, and/or shortness of breath. It may also affect the blood (decreased leukocyte count), and urinary system (kidneys). Repeated or prolonged skin contact may cause thickening, blackening, and cracking of the skin.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 423 mg/l 24 hours [Fish (Goldfish)]. 88 ppm 96 hours [Fish (fathead minnow)]. 75 ppm 96 hours [Fish (bluegill sunfish)]. >100 ppm 96 hours [Daphnia].

BOD5 and COD: BOD-5: 0.34-0.88 g oxygen/g

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification:

CLASS 3: Flammable liquid. Class 8: Corrosive material

Identification: : Acetic Acid, Glacial UNNA: 2789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
New York release reporting list: Acetic acid Rhode Island RTK hazardous substances: Acetic acid Pennsylvania RTK: Acetic acid Florida: Acetic acid Minnesota: Acetic acid Massachusetts RTK: Acetic acid New Jersey: Acetic acid California Director's List of Hazardous Subtances (8 CCR 339): Acetic acid TSCA 8(b) inventory: Acetic acid CERCLA: Hazardous substances.: Acetic acid: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS E: Corrosive liquid.

DSCL (EEC):
R10- Flammable. R35- Causes severe burns. S23- Do not breathe gas/fumes/vapour/spray [***] S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 2

Reactivity: 0

Personal Protection: H

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves (impervious). Synthetic apron. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 03:35 PM

Last Updated: 05/21/2013 12:00 PM

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HALLIBURTON

SAFETY DATA SHEET

ADAPTA®

Revision Date: 13-Apr-2015 **Revision Number:** 18

1. Product and Company Identification

Product Name
Product Trade Name: ADAPTA®

Other Names
Synonyms: None
Product Code: HM004609

Recommended Use
Recommended Use Filtrate Reducer
Uses Advised Against No information available

Company Name, Address and Contact Details
Manufacturer/Supplier Halliburton New Zealand
1 Paraite Rd,
Bell Block, New Plymouth
New Zealand Registration No.: 824207

E-Mail address: fdunexchem@halliburton.com

Emergency Telephone Number +64-6-7559274

New Zealand National Poisons Centre 0800 764 766 (24 hours)

2. Hazard(s) Identification

Statement of Hazardous Nature
Not Classified as hazardous according to criteria in the Hazardous Substances (Minimum Degrees of Hazard) Regulation 2001; Not Classified as dangerous good according to NZS 5433:2012, UN, IMDG or IATA

Classification
Non-hazardous

Hazard and Precautionary Statements

Hazard Pictograms

Signal Word None

Hazard Statements Not Hazardous

Precautionary Statements

Prevention None

Response None

Storage None

Disposal None

Contains

Substances	CAS Number	Substance HSNO Classification
Contains no hazardous substances in concentrations above cut-off values according to	NA	Not applicable

the competent authority		

2.3. Other Hazards
This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).
This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

3. Composition and Information on Ingredients

Substances	CAS Number	PERCENT (w/w)
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	60 - 100%

4. First-Aid Measures

Requirements for First Aid or Medical Care
Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Skin Wash with soap and water. Get medical attention if irritation persists.
Ingestion Rinse mouth with water many times.

Workplace Facilities Required
None

Relation to Health Effect
Most Important Symptoms/Effects
No significant hazards expected.

Medical Attention and Special Treatment
Notes to Physician
Treat symptomatically

5. Fire-fighting measures

Type of Hazard
Flammability Hazard
Combustible dust when in finely divided and highly suspended state.

5.1. Extinguishing media
Suitable Extinguishing Media
Water fog, carbon dioxide, foam, dry chemical.
Extinguishing media which must not be used for safety reasons
None known.

HAZCHEM Code
Hazchem Code: None Allocated

Special Protective Equipment and Precautions for Fire Fighters
Special Protective Equipment for Fire-Fighters
Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
Special Exposure Hazards
Decomposition in fire may produce harmful gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

6. Spillage, Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures
Remove sources of ignition. Use appropriate protective equipment. Avoid creating and breathing dust. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing.
See Section 8 for additional information

6.2. Environmental precautions

Prevent from entering sewers, waterways, or low areas.

6.3. Methods and material for containment and cleaning up
Scoop up and remove.

6.4. Reference to other sections
See Section 8 and 13 for additional information.

7. Handling and storage

7.1. Precautions for Safe Handling
Handling Precautions
Remove sources of ignition. Avoid creating or inhaling dust. Avoid dust accumulations. Ensure adequate ventilation. Ground and bond containers when transferring from one container to another. Avoid contact with eyes, skin, or clothing. Use appropriate protective equipment.

Handling Practices
Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

Approved Handlers
This product does NOT require an approved handler.

7.2. Conditions for safe storage, including any incompatibilities
Store away from oxidizers. Keep away from friction, impact, and heat. Store in a well ventilated area. Product has a shelf life of 36 months.

Store Site Requirements
No special controls required

Packaging
No special packaging required

8. Exposure Controls and Personal Protection

Workplace Exposure Standards
Exposure Limits

Substances	CAS Number	New Zealand WES	ACGIH TLV-TWA
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	Not applicable	Not applicable

Engineering Controls
Engineering Controls Use in a well ventilated area. Trace amounts of monomers may be released during use of this material.

Personal Protective Equipment (PPE)
Respiratory Protection If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, AS/NZS 1715:2009, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional. Dust/mist respirator. (N95, P2/P3)
Hand Protection Neoprene gloves. Rubber gloves.
Skin Protection Normal work coveralls.
Eye Protection Wear safety glasses or goggles to protect against exposure.
Other Precautions None known.
Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

9.1. Information on basic physical and chemical properties
Physical State: Powder
Odor: Odorless
Color: Off white
Odor Threshold: No information available

Property	Values	Remarks/ - Method
pH:	No data available	
Freezing Point/Range	No data available	
Melting Point/Range	No data available	
Boiling Point/Range	No data available	
Flash Point	No data available	
Evaporation rate	No data available	
Vapor Pressure	No data available	
Vapor Density	No data available	
Specific Gravity	1.03	
Water Solubility	Insoluble in water	
Solubility in other solvents	No data available	
Partition coefficient: n-octanol/water	No data available	
Autoignition Temperature	No data available	
Decomposition Temperature	No data available	
Viscosity	No data available	
Explosive Properties	No information available	
Oxidizing Properties	No information available	

9.2. Other information
VOC Content (%) No data available
Bulk Density 33 lbs/ft3 @ 20

10. Stability and Reactivity

10.2. Chemical Stability
Stable

10.4. Conditions to Avoid
None anticipated

10.5. Incompatible Materials
Strong oxidizers.

10.6. Hazardous Decomposition Products
Carbon monoxide and carbon dioxide.

Hazardous Reactions
Hazardous Polymerization: Will Not Occur

11. Toxicological Information

Health Effect from Likely Routes of Exposure
Acute Toxicity

Inhalation May cause mild respiratory irritation.
Eye Contact May cause mild eye irritation.
Skin Contact May cause mild skin irritation.
Ingestion Irritation of the mouth, throat, and stomach.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

Toxicity Data

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances in concentrations above cut-off values according to the competent	NA	No data available	No data available	No data available

authority				

12. Ecological Information

12.1. Toxicity
Ecotoxicity Effects

Product Ecotoxicity Data
No data available

Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available	No information available	No information available	No information available

12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	

12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No data available

12.4. Mobility in soil

Substances	CAS Number	Mobility
Contains no hazardous substances in concentrations above cut-off values according to the competent authority	NA	No information available

Ecotoxicity Hazard Statements
None known

12.6. Other adverse effects
Endocrine Disruptor Information
This product does not contain any known or suspected endocrine disruptors

13. Disposal Considerations

13.1. Waste treatment methods
Disposal Method If not contaminated, reuse product. Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging Follow all applicable national or local regulations.

14. Transport Information

IMDG/IMO
UN Number: Not restricted
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable
Packing Group: Not applicable
Environmental Hazards: Not applicable

NZ 5433.1999
UN Number: Not restricted
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable
Packing Group: Not applicable

IATA/ICAO
UN Number: Not restricted
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable
Packing Group: Not applicable

Special Precautions for User: None
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

15. Regulatory Information

New Zealand Inventory of Chemicals All components listed on inventory or are exempt.

HSNO Approval Number Non-hazardous

Group Name Not Applicable

HSNO Controls Refer to the NZ EPA website for information: http://www.epa.govt.nz

Approved Handlers Not Applicable

Poisons Schedule: None Allocated

16. Other information

The following sections have been revised since the last issue of this SDS
Not applicable

Additional information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

Key literature references and sources for data
www.ChemADVISOR.com/

Revision Date: 13-Apr-2015
Revision Note Revision Note
SDS sections updated:
SECTION:
2
3
6
7
8
10
12

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End of Safety Data Sheet

ScienceLab.com Chemicals & Laboratory Equipment

Health	1
Fire	1
Reactivity	0
Personal Protection	A

Material Safety Data Sheet
Antifoam A MSDS

Section 1: Chemical Product and Company Identification

Product Name: Antifoam A

Catalog Codes: SLA4819

CAS#: Not available.

RTECS: Not available.

TSCA: TSCA 8(b) inventory: No products were found.

CI#: Not available.

Synonym: Dow Corning Antifoam A Compound; Silicone Compound

Chemical Name: Not available.

Chemical Formula: Not available.

Contact Information:
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Polydimethylsiloxane	63148-62-9	>60
Octamethylcyclotetrasiloxane	556-67-2	5 - 10
Decamethylcyclopentasiloxane	541-02-6	3 - 7
Dodecamethyl cyclohexasiloxane	540-97-6	1 - 5
Dimethylcyclosiloxanes		1 - 5
Methylated Silica	67762-90-7	7 - 13

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe gas/fumes/ vapor/spray. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Safety glasses. Lab coat.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: Not available.

Color: Translucent gray

pH (1% soln/water): Not available.

Boiling Point: 35°C (95°F)

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: 0.97 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Not available.

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: No products were found.

Other Regulations: Not available.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
This product is not classified according to the EU regulations. Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: a

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Not applicable. Lab coat. Not applicable. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:50 AM

Last Updated: 05/21/2013 12:00 PM

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Skin. Eye contact.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant, sensitizer), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
This product contains Octamethylcyclotetrasiloxane. Repeated inhalation may cause adverse reproductive effects defects and cancer based on animal data, but no teratorgenic effects were observed. No data for humans has been found. This product contains polydimethylsiloxane. Repeated skin absorption may cause adverse reproductive effects and birth defects based on animal test data. No data for humans has been found.

Special Remarks on other Toxic Effects on Humans:
Acute and Chronic Potential Health Effects: Skin: May cause mild skin irritation and dermatitis. No significant irritation expected from a single short-term exposure. Eyes: May cause mild eye irritation with temporary reddness and discomfort. Inhalation: No signficant effect expected (low hazard) from a single short-term exposure from inhalation. However, overexposure may affect the blood, respiration, behavior (tremor, excitement, etc.), and liver while chronic exposure by inhalation of mist or vapor may affect liver, and metabolism. Ingestion: The hazard from ingestion is expected to be low for normal use and handling. Acute overexposure may cause gastrointestinal tract irritation with hypermotility and diarrhea. Acute and chronic or prolonged ingestion may also affect behavior, blood, respiration (dynpnea), liver, and urinary system.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARACARB**

Revision Date: 29-Apr-2013

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton/Baroid Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
New Zealand: 06-[illegible]5927

Fire Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name:	BARACARB
Synonyms:	None
Chemical Family:	Mineral
UN Number:	None
Dangerous Goods Class:	None
Subsidiary Risk:	None
Hazchem Code:	None Allocated
Poisons Schedule:	None Allocated
Application:	Bridging Agent

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Calcium carbonate	471-34-1	60 - 100%	TWA: 10 mg/m^3	TWA: 10 mg/m^3	10 mg/m^3
Crystalline silica, quartz	14808-60-7	0 - 1%	TWA: 0.1 mg/m^3	TWA: 0.2 mg/m^3	TWA: 0.025 mg/m^3

Non-Hazardous Substance to Total of 100%

3. HAZARDS IDENTIFICATION

Hazard Overview

CAUTION! - ACUTE HEALTH HAZARD
May cause eye, skin, and respiratory irritation.

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

Risk Phrases

R49 May cause cancer by inhalation.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

HSNO Classification

Not Determined

4. FIRST AID MEASURES

Inhalation

If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin

Wash with soap and water. Get medical attention if irritation persists.

Eyes

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion

Under normal conditions, first aid procedures are not required.

Notes to Physician

Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media

All standard fire fighting media

Extinguishing media which must not be used for safety reasons

None known.

Special Exposure Hazards

Not applicable.

Special Protective Equipment for Fire-Fighters

Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures

Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures

None known.

Procedure for Cleaning / Absorption

Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions

Avoid contact with eyes, skin, or clothing. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information

Store away from acids. Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 60 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits.

Respiratory Protection

Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), or equivalent respirator when using this product.

Hand Protection

Normal work gloves.

Skin Protection

Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

Eye Protection

Wear safety glasses or goggles to protect against exposure.

Other Precautions

None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid Powder
Color:	White
Odor:	Odorless
pH:	8-9
Specific Gravity @ 20 C (Water=1):	2.7
Density @ 20 C (kg/l):	Not Determined
Bulk Density @ 20 C (kg/m^3):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m^3):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m^3):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None anticipated

Incompatibility (Materials to Avoid) Strong acids.

Hazardous Decomposition Products Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Skin Contact May cause skin irritation.

Eye Contact May cause eye irritation.

Ingestion None known

Aggravated Medical Conditions Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	LD50: > 5000 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined

Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Transportation Information

Labels: None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory	All components listed on inventory or are exempt.
New Zealand Inventory of Chemicals	All components listed on inventory or are exempt.
US TSCA Inventory	All components listed on inventory or are exempt.
EINECS Inventory	This product, and all its components, complies with EINECS
Classification	T - Toxic. Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.
Risk Phrases	R49 May cause cancer by inhalation. R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Safety Phrases	S22 Do not breathe dust.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

ScienceLab.com
Chemicals & Laboratory Equipment

Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Bentonite MSDS

Section 1: Chemical Product and Company Identification

Product Name: Bentonite

Catalog Codes: SLB1441, SLB2935, SLB4435

CAS#: 1302-78-9

RTECS: CT9450000

TSCA: TSCA 8(b) inventory: Bentonite

CI#: Not applicable.

Synonym: Montmorillonite;

Chemical Name: Not available.

Chemical Formula: (Al,Fe1.67Mg.33)Si10(OH)2Na(+)Ca(++).33

Contact Information:
Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**
Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

Fo[illegible]rgency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Bentonite	1302-78-9	100

Toxicological Data on Ingredients: Bentonite LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

Potential Chronic Health Effects:
Hazardous in case of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: Not available.

Color: Beige. (Light.)

pH (1% soln/water): Not available.

Boiling Point: Not available.

Melting Point: Decomposes.

Critical Temperature: Not available.

Specific Gravity: 2.5 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Very slightly soluble in cold water, hot water. Insoluble in methanol, diethyl ether, n-octanol, acetone.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:14 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Causes damage to the following organs: lungs.

Other Toxic Effects on Humans:
Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Bentonite

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

ScienceLab.com
Chemicals & Laboratory Equipment

Material Safety Data Sheet
Calcium carbonate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Calcium carbonate

Catalog Codes: SLC1141, SLC4720, SLC4438, SLC1645

CAS#: 471-34-1

RTECS: FF9335000

TSCA: TSCA 8(b) inventory: Calcium carbonate

CI#: Not available.

Synonym:

Chemical Name: Calcium Carbonate

Chemical Formula: CaCO3

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Calcium carbonate	471-34-1	100

Toxicological Data on Ingredients: Calcium carbonate: ORAL (LD50): Acute: 6450 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of eye contact (irritant). Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Will ignite and burn fiercely in contact with fluorine.

Special Remarks on Explosion Hazards:
When a mixture of calcium carbonate and magnesium is heated in a current of hydrogen, a violent explosion occurs.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Hygroscopic

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 (mg/m3) from ACGIH (TLV) [United States] Inhalation Total. TWA: 10 STEL: 20 (mg/m3) [Canada] Inhalation Total. TWA: 5 (mg/m3) from OSHA (PEL) [United States] Inhalation Respirable. TWA: 15 from OSHA (PEL) [United States] Inhalation Total.Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Powdered solid.)

Odor: Odorless.

Taste: Chalky

Molecular Weight: 100.09 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: Not available.

Melting Point: 825°C (1517°F)

Critical Temperature: Not available.

Specific Gravity: 2.8 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Very slightly soluble in cold water. Soluble in dilute acid. Insoluble in alcohol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible Materials

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Hygroscopic. Will ignite and burn fiercely in contact with fluorine. Incompatible with acids, alum, ammonium salts, mercury + hydrogen, aluminum and magnesium

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 6450 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: kidneys.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. Eyes: Dust causes eye irritation. Inhalation: Excessive inhalation causes respiratory tract and mucous membrane irritation. Low hazard for usual industrial handling. Ingestion: Ingestion of large amounts may cause gastrointestional tract disturbances with nausea and possibly constipation. Expected to be a low hazard for usual industrial handling. Chronic Potential Health Effects: Chronic ingestion may affect kidneys, and may cause hypercalcemia with alkalosis.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Calcium carbonate

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R36- Irritating to eyes. S2- Keep out of the reach of children. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 05/21/2013 12:00 PM

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Chemicals & Laboratory Equipment

Health	2
Fire	0
Reactivity	0
Personal Protection	J

Material Safety Data Sheet
Calcium hydroxide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Calcium hydroxide

Catalog Codes: SLC4525, SLC1732, SLC3523, SLC5311

CAS#: 1305-62-0

RTECS: EW2800000

TSCA: TSCA 8(b) inventory: Calcium hydroxide

CI#: Not applicable.

Synonym: Hydrated lime; Slaked Lime; Calcium Oxide, hydrated

Chemical Name: Calcium Hydroxide

Chemical Formula: Ca(OH)2

Contact Information:

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Houston, Texas 77396

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CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Calcium hydroxide	1305-62-0	100

Toxicological Data on Ingredients: Calcium hydroxide: ORAL (LD50): Acute: 7340 mg/kg [Rat.]. 7300 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant), of eye contact (corrosive), of ingestion, of inhalation. Corrosive to eyes and skin. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Alkaline hydroxides boiled with phosphorus yields mixed phosphines which may ignite spontaneously in air.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Corrosive solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep container dry. Do not ingest. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 5 (mg/m3) from ACGIH (TLV) [United States] TWA: 5 (mg/m3) [Canada] TWA: 5 (mg/m3) from NIOSH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Powdered solid.)

Odor: Odorless.

Taste: Bitter. Alkaline. (Slight.)

Molecular Weight: 74.1g/mole

Color: White.

pH (1% soln/water): 14 [Basic.]

Boiling Point: Not available.

Melting Point: 580°C (1076°F)

Critical Temperature: Not available.

Specific Gravity: 2.24 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Very slightly soluble in cold water, hot water. Insoluble in alcohol. Soluble in ammonium salts, glyerol, sugar or ammonium chloride solution, soluble in acids with evolution of much heat. Solubility in water: 0.185 g/100 ml @ 0 deg. C; 0.077 g/100 ml @ 100 deg. C; 1.73 g/1000 ml @ 20 C

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, air

Incompatibility with various substances: Reactive with acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with maleic anhydride, phosphorous, nitroethane, nitromethane, nitorparaffins, nitropropane, polychlorinated phenols + potassium nitrate. When chlorinated phenols are heated for analytical purposes with calcium hydroxide-potassium nitrate mixutures, chlorinated benzodioxins analagous to extremely toxic tetrachlorodibenzodioxin may be formed. Readily absorbs CO2 from air forming calcium carbonate.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 7300 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Extremely hazardous in case of eye contact (irritant) Hazardous in case of skin contact (irritant), of eye contact (corrosive), of ingestion, inhalation Slightly hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Mutangenicity: Cytogenic analysis [Rat]: Cell type: Ascities tumor; Dose: 1200 mg/kg

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. Alkalies penetrate skin slowly. The extent of damage depends on the duration of contact. Eyes: Causes severe irritation of the eyes. Can cause "Lime Burns" of the eye. Clumps may lodge deep in the recesses of the eye, releasing calcium hydroxide over a long period of time. Severe burns of the cornea with possible damage to to corneal nerves can occur. Ingestion: Causes gastrointestinal tract irritation with vomiting, diarrhea, severe pain. Vomitus may contain blood and desquamated mucosal lining. May cause delayed gastrointestinal burns and perforation (gastric or esophageal) with severe abdominal pain and rapid fall in blood pressure. Inhalation: Causes severe irritation of the respiratory tract (nose, throat, lungs), and mucous membranes with coughing, wheezing and/or shortness of breath. Material is destructive to tissue of the mucous membranes and upper respiratory tract. Chronic Potential Health Effects: Prolonged or repeated skin contact may produce severe irritation or dermatitis.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Illinois toxic substances disclosure to employee act: Calcium hydroxide Rhode Island RTK hazardous substances: Calcium hydroxide Pennsylvania RTK: Calcium hydroxide Minnesota: Calcium hydroxide Massachusetts RTK: Calcium hydroxide New Jersey: Calcium hydroxide California Director's list of Hazardous Substances: Calcium hydroxide TSCA 8(b) inventory: Calcium hydroxide

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive solid.

DSCL (EEC):
R34- Causes burns. R41- Risk of serious damage to eyes. S24/25- Avoid contact with skin and eyes. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28- After contact with skin, wash immediately with plenty of water. S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Material safety data sheet emitted by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II.

Other Special Considerations: Not available.

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MATERIAL SAFETY DATA SHEET

CAUSTIC SODA

BAKER HUGHES
Drilling Fluids

1. Product and Company Identification

Material name	**CAUSTIC SODA**
Chemical name	Sodium hydroxide
Applications	Alkalinity Control
Supplier	Baker Hughes Drilling Fluids 2001 Rankin Rd. Houston, TX 77073 Emergency telephone number 713-439-8900

2. Composition / Information on Ingredients

Components	CAS #	Percent
SODIUM HYDROXIDE	1310-73-2	> 97
Non-hazardous and other components below reportable levels		1 - 2.5

Composition comments This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

3. Hazards Identification

Emergency overview May cause severe irritation or burns to the eyes, skin, gastrointestinal tract, and respiratory system. Risk of serious damage to eyes.

Potential health effects

Routes of exposure Inhalation. Skin contact. Eye contact.

Eyes Causes severe eye burns. Corrosive to the eyes and may cause severe damage including blindness.

Skin Contact causes severe skin irritation and possible burns.

Inhalation Can cause severe respiratory irritation. Inhalation of mists or vapors may produce upper airway edema, wheezing, pulmonary edema, pneumonitis and respiratory failure.

Ingestion Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. Ingestion of this product may cause nausea, vomiting and diarrhea.

Target organs Eyes. Respiratory system. Skin.

Chronic effects Prolonged skin contact may defat the skin and produce dermatitis.

4. First Aid Measures

First aid procedures

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention immediately.

Skin contact Wash off immediately with plenty of water for at least 15 minutes. Wash affected area with mild soap and water. Remove and isolate contaminated clothing and shoes. Get medical attention immediately. Launder contaminated clothing before reuse.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion Immediately give large quantities of water to drink. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Get medical attention immediately.

General advice Keep victim warm. In case of shortness of breath, give oxygen. Immediate medical attention is required. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties None known.

Extinguishing media

Suitable extinguishing media Do not use water. Use extinguishing agent suitable for type of surrounding fire.

Protection of firefighters

Protective equipment for firefighters Move containers from fire area if you can do it without risk. Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

6. Accidental Release Measures

Evacuation procedures Ventilate closed spaces before entering. Keep unnecessary personnel away. Loca authorities should be advised if significant spillages cannot be contained.

Methods for containment Prevent entry into waterways, sewers, basements or confined areas. Stop the flow of material, if this is without risk.

Methods for cleaning up Shovel or sweep up. Avoid dust formation.

7. Handling and Storage

Handling Handle and open container with care. Avoid breathing dusts from this material. Do not get this material in your eyes, on your skin, or on your clothing. Wash hands after handling and before eating. Considerable heat is generated when water or acid is added, therefore when making solutions always add the caustic to the water or acid with constant stirring

Storage Use care in handling/storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep this material away from food, drink and animal feed. Keep out of the reach of children.

8. Exposure Controls / Personal Protection

Exposure guidelines

ACGIH - Threshold Limits Values - Ceilings (TLV-C)
SODIUM HYDROXIDE 1310-73-2 2 Mg/m3 Ceiling
ACGIH - Threshold Limits Values - TLV Basis - Critical Effects
SODIUM HYDROXIDE 1310-73-2 irritation
OSHA - Final PELs - Time Weighted Averages (TWAs)
SODIUM HYDROXIDE 1310-73-2 2 Mg/m3 TWA

Engineering controls Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Personal protective equipment

Eye / face protection Wear chemical goggles. Face-shield. Eye wash fountain and emergency showers are recommended.

Skin protection Use of protective coveralls and long sleeves is recommended. Use of impervious boots is recommended. Use of an impervious apron is recommended. Recommended gloves include rubber, neoprene, nitrile or viton.

Respiratory protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

General hygeine considerations Avoid contact with the skin and the eyes. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product.

9. Physical and Chemical Properties

Appearance / Color / Form	Pellets. White. Solid.
Odor	Odourless.
Clarity	Not available
Odor threshold	Not available
Physical state	Solid
pH	12, conc: 0.05% (solution); 13, conc: 1% (solution); 14, conc: 5% (solution)
Melting point	604.4 °F (318 °C) estimated
Freezing point	Not available
Boiling point	2534 °F (1390 °C) estimated
Flash point	Not available
Evaporation rate	Not available
Flammability limits in air, lower, % by volume	Not available
Flammability limits in air, upper, % by volume	Not available
Vapor pressure	0 HPa at 20 °C
Vapor density	Not available

Specific gravity	2.13 @20 C
Relative density	2.1322 estimated
Solubility	Soluble in water.
Octanol/H2O coeff	Not available
Auto-ignition temperature	Not available
Decomposition temperature	Not available
Molecular weight	40.01 g/mol
Molecular formula	NaOH

10. Chemical Stability and Reactivity Information

Chemical stability	Stable at normal conditions.
Conditions to avoid	Avoid contact with water. Direct contact with water may cause an exothermic reaction
Incompatible materials	Alkali sensitive metals or alloys including aluminum, brass, bronze, copper, lead, tin, and zinc. Acids. Halogenated compounds.
Hazardous decomposition products	None known.
Possibility of hazardous reactions	Will not occur.

11. Toxicological Information

Acute effects	Causes severe burns.
Component analysis - LD50	

Toxicology Data - Selected LD50s and LC50s

SODIUM HYDROXIDE	1310-73-2	Dermal LD50 Rabbit: 1350 mg/kg

Chronic effects	Prolonged or repeated exposure may cause lung injury. Prolonged skin contact may defat the skin and produce dermatitis.

12. Ecological Information

Ecotoxicity	Because of the high pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.
Environmental effects	Harmful to aquatic life.
Persistence / degradability	This material is inorganic and not subject to biodegradation.
Bioaccumulation / accumulative	Not expected to bioaccumulate.

13. Disposal Considerations

Disposal instructions	Dispose in accordance with all applicable regulations.

14. Transport Information

Department of Transportation (DOT) Requirements

Basic shipping requirements:	
Proper shipping name	Sodium hydroxide, solid
Hazard class	8
UN number	UN1823
Packaging group	II
Additional information:	
Special provisions	IB8, IP2, IP4
Packaging exceptions	154
Packaging non bulk	212
Packaging bulk	240
ERG number	154

IATA

Basic shipping requirements:	
Proper shipping name	Sodium hydroxide, solid
Hazard class	8
UN number	1823
Packaging group	II

IMDG

Basic shipping requirements:	
Proper shipping name	SODIUM HYDROXIDE, SOLID
Hazard class	8
UN number	1823
Packaging group	II
Additional information:	
Hazard ID	80
Item	C6
Labels required	8
Transport Category	2

15. Regulatory Information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

FDA - Direct Food Additives

SODIUM HYDROXIDE	1310-73-2	21 CFR 173.3...

FDA - Food Additives Generally Recognized as Safe (GRAS)

SODIUM HYDROXIDE	1310-73-2	21 CFR 184.1763

Occupational Safety and Health Administration (OSHA)	
29 CFR 1910.1200 hazardous chemical	Yes
CERCLA (Superfund) reportable quantity	SODIUM HYDROXIDE: 1000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - Yes
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	Yes

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (CCS)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Japanese Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Korean Inventory of Chemicals (KICS)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

International regulations	The product is classified and labelled in accordance with EC directives or respective national laws.

State regulations

Massachusetts - Right To Know List

SODIUM HYDROXIDE	1310-73-2	Present

New Jersey - Right to Know Hazardous Substance List

SODIUM HYDROXIDE	1310-73-2	sn 1706

Pennsylvania - RTK (Right to Know) List

SODIUM HYDROXIDE	1310-73-2	Environmental hazard

16. Other Information

HMIS ratings	Health: 3* Flammability: 0 Physical hazard: 2 Personal protection: D
NFPA ratings	Health: 3 Flammability: 0 Instability: 2
Disclaimer	The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
EU preparer	Melanie Thatcher (Tel +44 (0)1224 721597)
US preparer	Cheryl Hood - (713)625-4888
Issue date	03-27-2006

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

Nalco 2837

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME :	**Nalco 2837**
APPLICATION :	CORROSION INHIBITOR, SCALE INHIBITOR
COMPANY IDENTIFICATION :	Nalco Company 1601 W. Diehl Road Naperville, Illinois 60563-1198
EMERGENCY TELEPHONE NUMBER(S) :	(800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 2 / 2 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Molybdate	[illegible]	10.0 - 30.0
Sodium Metaborate	7775-19-1	1.0 - 5.0
Sodium Hydroxide	1310-73-2	0.1 - 1.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

WARNING
Irritating to eyes and skin.
Do not get in eyes, on skin, on clothing. Do not take internally. Keep container tightly closed. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear suitable protective clothing, gloves and eye/face protection.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Irritating, and may injure eye tissue if not removed promptly.

SKIN CONTACT :
Can cause moderate irritation.

INGESTION :
Not a likely route of exposure. There may be irritation to the gastro-intestinal tract.

INHALATION :
Not a likely route of exposure. Aerosols or product mist may irritate the upper respiratory tract.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

HUMAN HEALTH HAZARDS - CHRONIC :
No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

EYE CONTACT :
Immediately flush eye with water for at least 15 minutes while holding eyelids open. If irritation persists, repeat flushing. Get medical attention.

SKIN CONTACT :
Immediately flush with plenty of water for at least 15 minutes. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

LOWER EXPLOSION LIMIT : Not flammable

UPPER EXPLOSION LIMIT : Not flammable

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EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste handler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Keep the containers closed when not in use. Use with adequate ventilation.

STORAGE CONDITIONS :
Store the containers tightly closed. Store in suitable labeled containers. Store separately from acids.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)
Sodium Hydroxide CEILING: 2 mg/m3

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Molybdenum (as Mo), Soluble Compounds TWA: 0.5 mg/m3 respirable
OSHA/PEL :
Substance(s)
Sodium Hydroxide CEILING: 2 mg/m3

Molybdenum (as Mo), Soluble Compounds TWA: 5 mg/m3

ENGINEERING MEASURES :
The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.

RESPIRATORY PROTECTION :
Respiratory protection is not normally needed. If significant mists, vapors or aerosols are generated an approved respirator is recommended. A particulate cartridge may be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
When handling this product, the use of chemical gauntlets is recommended. The choice of work glove depends on work conditions and what chemicals are handled, but we have no positive experience under light handling conditions using gloves made from [illegible] Gloves should be replaced immediately if signs of degradation are observed., Breakthrough time not determined as preparation, consult PPE manufacturers.

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Keep an eye wash fountain available. Keep a safety shower available. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow
ODOR	Slight
SPECIFIC GRAVITY	1.18 - 1.24 @ 77 °F / 25 °C

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SOLUBILITY IN WATER	Complete
pH (100 %)	12.0 - 12.8
VISCOSITY	4 - 6 cps
FREEZING POINT	19.4 °F / -7 °C
VAPOR DENSITY	Same as water

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Extremes of temperature

MATERIALS TO AVOID :
Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfamic) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Moderate

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	50 - 70%

The portion in water is expected to be soluble or dispersible.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it does meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	III
Flash Point :	None

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X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product contains the following substances listed in the regulation:

Substance(s)	Citation
• Sodium Hydroxide	Sec. 311

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
E - Corrosive Material

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DOT Reportable Quantity (per package) :	157,000 lbs
DOT RQ Component :	SODIUM HYDROXIDE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	III
IATA Cargo Packing Instructions :	820
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	III

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Molybdate : Exposure Limit - Compound Class
Sodium Metaborate : Irritant
Sodium Hydroxide : Corrosive

CERCLA/SUPERFUND, 40 CFR 117, 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

RQ Substance	RQ
Sodium Hydroxide	157,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

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CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For all other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local Nalco representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 01/26/2007
Version Number : 1.6

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. There may be irritation to the gastro-intestinal tract with nausea and vomiting.

INHALATION :
Not a likely route of exposure. Repeated or prolonged exposure may irritate the respiratory tract.

4. FIRST AID MEASURES

EYE CONTACT :
Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get medical attention.

SKIN CONTACT :
Flush with large amounts of water. Use soap if available. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 F/ > 93.3 °C

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO® EC2483A**

APPLICATION : EMULSION BREAKER

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 2 / 2 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Carboxylic acid	Proprietary	30 - 60

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

WARNING
Irritating to eyes.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.
Wear suitable protective clothing. Wear chemical splash goggles.
Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause moderate to severe irritation.

Keep people away from and upwind of spill/leak. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Ensure the containers are tightly closed. Store separately from oxidizers. Store separately from bases.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use., Stainless Steel 304, Stainless Steel 316L, MDPE, HDPE (high density polyethylene), Nylon, Surface-modified HDPE (high density polyethylene), TFE, Perfluoroelastomer, Nitrile, Neoprene, EPDM, FEP (encapsulated), PTFE, Fluoroelastomer

UNSUITABLE CONSTRUCTION MATERIAL :
Carbon Steel C1018

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended. Consult the respirator / cartridge manufacturer data to verify the suitability of specific devices. In event of emergency

or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
When handling this product, the use of chemical gloves is recommended. The choice of work glove depends on work conditions and what chemicals are handled. Please contact the PPE manufacturer for advice on what type of glove material may be suitable. Gloves should be replaced immediately if signs of degradation are observed.

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is:
Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE Liquid

APPEARANCE Clear Colorless - Light yellow

ODOR Somewhat sweet

SPECIFIC GRAVITY	1.22 @ 60.0 °F / 15.6 °C
DENSITY	10.2 lb/gal
SOLUBILITY IN WATER	Complete
pH (100.0 %)	0.6
VISCOSITY	2.7 cps @ 104.0 °F / 40.0 °C
POUR POINT	1.4 °F / -17.0 °C
VOC CONTENT	0.0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Avoid extremes of temperature.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Moderate

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	> 5,000 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Ceriodaphnia dubia	48 hrs	3,649 mg/l		Product

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is

intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	10 - 30%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it complies with the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	Carboxylic acid
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	III
Flash Point :	> 200 F/ > 93.3 °C

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	Carboxylic acid
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	III
IATA Cargo Packing Instructions :	820
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	Carboxylic acid
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	III

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Carboxylic acid : Eye irritant

CERCLA/SUPERFUND, 40 CFR 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard

- Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation. Additional components may be unintentionally present at trace levels.

Substance(s)	Citations
• Maleic Acid • Fumaric Acid	Sec. 311

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
This product contains substance(s) which are found on the Non-Domestic Substances List (NDSL), or are not in compliance with other Canadian Acts.

NALCO
SAFETY DATA SHEET
PRODUCT
NALCO® EC2483A
EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/19/2010
Version Number : 1.5

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SAFETY DATA SHEET
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AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

SAFETY DATA SHEET

DRILLING SPECIALTIES COMPANY

Drispac® (Regular and Superlo®) Polymer

Version 2.1 Revision Date 2016-06-01

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product information

Product Name : Drispac® (Regular and Superlo®) Polymer
Material : 1116045, 1016803, 1016806

Use : Drilling Mud Additive

Company : Chevron Phillips Chemical Company LP
Drilling Specialties Company LLC
10001 Six Pines Drive
The Woodlands TX 77380

Emergency telephone:

Health:
866.442.9628 (North America)
1.832.813.4984 (International)
Transport:
CHEMTREC 800.424.9300 or 703.527.3887(int'l)
Asia: +800 CHEMCALL (+800 2436 2255) China:+86-21-22157316
EUROPE: BIG +32.14.584545 (phone) or +32.14583516 (telefax)
South America SOS-Cotec Inside Brazil: 0800.111.767 Outside Brazil: +55.19.3467.1600

Responsible Department : Product Safety and Toxicology Group
E-mail address : SDS@CPChem.com
Website : www.CPChem.com

SECTION 2: Hazards identification

Classification of the substance or mixture
This product has been classified in accordance with the hazard communication standard 29 CFR 1910.1200; the SDS and labels contain all the information as required by the standard.

Emergency Overview

Warning
Form: Powder **Physical state**: Solid **Color**: White to off-white **Odor**: Slight
OSHA Hazards : Combustible dust

Classification
: Combustible dust

Labeling

Signal Word : Warning

Hazard Statements : May form combustible dust concentrations in air.

Potential Health Effects

Physical Hazards : Mechanical processing may form combustible dust concentrations in air and thermal processing at elevated temperatures may generate simple hydrocarbons and carbon oxides.

Carcinogenicity:

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

ACGIH No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

SECTION 3: Composition/information on ingredients

Synonyms : Viscosifier, Water loss control agent

Component	CAS-No.	Weight %
Sodium Carboxymethylcellulose	9004-32-4	100

SECTION 4: First aid measures

General advice : No hazards which require special first aid measures.

If inhaled : If unconscious place in recovery position and seek medical advice. If symptoms persist, call a physician.

In case of eye contact : Remove contact lenses. Protect unharmed eye. If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: Firefighting measures

Flash point : Not applicable

Autoignition temperature : Not applicable

Specific hazards during fire fighting : Risks of ignition followed by flame propagation or secondary explosions can be caused by the accumulation of dust, e.g. on floors and ledges.

Special protective equipment for fire-fighters : Wear self-contained breathing apparatus for firefighting if necessary.

Further information : Standard procedure for chemical fires. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Fire and explosion protection : Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Provide appropriate exhaust ventilation at places where dust is formed.

Hazardous decomposition products : No data available.

SECTION 6: Accidental release measures

Personal precautions : Avoid dust formation.

Environmental precautions : If the product contaminates rivers and lakes or drains inform respective authorities.

Methods for cleaning up : Pick up and arrange disposal without creating dust. Clean up promptly by sweeping or vacuum. Keep in suitable, closed containers for disposal.

Additional advice : Contaminated surfaces will be extremely slippery. Avoid spillage on floor as the product can become very slippery when wet. Sweep up to prevent slipping hazard.

SECTION 7: Handling and storage

Handling

Advice on safe handling : For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary, but may not by themselves be sufficient.

Advice on protection against fire and explosion : Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Provide appropriate exhaust ventilation at places where dust is formed.

Storage

Requirements for storage areas and containers : Electrical installations / working materials must comply with the technological safety standards.

Advice on common storage : No materials to be especially mentioned.

SECTION 8: Exposure controls/personal protection

Engineering measures

Adequate ventilation to control airborned concentrations below the exposure guidelines/limits. Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

Personal protective equipment

Respiratory protection : Wear a supplied-air NIOSH approved respirator unless ventilation or other engineering controls are adequate to maintain minimal oxygen content of 19.5% by volume under normal atmospheric pressure. Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection : The suitability for a specific workplace should be discussed with the producers of the protective gloves. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Eye protection : Eye wash bottle with pure water. Safety glasses.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Wear as appropriate:. Protective suit. Safety shoes.

Hygiene measures : General industrial hygiene practice.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance

Form : Powder
Physical state : Solid
Color : White to off-white

Odor : Slight
Odor Threshold : No data available

Safety data

Flash point : Not applicable

Lower explosion limit : Not applicable

Upper explosion limit : Not applicable

Oxidizing properties : no

Autoignition temperature : Not applicable

Thermal decomposition : No data available

Molecular weight : No data available

pH : Not applicable

Pour point : No data available

Melting point/range : No data available

Boiling point/boiling range : No data available

Vapor pressure : Not applicable

Relative density : Not applicable

Density : 1.5 g/cm3

Water solubility : Completely Soluble

Partition coefficient: n-octanol/water : No data available

Solubility in other solvents : No data available

Viscosity, kinematic : No data available

Relative vapor density : Not applicable

Evaporation rate : No data available

SECTION 10: Stability and reactivity

Chemical stability : This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions

Conditions to avoid : Generation of Dusts.

Thermal decomposition : No data available

Hazardous decomposition products : No data available

Other data : No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

Acute oral toxicity

Sodium Carboxymethylcellulose : LD50: 27,000 mg/kg
Species: Rat

Acute inhalation toxicity

Sodium Carboxymethylcellulose : LC50: > 5800 mg/m3Exposure time: 4 h
Species: Rat

Acute dermal toxicity

Sodium Carboxymethylcellulose : LD50: > 2,000 mg/kg
Species: Rabbit

Drispac® (Regular and Superlo®) Polymer
Aspiration toxicity : No aspiration toxicity classification.

Drispac® (Regular and Superlo®) Polymer
Further information : No data available.

SECTION 12: Ecological information

Biodegradability

Sodium Carboxymethylcellulose : This material is expected to be readily biodegradable.

Additional ecological information
Sodium Carboxymethylcellulose : This material is not expected to be harmful to aquatic organisms.

SECTION 13: Disposal considerations

The information in this SDS pertains only to the product as shipped.

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

The shipping descriptions shown here are for bulk shipments only, and may not apply to shipments in non-bulk packages (see regulatory definition).

Consult the appropriate domestic or international mode-specific and quantity-specific Dangerous Goods Regulations for additional shipping description requirements (e.g., technical name or names, etc.) Therefore, the information shown here, may not always agree with the bill of lading shipping description for the material. Flashpoints for the material may vary slightly between the SDS and the bill of lading.

US DOT (UNITED STATES DEPARTMENT OF TRANSPORTATION)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

IMO / IMDG (INTERNATIONAL MARITIME DANGEROUS GOODS)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

IATA (INTERNATIONAL AIR TRANSPORT ASSOCIATION)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

ADR (AGREEMENT ON DANGEROUS GOODS BY ROAD (EUROPE))
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

RID (REGULATIONS CONCERNING THE INTERNATIONAL TRANSPORT OF DANGEROUS GOODS (EUROPE))
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

ADN (EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY INLAND WATERWAYS)
NOT REGULATED AS A HAZARDOUS MATERIAL OR DANGEROUS GOODS FOR TRANSPORTATION BY THIS AGENCY.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

National legislation

SARA 311/312 Hazards : Fire Hazard

CERCLA Reportable Quantity : This material does not contain any components with a CERCLA RQ.

SARA 302 Reportable Quantity : This material does not contain any components with a SARA 302 RQ.

SARA 302 Threshold Planning Quantity : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 304 Reportable Quantity : This material does not contain any components with a section 304 EHS RQ.

SARA 313 Ingredients : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Air Act

Ozone-Depletion Potential : This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

US State Regulations

Pennsylvania Right To Know

: No components are subject to the Pennsylvania Right to Know Act.

New Jersey Right To Know
: No components are subject to the New Jersey Right to Know Act.

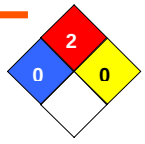
California Prop. 65 Ingredients : This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

Europe REACH	: On the inventory, or in compliance with the inventory
United States of America TSCA	: On the inventory, or in compliance with the inventory
Canada DSL	: On the inventory, or in compliance with the inventory
Australia AICS	: On the inventory, or in compliance with the inventory
New Zealand NZIoC	: On the inventory, or in compliance with the inventory
Japan ENCS	: On the inventory, or in compliance with the inventory
Korea KECI	: On the inventory, or in compliance with the inventory
Philippines PICCS	: On the inventory, or in compliance with the inventory
China IECSC	: On the inventory, or in compliance with the inventory

SECTION 16: Other information

NFPA Classification : Health Hazard: 0
Fire Hazard: 2
Reactivity Hazard: 0



Further information

Legacy SDS Number : 25950

Significant changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information in this SDS pertains only to the product as shipped.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%

AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit
EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemicals Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **EZ MUL® NT**

Revision Date: 13-Jan-2014

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Non-Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
NewZealand: 06-758 1927

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name: EZ MUL® NT
Synonyms: None
Chemical Family: Blend
UN Number: None
Dangerous Goods Class: None
Subsidiary Risk: None
Hazchem Code: None Allocated
Poisons Schedule: None Allocated
Application: Emulsifier

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. HAZARDS IDENTIFICATION

Statement of Hazardous Nature Non-Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Hazard Overview May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. Combustible.

Classification Xi - Irritant.

Risk Phrases R43 May cause sensitization by skin contact.
R36/38 Irritating to eyes and skin.

Safety Phrases S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S24/25 Avoid contact with skin and eyes.

HSNO Classification 6.3A Irritating to the skin
6.4A Irritating to the eye
6.5B Contact sensitisers

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT (w/w)	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Fatty acid, tall-oil, reaction product with diethylenetriamine, maleic anhydride, tetraethylenepentamine, and triethylenetetramine	68990-47-6	60 - 100%	Not applicable	Not applicable	Not applicable
Hydrotreated light petroleum distillate	64742-47-8	10 - 30%	Not applicable	Not applicable	Not applicable
Ethylene glycol monobutyl ether	111-76-2	1 - 5%	TWA: 20 ppm TWA: 96.9 mg/m³ STEL: 50 ppm STEL: 242 mg/m³	TWA: 25 ppm TWA: 121 mg/m³	TWA: 20 ppm
Diethylene glycol monobutyl ether	112-34-5	1 - 5%	Not applicable	Not applicable	Not applicable

Non-Hazardous Substance to Total of 100%

4. FIRST AID MEASURES

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media
Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons
Do NOT spray pool fires directly with water. A solid stream of water directed into hot burning liquid can cause splattering.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Use water spray to cool fire exposed surfaces.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, and clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse. Ground and bond containers when transferring from one container to another.

Storage Information Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use. Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

Organic vapor respirator with a dust/mist filter. (A2P2/P3) In high concentrations, supplied air respirator or a self-contained breathing apparatus.

Hand Protection Impervious rubber gloves. Nitrile gloves. Neoprene gloves. Butyl rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Dark amber
Odor:	Mild hydrocarbon
pH:	4-7
Specific Gravity @ 20 C (Water=1):	0.96
Density @ 20 C (kg/l):	0.96
Bulk Density @ 20 C (kg/M3):	Not Determined
Boiling Point/Range (C):	150
Freezing Point/Range (C):	-20
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	65
Flash Point Method:	PMCC
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m³):	Not Determined
Flammability Limits in Air - Lower (%):	0.6
Flammability Limits in Air - Upper (g/m³):	Not Determined
Flammability Limits in Air - Upper (%):	4.7
Vapor Pressure @ 20 C (mmHg):	0.2
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	35
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid Keep away from heat, sparks and flame.

Incompatibility (Materials to Avoid) Strong oxidizers.

Hazardous Decomposition Products Oxides of nitrogen. Hydrocarbons. Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Acute Toxicity

Inhalation May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Eye Contact May cause eye irritation.

Skin Contact May cause skin irritation. May cause an allergic skin reaction.

Ingestion Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 1% are chronic health hazards.

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Fatty acid, tall-oil, reaction product with diethylenetriamine, maleic anhydride, tetraethylenepentamine, and triethylenetetramine	68990-47-6	> 2020 mg/kg (Rat)	> 2000 mg/kg (Rat)	No data available
Hydrotreated light petroleum distillate	64742-47-8	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	5.28 mg/L (Rat) 4h
Ethylene glycol monobutyl ether	111-76-2	470 mg/kg (Rat) 1414 mg/kg (Guinea pig) 1746 mg/kg (Rat) 320 mg/kg (Rabbit) 530 mg/kg (Rat) 560 mg/kg (Rat) 3000 mg/kg (Rat)	220 mg/kg (Rabbit) 2270 mg/kg (Rat) 200 mg/kg (Guinea pig) >2000 mg/kg (Rabbit) 441 mg/kg (Rabbit) 435 mg/kg (Rabbit) >2000 mg/kg (Guinea pig) >2000 mg/kg (Rat) 100 mg/kg (Rabbit) 207 mg/kg (Guinea pig) 400-500 mg/kg (Rabbit)	450 ppm (Rat) 4h 2.174 mg/L (Rat) 4h 2.21 mg/L (Rat) 4h 450-486 ppm (Rat) 4h 925 ppm (Rat) 4h >633 ppm (Guinea pig) 1h
Diethylene glycol monobutyl ether	112-34-5	3384 mg/kg (Rat) 6560 mg/kg (Rat) 5660 mg/kg (Rat) 2406 mg/kg (Mouse) 2000 mg/kg (Guinea pig)	2700 mg/kg (Rabbit) 2764 mg/kg (Rabbit)	No data available

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

Ecotoxicity Product

Acute Fish Toxicity: EC50: 1701 mg/l (Corophium volutator)

Acute Crustaceans Toxicity: TLM48: 199.4 mg/l (Acartia tonsa)

Acute Algae Toxicity: Not determined

Ecotoxicity Substance

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Fatty acid, tall-oil, reaction product with diethylenetriamine, maleic anhydride, tetraethylenepentamine, and triethylenetetramine	68990-47-6	EC50(72h): > 100 mg/L (growth rate) (Pseudokirchnerella subcapitata)	LC50(96h): > 100 mg/L (Danio rerio)	EC50(3h): > 100 mg/L (respiration rate) (Activated sludge)	IC50(48h): > 100 mg/L (Daphnia magna)
Hydrotreated light petroleum distillate	64742-47-8	EC50(72h): > 10,000 mg/L (Skeletonema costatum) (ISO 10253)	LC50 96h): > 10,000 mg/L (Sophthalmus maximus) (OSPARCOM 1995)	No information available	LC50(48h): > 10,000 mg/L (Acartia tonsa) (ISO 14669)
Ethylene glycol monobutyl ether	111-76-2	EC50: 839.56 mg/l (Skeletonema costatum) EC50(72h): 911 mg/L (biomass) EC50: > 500 mg/l (Scenedesmus subspicatus) NOEC(72h): 88 mg/L (biomass)(Pseudokirchnerella subcapitata)	LC50: > 1000 mg/l (Scophthalmus maximus juvenile) LC50(96h): 1474 mg/L (Oncorhynchus mykiss) NOEC(21d): > 100mg/L (Danio rerio)	TT/EC3(48h): 463 mg/L (Uronema parduzci) TT/EC3(72h): 73 mg/L (Entosiphon sulcatum) TT/EC3(16h): 700 mg/L (Pseudomonas putida)	EC50: >1000 mg/L (Daphnia magna) EC50 (48h): 1800 mg/L (Daphnia magna) EC50: 1875 mg/l (Daphnia magna) NOEC(21d)(reproduction) : 100 mg/L (Daphnia magna)
Diethylene glycol monobutyl ether	112-34-5	EC50: > 100 mg/L (Desmodesmus subspicatus)	LC50: 1300 mg/L (Lepomis macrochirus)	EC10: >1995 mg/L (Activated sludge, industrial)	EC50: > 100 mg/L (Daphnia magna)

12.2 Persistence and degradability

Substances	Persistence and Degradability
Fatty acid, tall-oil, reaction product with diethylenetriamine, maleic anhydride, tetraethylenepentamine, and triethylenetetramine	Readily biodegradable (71% @ 28d)
Hydrotreated light petroleum distillate	Readily biodegradable (87% @ 28d)
Ethylene glycol monobutyl ether	Readily biodegradable (75-88% @ 28d)
Diethylene glycol monobutyl ether	Readily biodegradable (71% @ 28d)

12.3 Bioaccumulative potential

Substances	Log Pow
Fatty acid, tall-oil, reaction product with diethylenetriamine, maleic anhydride, tetraethylenepentamine, and triethylenetetramine	3.1
Hydrotreated light petroleum distillate	7.5
Ethylene glycol monobutyl ether	0.81
Diethylene glycol monobutyl ether	1.0

12.4 Mobility in soil
No information available

12.5 Results of PBT and vPvB assessment
This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT).

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Transportation Information

Labels: None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory Product contains one or more components not listed on inventory.
New Zealand Inventory of Chemicals All components listed on inventory or are exempt.
US TSCA Inventory All components listed on inventory or are exempt.
EINECS Inventory This product, and all its components, complies with EINECS

Classification Xi - Irritant.

Risk Phrases
R43 May cause sensitization by skin contact.
R36/38 Irritating to eyes and skin.

Safety Phrases
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S24/25 Avoid contact with skin and eyes.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional Information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

Hazard Overview

May cause mild eye, skin, and respiratory irritation. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential. Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

Classification

T - Toxic.
Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.

Risk Phrases

R49 May cause cancer by inhalation.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Safety Phrases

S22 Do not breathe dust.
S24/25 Avoid contact with skin and eyes.

HSNO Classification

6.7A Known or presumed human carcinogens
6.9B Harmful to human target organs or systems

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT (w/w)	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Crystalline silica, quartz	14808-60-7	1 - 5%	TWA: 0.1 mg/m³	TWA: 0.2 mg/m³	TWA: 0.025 mg/m³
Bis(hydrogenated tallow alkyl) methylamines	61788-63-4	0 - 1%	Not applicable	Not applicable	Not applicable

Non-Hazardous Substance to Total of 100%

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **GELTONE® II**

Revision Date: 19-Mar-2014

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier

Halliburton/Baroid Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 281 575 5000
New Zealand: 0800 7592

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name: GELTONE® II
Synonyms: None
Chemical Family: Blend
UN Number: None
Dangerous Goods Class: None
Subsidiary Risk: None
Hazchem Code: None Allocated
Poisons Schedule: None Allocated
Application: Viscosifier

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. HAZARDS IDENTIFICATION

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Suitable Extinguishing Media
All standard fire fighting media

Extinguishing media which must not be used for safety reasons
None known.

Special Exposure Hazards Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits.

Respiratory Protection Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), or equivalent respirator when using this product.

Hand Protection Normal work gloves.

Skin Protection Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Powder
Color:	Tan
Odor:	Mild
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.6
Density @ 20 C (kg/l):	Not Determined
Bulk Density @ 20 C (kg/M3):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m³):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m³):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Miscible in hydrocarbons
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None anticipated

Incompatibility (Materials to Avoid) Hydrofluoric acid.

Hazardous Decomposition Products Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure
Acute Toxicity

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Eye Contact May cause eye irritation
Skin Contact May cause skin irritation.
Ingestion Irritation of the mouth, throat, and stomach.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Crystalline silica, quartz	14808-60-7	500 mg/kg (Rat)	No data available	No data available
Bis(hydrogenated tallow alkyl) methylamines	61788-63-4	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit) (Similar substance)	> 180 mg/L (Rat, aerosol, 1h)

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

Ecotoxicity Product
Acute Fish Toxicity: LC50(96h): > 1000 mg/l (Scophthalmus maximus juvenile)
Acute Crustaceans Toxicity: LC50(48h): > 2000 mg/l (Acartia tonsa)
Acute Algae Toxicity: EC50(72h): > 1000 mg/l (Skeletonema costatum)

Ecotoxicity Substance

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Crystalline silica, quartz	14808-60-7	EC50(72h): 89 mg/L (biomass) (Scenedesmus subspicatus) (similar substance)	LC50(96h): 508 mg/L (Danio rerio) (similar substance)	No information available	LC50(48h): 731 mg/L (Daphnia magna) (similar substance) LC50(48h): 33.5 mg/L (Ceriodaphnia dubia) (similar substance)
Bis(hydrogenated tallow alkyl) methylamines	61788-63-4	No information available	LC50(96h): > 1000 mg/L (Brachydanio rerio)	No information available	EC50(48h): 50 mg/L (Daphnia magna)

12.2 Persistence and degradability

Substances	Persistence and Degradability
Crystalline silica, quartz	The methods for determining biodegradability are not applicable to inorganic substances.
Bis(hydrogenated tallow alkyl) methylamines	Readily biodegradable (100% @ 28d)

12.3 Bioaccumulative potential
Bioaccumulation is unlikely

12.4 Mobility in soil
No information available

12.5 Results of PBT and vPvB assessment
No information available.

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Transportation Information

Labels: None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory Product contains one or more components not listed on inventory.
New Zealand Inventory of Chemicals All components listed on inventory or are exempt.
US TSCA Inventory All components listed on inventory or are exempt.
EINECS Inventory This product, and all its components, complies with EINECS

Classification T - Toxic.

Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.

Risk Phrases
R49 May cause cancer by inhalation.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Safety Phrases
S22 Do not breathe dust.
S24/25 Avoid contact with skin and eyes.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional information For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

MATERIAL SAFETY DATA SHEET

Product Trade Name: **GELTONE® II**

Revision Date: 19-Mar-2014

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Manufacturer/Supplier
Halliburton/Baroid Australia Pty. Ltd.
15 Marriott Road
Jandakot
WA 6164
Australia

ACN Number: 009 000 775
Telephone Number: 61 (08) 9455 8300
Fax Number: 61 (08) 9455 5300

Product Emergency Telephone
Australia: 08-64244950
Papua New Guinea: 05 1 [illegible]81 [illegible] 5000
New Zealand: 06 [illegible]5592[illegible]

Fire, Police & Ambulance - Emergency Telephone
Australia: 000
Papua New Guinea: 000
New Zealand: 111

Identification of Substances or Preparation

Product Trade Name:	GELTONE® II
Synonyms:	None
Chemical Family:	Blend
UN Number:	None
Dangerous Goods Class:	None
Subsidiary Risk:	None
Hazchem Code:	None Allocated
Poisons Schedule:	None Allocated
Application:	Viscosifier

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. HAZARDS IDENTIFICATION

Statement of Hazardous Nature Hazardous according to the criteria of NOHSC, Non-Dangerous Goods according to the criteria of ADG.

Hazard Overview May cause mild eye, skin, and respiratory irritation. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential. Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

Classification
T - Toxic.
Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.

Risk Phrases
R49 May cause cancer by inhalation.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Safety Phrases

S22 Do not breathe dust.
S24/25 Avoid contact with skin and eyes.

HSNO Classification
6.7A Known or presumed human carcinogens
6.9B Harmful to human target organs or systems

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT (w/w)	Australia NOHSC	New Zealand WES	ACGIH TLV-TWA
Crystalline silica, quartz	14808-60-7	1 - 5%	TWA: 0.1 mg/m³	TWA: 0.2 mg/m³	TWA: 0.025 mg/m³
Bis(hydrogenated tallow alkyl) methylamines	61788-63-4	0 - 1%	Not applicable	Not applicable	Not applicable

Non-Hazardous Substance to Total of 100%

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media
All standard fire fighting media

Extinguishing media which must not be used for safety reasons
None known.

Special Exposure Hazards Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.

Special Protective Equipment for Fire-Fighters Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Avoid creating and breathing dust.

Environmental Precautionary Measures None known.

Procedure for Cleaning / Absorption Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits.

Respiratory Protection Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), or equivalent respirator when using this product.

Hand Protection Normal work gloves.

Skin Protection Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Powder
Color:	Tan
Odor:	Mild
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	1.6
Density @ 20 C (kg/l):	Not Determined
Bulk Density @ 20 C (kg/M3):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (C):	Not Determined
Pour Point/Range (C):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (g/m³):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (g/m³):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Miscible in hydrocarbons
VOCs (g/l):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined
Decomposition Temperature (C):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None anticipated

Incompatibility (Materials to Avoid) Hydrofluoric acid.

Hazardous Decomposition Products Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure
Acute Toxicity

Inhalation

Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).

Eye Contact May cause eye irritation

Skin Contact May cause skin irritation.

Ingestion Irritation of the mouth, throat, and stomach.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Crystalline silica, quartz	14808-60-7	500 mg/kg (Rat)	No data available	No data available
Bis(hydrogenated tallow alkyl) methylamines	61788-63-4	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit) (Similar substance)	> 180 mg/L (Rat, aerosol, 1h)

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

Ecotoxicity Product

Acute Fish Toxicity: LC50(96h): > 1000 mg/l (Scophthalmus maximus juvenile)
Acute Crustaceans Toxicity: LC50(48h): > 2000 mg/l (Acartia tonsa)
Acute Algae Toxicity: EC50(72h): > 1000 mg/l (Skeletonema costatum)

Ecotoxicity Substance

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Crystalline silica, quartz	14808-60-7	EC50(72h): 89 mg/L (biomass) (Scenedesmus subspicatus) (similar substance)	LC50(96h): 508 mg/L (Danio rerio) (similar substance)	No information available	LC50(48h): 731 mg/L (Daphnia magna) (similar substance) LC50(48h): 33.5 mg/L (Ceriodaphnia dubia) (similar substance)
Bis(hydrogenated tallow alkyl) methylamines	61788-63-4	No information available	LC50(96h): > 1000 mg/L (Brachydanio rerio)	No information available	EC50(48h): 50 mg/L (Daphnia magna)

12.2 Persistence and degradability

Substances	Persistence and Degradability
Crystalline silica, quartz	The methods for determining biodegradability are not applicable to inorganic substances.
Bis(hydrogenated tallow alkyl) methylamines	Readily biodegradable (100% @ 28d)

12.3 Bioaccumulative potential
Bioaccumulation is unlikely

12.4 Mobility in soil
No information available

12.5 Results of PBT and vPvB assessment
No information available.

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Transportation Information

Labels: None

15. REGULATORY INFORMATION

Chemical Inventories

Australian AICS Inventory Product contains one or more components not listed on inventory.
New Zealand Inventory of Chemicals All components listed on inventory or are exempt.
US TSCA Inventory All components listed on inventory or are exempt.
EINECS Inventory This product, and all its components, complies with EINECS

Classification T - Toxic.

Crystalline silica is not classified as a carcinogen in EU Council Directives 67/548/EEC and 88/379/EEC.

Risk Phrases R49 May cause cancer by inhalation.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

Safety Phrases

S22 Do not breathe dust.
S24/25 Avoid contact with skin and eyes.

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Contact

Australian Poisons Information Centre
24 Hour Service: - 13 11 26
Police or Fire Brigade: - 000 (exchange): - 1100

New Zealand National Poisons Centre
0800 764 766

Additional information For additional information in the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

Safety Data Sheet

KELZAN® XCD POLYMER

SECTION 1. IDENTIFICATION

Product Identifier KELZAN® XCD POLYMER
Other Means of Identification Xanthan Gum
Product Family Viscosifier
Recommended Use Drilling Fluid Additive.
Supplier Bri-Chem Supply Ltd., Bay 4, 5510 - 3rd Street SE, Calgary, Alberta, T2H 1J9, Bri-Chem Supply, 403-252-5904, www.brichemsupply.com
Emergency Phone No. ChemTrec, (800) 424-9300, 24/7

SECTION 2. HAZARDS IDENTIFICATION

GHS Label Elements
Inhalation of the dust may cause respiratory tract irritation.
Excessive inhalation of the dust may cause coughing and sneezing.
Other Hazards
Product is EXTREMELY slippery when wet.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS	%	Other Identifiers
Xanthan gum	11138-66-2	98.0-100	
Glyoxal solutions	107-22-2	<1	

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation
Remove to fresh air. If symptoms persist, call a physician. If not breathing, give artificial respiration.

Skin Contact
Wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 5 minutes.

Eye Contact
Immediately flush the contaminated eye(s) with lukewarm, gently flowing water while holding the eyelid(s) open for several minutes. If eye irritation persists, seek medical attention.

Ingestion
No adverse health effects are expected to develop if only small amounts (less than a mouthful) are swallowed.

First-aid Comments
Remove material from eyes, skin and clothing. In case of doubt or when symptoms persist, seek medical attention. Wash heavily-contaminated clothing before re-use.

Most Important Symptoms and Effects, Acute and Delayed
If on skin:
May cause mild irritation.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water, dry chemical, carbon dioxide.

Specific Hazards Arising from the Chemical

Product will burn when in contact with a flame. Treat as a Class "A" fire. Self-extinguishes when ignition source is removed. Tends to smoulder.
Can contain sufficient fines to cause a combustible dust explosion. Do not breathe smoke, gases or vapours generated.
Will liberate carbon dioxide, carbon monoxide.

Special Protective Equipment and Precautions for Fire-fighters

Firefighters should wear a full-body encapsulating chemical protective suit with positive-pressure self-contained breathing apparatus (SCBA).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Wet material on walking surfaces will be EXTREMELY slippery. Avoid dust generation. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment.

Methods and Materials for Containment and Cleaning Up

Use vacuum equipment designated for combustible dust. Take precautionary measures against static discharge. The use of water wash down is not recommended unless the spilled material is already wet.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Prevent dust accumulation on ALL surfaces including ceilings, rafters and other hidden surfaces.
DO NOT breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment.
Avoid conditions that generate airborne dust during handling, transfer and clean up.
Product may form combustible dust-air mixtures.
Avoid emptying package in or near flammable vapours.
Keep away from heat, flame, sparks and other ignition sources.
Static charges may cause flash fire.
Remove material from eyes, skin and clothing.

Conditions for Safe Storage

Store in a dry place away from strong oxidizing agents.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

(Xanthan gum)
OSHA = US Occupational Safety and Health Administration. PEL = Permissible Exposure Limits.
15 mg/m³ (8 hr TWA)
5 mg/m³ (8 hr TWA).

Appropriate Engineering Controls

Ventilation: provide natural or mechanical ventilation to control exposure levels below airborne exposure limits in this section. The use of local mechanical exhaust ventilation is preferred at sources of air contamination such as open process equipment.

Individual Protection Measures

Eye/Face Protection

This product does not cause significant eye irritation or eye toxicity requiring special protection. Where there is significant potential for eye contact, wear chemical goggles and have eye flushing equipment available.

Skin Protection

Minimize skin contamination by following good industrial practice. Protective gloves are recommended.

Respiratory Protection

Avoid breathing dust. Use NIOSH/MSHA-approved respiratory protection equipment when airborne exposures exceed established guidelines.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	White - tan powder. Particle Size: Not available
Odour	Odourless
Odour Threshold	Not available
pH	7.0 (1% solution)
Melting Point/Freezing Point	Not applicable (melting); Not available (freezing)
Initial Boiling Point/Range	Not available **Flash**
Point	Not applicable
Evaporation Rate	Not applicable
Vapour Pressure	Not applicable
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	1.5 at 25 °C (77 °F)
Solubility	Soluble in water; Not available (in other liquids)
Partition Coefficient, n-Octanol/Water (Log Kow)	Not applicable
Decomposition Temperature	Not available
Viscosity	Not available (kinematic)

Other Information

Physical State	Solid
Molecular Formula	Not available
Molecular Weight	Not available
Bulk Density	Not available
Surface Tension	Not applicable
Critical Temperature	Not applicable
Vapour Pressure at 50 deg C	Not available
Saturated Vapour Concentration	Not available

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability

Stable under recommended storage conditions.

Possibility of Hazardous Reactions

Hazardous polymerization will not occur.

Conditions to Avoid

Aviod dust formation.

Incompatible Materials

Avoid strong oxidizing agents.

Hazardous Decomposition Products

Carbon monoxide and carbon dioxide.

SECTION 11. TOXICOLOGICAL INFORMATION

The dry powder may cause foreign body irritation in some individuals.

Prolonged contact with the dry powder may cause drying or chapping of the skin.
Excessive inhalation of dust may be annoying and can mechanically impede respiration.
Due to the hygroscopic properties, a paste or gel can be formed in the airway.

Acute Toxicity

Glyoxal:
LC50 Inhalation Rat: 1300-2400 mg/m³ (4 hr)
Xanthan Gum:
LD50 Oral Rat: >5000 mg/kg
Glyoxal:
LD50 Oral Rat (acute): >640-8979 mg/kg
LD50 Dermal Rat: >2000mg/kg LD50
Dermal Rabbit: 12700 mg/kg LD50
Dermal Guinea Pig: >5000 mg/kg

Skin Corrosion/Irritation

May cause mild irritation. Prolonged contact with the dry powder may cause drying or chapping.
Non-irritating to the skin (rabbit). No skin allergy observed in guinea pig following repeated skin exposure.

Serious Eye Damage/Irritation

Dry powder may cause foreign body irritation in some individuals.
Non-irritating to the eye (rabbit).

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

Hygroscopic properties of the gum can form a paste or gel in the airway. Inhalation of the dust may cause respiratory tract irritation. Excessive inhalation of the dust may cause coughing and sneezing.

Ingestion

Non-toxic if swallowed (less than a mouthful) based on available information.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Xanthan Gum: No adverse effects observed in long-term feeding studies with rats (up to 1000 mg/kg per day).

Respiratory and/or Skin Sensitization

Glyoxal: May cause sensitization of susceptible persons.

Reproductive Toxicity

Sexual Function and Fertility

No adverse effects were observed in 3-generation reproduction study with rats (up to 500 mg/kg per day).

SECTION 12. ECOLOGICAL INFORMATION

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.

Toxicity

Xanthan Gum:
LC50 96-hr:
Rainbow trout: 490 mg/L
Mysid shrimp: >50,000 mg/L suspended particulate phase using 5.7 kg/m³ xanthan gum in a standard drilling fluid.
EC50 48-hr:
Daphnia magna: 980 mg/L

Persistence and Degradability

This product is biodegradable.

Bioaccumulative Potential

This product is inherently biodegradable.

Mobility in Soil

This is inert material.

Other Adverse Effects

Xanthan Gum:
BOD: ~ 200 mg O2/gram

COD: ~ 1600 mgO2/gram

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of according to Federal, Provincial or Municipal guidelines or laws.
Liquids may be sewered in accordance with local, provincial and national regulations if care is taken to avoid pluggage or blockage of sewer systems recognizing that these materials are intended to increase viscosity and form gels.
Dry or wet solid material can be landfilled in accordance with local, provincial and national regulations.
As a carbohydrate, this material is readily biodegradable, when in low concentrations, in a biological wastewater treatment plant.

SECTION 14. TRANSPORT INFORMATION

Not regulated under Canadian TDG Regulations.

Special Precautions for User Not applicable

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

WHMIS Classification

Not a WHMIS controlled product.

Additional Canadian Regulatory Lists

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

SECTION 16. OTHER INFORMATION

NFPA Rating	**Health - 1 Flammability - 1 Instability - 0**
SDS Prepared By	Bri-Chem Supply Ltd
Phone No.	(403) 252-5904
Date of Preparation	February 04, 2016
Disclaimer	This Health and Safety information is correct to the best of our knowledge and belief at the date of its publication, but we cannot accept liability for any loss, injury or damage which may result from its use. We shall ensure, so far as is reasonably practicable, that any revision of this Data Sheet is sent to all customers to whom we have directly supplied this substance, but must point out that it is the responsibility of any intermediate supplier to ensure that such revision is passed to the ultimate user. The information given in the Data Sheet is designed only as guidance for safe handling, storage, and the use of the substance. It is not a specification nor does it guarantee any specific properties. All chemicals should be handled only by competent personnel, within a controlled environment. Should further information be required, this can be obtained through the sales office whose address is at the top of this data sheet.

Section: 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	COREXIT® EC9500A
Other means of identification	:	Not applicable.
Recommended use	:	OIL SPILL DISPERSANT
Restrictions on use	:	Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.
Company	:	Nalco Environmental Solutions LLC 7705 Highway 90-A Sugar Land, Texas 77478 USA TEL: (281) 263-7000
Emergency telephone number	:	(800) 424-9300 (24 Hours) CHEMTREC
Issuing date	:	12/17/2014

Section: 2. HAZARDS IDENTIFICATION

GHS Classification

Eye irritation	:	Category 2A
Specific target organ toxicity - single exposure	:	Category 3 (Central Nervous System)

GHS Label element

Hazard pictograms :

Signal Word	:	Warning
Hazard Statements	:	Causes serious eye irritation. May cause drowsiness or dizziness.
Precautionary Statements	:	**Prevention:** Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. Wash skin thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear eye protection/face protection. **Response:** IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a POISON CENTER or doctor/ physician if you feel unwell. If eye irritation persists: Get medical advice/ attention. **Storage:** Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Other hazards : None known.

Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Concentration: (%)
Distillates, petroleum, hydrotreated light	64742-47-8	10 - 30
Organic sulfonic acid salt	Proprietary	10 - 30
Propylene Glycol	57-55-6	1 - 5

Section: 4. FIRST AID MEASURES

In case of eye contact	:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
In case of skin contact	:	Wash off with soap and plenty of water. Get medical attention if symptoms occur.
If swallowed	:	Rinse mouth. Get medical attention if symptoms occur.
If inhaled	:	Remove to fresh air. Treat symptomatically. Get medical attention if symptoms occur.
Protection of first-aiders	:	In event of emergency, assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders.Use personal protective equipment as required.
Notes to physician	:	Treat symptomatically.
Most important symptoms and effects, both acute and delayed	:	See Section 11 for more detailed information on health effects and symptoms.

Section: 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	:	None known.
Specific hazards during firefighting	:	Fire Hazard Keep away from heat and sources of ignition. Flash back possible over considerable distance.
Hazardous combustion products	:	Decomposition products may include the following materials: Carbon oxides nitrogen oxides (NOx) Sulphur oxides Oxides of phosphorus
Special protective equipment for firefighters	:	Use personal protective equipment.
Specific extinguishing methods	:	Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.

Section: 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Ensure adequate ventilation. Remove all sources of ignition. Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.
Environmental precautions	:	Do not allow contact with soil, surface or ground water.
Methods and materials for containment and cleaning up	:	Eliminate all ignition sources if safe to do so. Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

Section: 7. HANDLING AND STORAGE

Advice on safe handling	:	Avoid contact with skin and eyes. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). Keep away from fire, sparks and heated surfaces. Do not breathe dust/fume/gas/mist/vapours/spray. Wash hands thoroughly after handling. Use only with adequate ventilation.
Conditions for safe storage	:	Keep away from heat and sources of ignition. Keep away from oxidizing agents. Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.
Suitable material	:	The following compatibility data is suggested based on similar product data and/or industry experience: Stainless Steel 304, Stainless Steel 316L, Aluminum, Hastelloy C-276, MDPE (medium density polyethylene), HDPE (high density polyethylene), PVC, Plexiglass, Perfluoroelastomer, PTFE, TFE, FEP (encapsulated)
Unsuitable material	:	The following compatibility data is suggested based on similar product data and/or industry experience: Mild steel, Carbon steel, Buna-N, Brass, Copper, Natural rubber, Polyethylene, Polypropylene, Ethylene propylene, EPDM, Neoprene, Nitrile, Polyurethane, Fluoroelastomer, Chlorosulfonated polyethylene rubber, Polytetrafluoroethylene/polypropylene copolymer

Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Distillates, petroleum, hydrotreated light	64742-47-8	TWA	500 ppm 2,000 mg/m3	OSHA Z1
		TWA	200 mg/m3	ACGIH
Propylene Glycol	57-55-6	TWA	10 mg/m3	WEEL

Engineering measures : Effective exhaust ventilation system Maintain air concentrations

below occupational exposure standards.

Personal protective equipment

Eye protection	:	Safety glasses with side-shields
Hand protection	:	Wear protective gloves. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Skin protection	:	Wear suitable protective clothing.
Respiratory protection	:	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash face, hands and any exposed skin thoroughly after handling.

Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Liquid
Colour	:	amber
Odour	:	hydrocarbon-like
Flash point	:	93 °C Method: ASTM D 93 Pensky-Martens closed cup Does not sustain combustion.
pH	:	6.7 100 %
Odour Threshold	:	no data available
Melting point/freezing point	:	POUR POINT: < -57 °C, ASTM D-97
Initial boiling point and boiling range	:	147 °C (760 mm Hg) Method: ASTM D 86
Evaporation rate	:	no data available
Flammability (solid, gas)	:	no data available
Upper explosion limit	:	Not applicable.
Lower explosion limit	:	Not applicable.
Vapour pressure	:	15.5 mm Hg (37.8 °C)
Relative vapour density	:	no data available
Relative density	:	0.95 (15.6 °C) ASTM D-1298
Density	:	7.91 lb/gal
Water solubility	:	Miscible
Solubility in other solvents	:	no data available
Partition coefficient: n-octanol/water	:	no data available
Auto-ignition temperature	:	no data available
Thermal decomposition temperature	:	no data available

Viscosity, dynamic : no data available
Viscosity, kinematic : 177 mm2/s (0 °C)

70 mm2/s (15.6 °C)

22.5 mm2/s (40 °C)

VOC : no data available

Section: 10. STABILITY AND REACTIVITY

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions : No dangerous reaction known under conditions of normal use.

Conditions to avoid : Heat, flames and sparks.

Incompatible materials : Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

Hazardous decomposition products : Decomposition products may include the following materials:
Carbon oxides
nitrogen oxides (NOx)
Sulphur oxides
Oxides of phosphorus

Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

Potential Health Effects

Eyes : Causes serious eye irritation.

Skin : Health injuries are not known or expected under normal use.

Ingestion : Health injuries are not known or expected under normal use.

Inhalation : Inhalation may cause central nervous system effects.

Chronic Exposure : Health injuries are not known or expected under normal use.

Experience with human exposure

Eye contact : Redness, Pain, Irritation

Skin contact : No symptoms known or expected.

Ingestion : No symptoms known or expected.

Inhalation : Dizziness, Drowsiness

Toxicity

Product

Acute oral toxicity : LD50 rat > 5,000 mg/kg
Test substance Product

LD50 rat > 5,000 mg/kg
Test substance Distillates, petroleum, hydrotreated light

LD50 rat > 38,000 mg/kg
Test substance Oxyalkylated Fatty Acid Derivative

LD50 rat > 36,400 mg/kg
Test substance Oxyalkylate Polymer

LD50 rat 4,620 mg/kg
Test substance Organic Sulfonic Acid Salt

LD50 mouse 2,160 mg/kg
Test substance Glycol Ether

LD50 rat > 16,000 mg/kg
Test substance Polyol ester

LD50 rat 4,000 mg/kg
Test substance Glycol Ether

Acute inhalation toxicity : LC50 rat 5.3 mg/l
Exposure time: 4 hrs
Test substance: Product

LC50 rat: 42.1 mg/l
Exposure time: 4 hrs
Test substance: Glycol Ether

LC50 rat: 20 mg/l
Exposure time: 4 hrs
Test substance: Organic Sulfonic Acid Salt

LC50 rat: > 290 mg/l
Exposure time: 4 hrs
Test substance: Distillates, petroleum, hydrotreated light

Acute dermal toxicity : LD50 rabbit: > 5,000 mg/kg
Test substance: Product

LD50 rabbit: > 3,160 mg/kg
Test substance: Distillates, petroleum, hydrotreated light

LD50 rat: > 2,000 mg/kg
Test substance: Glycol Ether

LD50 rabbit: 10,000 mg/kg
Test substance: Organic Sulfonic Acid Salt

Skin corrosion/irritation : Species: rabbit
Result: Mild skin irritation
Test substance:Product

Serious eye damage/eye irritation : Species: rabbit
Result: Eye irritation
Test substance: Product

Respiratory or skin sensitization : no data available

Carcinogenicity

IARC : No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA : No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP : No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive effects : no data available

Germ cell mutagenicity : no data available

Teratogenicity : no data available

STOT - single exposure : no data available

STOT - repeated exposure : no data available

Aspiration toxicity : no data available

Section: 12. ECOLOGICAL INFORMATION

Ecotoxicity

Environmental Effects : Harmful to aquatic life.

Product

Toxicity to fish : LC50 Inland Silverside: 25.2 mg/l
Exposure time: 96 hrs
Test substance: Product

LC50 Common Mummichog: 140 mg/l
Exposure time: 96 hrs
Test substance: Product

LC50 Turbot: 75 mg/l
Exposure time: 96 hrs
Test substance: Product

Toxicity to daphnia and other aquatic invertebrates : LC50 Acartia tonsa: 34 mg/l
Exposure time: 48 hrs
Test substance: Product

LC50 Artemia: 20.7 mg/l
Exposure time: 48 hrs
Test substance: Product

LC50 Mysidopsis bahia (opossum shrimp): 32.23 mg/l
Exposure time: 48 hrs
Test substance: Product

LC50 Acartia tonsa: 2 mg/l
Exposure time: 48 hrs
Test substance: Product

Components

Toxicity to algae : Distillates, petroleum, hydrotreated light
EC50 : > 1,000 mg/l
Exposure time: 72 h

Components

Toxicity to bacteria : Distillates, petroleum, hydrotreated light
> 1,000 mg/l

Persistence and degradability

The organic portion of this preparation is expected to be readily biodegradable.

Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air : <5%
Water : 10 - 30%
Soil : 50 - 70%

The portion in water is expected to be soluble or dispersible.

Bioaccumulative potential

Based on a review of the individual components, utilizing U.S. EPA models, this material is not expected to bioaccumulate. The product is readily eliminated.

Other information

no data available

Section: 13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

Disposal methods : The product should not be allowed to enter drains, water courses or the soil. Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

Land transport (DOT)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

Sea transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

Section: 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Acute Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

INTERNATIONAL CHEMICAL CONTROL LAWS :

TOXIC SUBSTANCES CONTROL ACT (TSCA)
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

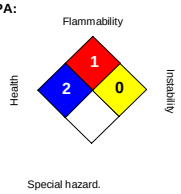
JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL).

PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

Section: 16. OTHER INFORMATION

NFPA:



HMIS III:

HEALTH	2
FLAMMABILITY	1
PHYSICAL HAZARD	0

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

Revision Date : 12/17/2014
Version Number : 1.0
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

Product Bulletin

NALCO 780

Chemical Oxygen Scavenger

PRODUCT DESCRIPTION AND APPLICATION

NALCO 780 is a traditional catalyzed, nonvolatile, inorganic oxygen scavenger that can be used in systems operating at pressures up to 62 barg (900 psig). **NALCO 780** is designed for systems that do **not** have a **mechanical deaerator** that performs according to **design specifications** (typically <below 20 ppb as dissolved oxygen) or have **malfunctioning mechanical deaerators. NALCO 780** begins to break down at pressures of 43 barg (620 psig) and is completely decomposed at pressures above 62 barg (900 psig).

PHYSICAL & CHEMICAL PROPERTIES

Form:	Liquid
Colour:	Yellow
Odor:	Pungent
Boiling point:	100ºC
Viscosity @ 20ºC:	6.0 cps
Relative Density @ 25ºC:	1.31
pH (Neat @ 20ºC):	3.8
Flash Point (PMCC):	Not Available
Solubility in water:	Complete
Freezing Point:	-18ºC

These properties are typical. Refer to the Material Safety Data Sheet for the most current data.

ACTIVE CONSTITUENTS

Sodium bisulfite
Cobalt sulfate

REGULATORY APPROVALS

When use situations necessitate (Check with Plant Manager or Process Area Superintendent), **NALCO 780** is in compliance with the United States Food & Drugs Administration (F.D.A.) regulations pertaining to Boiler Water Additives (21 CFR 173.310).

MATERIALS OF COMPATIBILITY

Compatible	Not Compatible
Buna-N	Aluminium
EPDM	Brass
Hypalon	Carbon Steel
Neoprene	Copper
Plasite 6000	Nickel
Polyethylene	Plasite 4005
Polypropylene	Plasite 7122
Polyurethane	
PVC	
Teflon	
Stainless Steel 304 (may discolour)	

Stainless Steel 316 (may discolour)
Vinyl
Viton

DOSAGE AND FEEDING

Without a deaerator, the oxygen content of the feedwater in equilibrium with the atmosphere as function of temperature is given below in Table One.

-- Table One --

Temperature (°C)	Dissolved O2 (mg/l)
30	7,4
40	6,1
50	5,4
60	4,6
70	3,7
80	2,9
90	1,7
95	0,7

Dissolved oxygen measurements are required to determine the dosage of **NALCO 780.** The dosage of **NALCO 780** is based on the dissolved oxygen level in the feedwater and the required residual sulfite concentration in the boilerwater. The residual range for **NALCO 780** should be controlled based on the cycles of concentration and the pressure of the boiler. The specification for the residual range is based on the applicable **industry standard** and/or the **boiler manufacturers specification.**

The presence of a residual in NALCO 780 does not mean that the oxygen has been effectively scavenged as oxygen and scavenger can coexist in the feedwater system.

The use of NALCO ELIMIN-OX, NALCO 4221, NALCO 1700 or NALCO 77213 is encouraged at boiler pressures above 40 barg. These products will prevent sulfite generation, condensate contamination and subsequent corrosion damage.

Feeding

1. **NALCO 780** is best fed to the deaerator storage section or, for systems without deaerator, into the boiler feedwater tank.
2. **NALCO 780** MUST be fed separately and not mixed with other boiler treatment chemicals, either neat or in dilution.
3. **NALCO 780** can be dosed into the boiler feedwater line, just where it leaves the boiler feedwater tank.
4. **NALCO 780** must be fed neat (undiluted). Diluting oxygen scavengers will cause loss of oxygen scavenging ability.
5. If feedwater is used for attemperation, **NALCO 780 MUST** be fed down-stream of the attemperation water takeoff. If oxygen removal from attemperation water and attemperation line protection are needed, use an organic scavenger.
6. Feed **NALCO 780** via a NAL-QUILL® injector.
7. A steam heated feedwater tank with automated temperature control must be installed whenever possible.
8. To minimize iron transport to the boiler, a **minimum boiler feedwater pH of 8.5 and above is generally recommended** in boiler feedwater chemistry guidelines.
9. Feed **NALCO 780** continuously. Interruption in feed will result in corrosion and/or scale formation.
10. **NALCO 780** can be used for boiler lay-up.

ENVIRONMENTAL AND TOXICITY DATA

Refer to the product's Material Safety Data Sheet for all aquatic and mammalian information.

SAFETY AND HANDLING

Read carefully the label and Material Safety Data Sheet for complete handling information before using this product. Sulfites can cause an allergic reaction in sensitive individuals.

STORAGE

NALCO 780 has a maximum recommended in-plant storage life of one year in factory sealed containers. Keep container closed when not in use. The maximum storage temperature is 49ºC. All storage and feeding equipment should be built of compatible materials (See section "Materials Compatibility").

REMARKS

If you need assistance or more information on this product, please call your nearest Nalco Representative. For more news about Nalco Company, visit our website at www.nalco.com.

For **Medical and Transportation Emergencies** involving Nalco products, please see the Material Safety Data Sheet for the phone number.

ADDITIONAL INFORMATION

NALCO is a registered trademark of Nalco Company (9-0

Material Safety Data Sheet

BIOCIDE BPA68915

1 . Identification of the material and supplier

Names

Product name : BIOCIDE BPA68915

Product code : BPA68915

ADG : Corrosive liquid, acidic, organic, n.o.s. (isothiazolones)

Supplier : Baker Petrolite, Australia
5 Walker Street,
Braeside,
Victoria 3195,
Australia

Tel: +613 9580 9004
Fax: +613 9580 6004

Emergency telephone number : AUSTRALIA: In the event of an emergency ring Orica Emergency Response Service (formerly known as SHE Pacific) 1800 033 111 for specialist advice. Note: This number is continually manned for emergencies only. CHEMTREC International: +1 703 527 3887

Uses

Material uses : Biocide

2 . Hazards identification

Classification : R43
N; R50/53

Risk phrases : R43- May cause sensitisation by skin contact.
R50/53- Very toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment.

Safety phrases : S24- Avoid contact with skin.
S37- Wear suitable gloves.
S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

Statement of hazardous/dangerous nature : HAZARDOUS SUBSTANCE. DANGEROUS GOODS.

3 . Composition/information on ingredients

Ingredient name	CAS number	Concentration
Magnesium nitrate	10377-60-3	1 - 5
reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one[EC no. 247-500-7]and 2-methyl-2H-isothiazol-3-one [EC no. 220-239-6] (3:1)	55965-84-9	1 - 5

Other ingredients, determined not to be hazardous according to NOHSC criteria, and not dangerous according to the ADG Code, make up the product concentration to 100%.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First-aid measures

Inhalation : Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

4 . First-aid measures

Ingestion : Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 15 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 15 minutes. Get medical attention if irritation occurs.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Advice to doctor : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5 . Fire-fighting measures

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. This material is very toxic to aquatic organisms. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
sulfur oxides
halogenated compounds
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Hazchem code : 2X

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Small spill : Stop leak if without risk. Move containers from spill area. Dispose of via a licensed waste disposal contractor. Absorb with an inert dry material and place in an appropriate waste disposal container.

6 . Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Occupational exposure limits

Ingredient name	Exposure limits
Magnesium nitrate	**SWA (Australia, 8/2005).** TWA: 1 mg/m³, (as Mn) 8 hour(s). Form: Dust

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Liquid.
Colour : Grey. / Yellow.
Odour : Characteristic.
Relative density : 1.03 (20°C)
pH : 3 to 5
Solubility : Soluble in water.

10 . Stability and reactivity

Chemical stability : The product is stable.
Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid : Avoid release to the environment. Refer to special instructions/safety data sheet.
Materials to avoid : No specific data.
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 . Toxicological information

Potential acute health effects

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Ingestion : No known significant effects or critical hazards.
Skin contact : May cause sensitisation by skin contact.
Eye contact : No known significant effects or critical hazards.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Magnesium nitrate	LD50 Ora	Rat	5440 mg/kg	-
reaction mass of: 5-chloro-2-methyl-4-isothiazolin-3-one[EC no. 247-500-7]and 2-methyl-2H-isothiazol-3-one [EC no. 220-239-6] (3:1)	LD50 Ora	Rat	53 mg/kg	-

Conclusion/Summary : Not available.

Potential chronic health effects

Chronic toxicity
Conclusion/Summary : Not available.
Irritation/Corrosion
Conclusion/Summary : Not available.
Sensitiser
Conclusion/Summary : Not available.
Carcinogenicity
Conclusion/Summary : Not available.
Mutagenicity
Conclusion/Summary : Not available.
Teratogenicity
Conclusion/Summary : Not available.
Reproductive toxicity
Conclusion/Summary : Not available.
Chronic effects : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.

11 . Toxicological information

Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.
Inhalation : No specific data.
Ingestion : No specific data.
Skin : Adverse symptoms may include the following:
irritation
redness
Eyes : No specific data.
Target organs : Contains material which may cause damage to the following organs: upper respiratory tract, skin, eyes.

12 . Ecological information

Ecotoxicity : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Aquatic ecotoxicity
Conclusion/Summary : Not available.
Other ecological information
Persistence/degradability
Conclusion/Summary : Not available.
Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

Methods of disposal : This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Label	Additional information
ADG	UN3265	Corrosive liquid, acidic, organic, n.o.s. (isothiazolones)	8	III		Hazchem code 2X
ADR	UN3265	Corrosive liquid, acidic, organic, n.o.s. (isothiazolones)	8	III		UK Hazchem: 2X
IMDG	UN3265	Corrosive liquid, acidic, organic, n.o.s. (isothiazolones)	8	III		-
IATA	UN3265	Corrosive liquid, acidic, organic, n.o.s. (isothiazolones)	8	III		-

PG* : Packing group

15 . Regulatory information

Standard for the Uniform Scheduling of Drugs and Poisons

Not regulated.

Control of Scheduled Carcinogenic Substances

Ingredient name	Schedule
No listed substance	

Australia inventory (AICS) : All components are listed or exempted.
EU Classification : R43
N; R50/53
HCS Classification : Toxic material
Irritating material
Carcinogen
Target organ effects
Risk phrases : R43- May cause sensitisation by skin contact.
R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety phrases : S24- Avoid contact with skin.
S37- Wear suitable gloves.
S61- Avoid release to the environment. Refer to special instructions/safety data sheet.
National regulations : **National Code of Practice for the Control of Workplace Hazardous Substances. National Code of Practice for the Labelling of Workplace Substances. National Code of Practice for the Preparation of Material Safety Data Sheets. Approved Criteria for Classifying Hazardous Substances.**

16 . Other information

Date of printing : 8/2/2010.
Date of issue/ Date of revision : 8/2/2010.
Date of previous issue : No previous validation
Version : 1.01

Indicates information that has changed from previously issued version.

Disclaimer

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

ScienceLab.com
Chemicals & Laboratory Equipment

Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Sodium formate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium formate

Catalog Codes: SLS3508

CAS#: 141-53-7

RTECS: LR0350000

TSCA: TSCA 8(b) inventory: Sodium formate

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: HCOONa

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium formate	141-53-7	100

Toxicological Data on Ingredients: Sodium formate: ORAL (LD50): Acute: 11200 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation.

Potential Chronic Health Effects:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Deliquescent crystals solid.)

Odor: Formic acid. (Slight.)

Taste: Not available.

Molecular Weight: 68.01 g/mole

Color: White.

pH (1% soln/water): 7 [Neutral.]

Boiling Point: Decomposes.

Melting Point: 253°C (487.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.92 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 11200 mg/kg [Mouse].

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Sodium formate

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36/38- Irritating to eyes and skin.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 12:34 PM

Last Updated: 05/21/2013 12:00 PM

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TOTAL

SAFETY DATA SHEET
according to the Global Harmonized System

SDS # : 30026

EDC 95-11

Issuing date: no data available **Revision Date:** *2014-12-16* **Version** *1*

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Identification of the substance or preparation

Product name **EDC 95-11**
Trade name -
Substance/mixture Substance

Use of the Substance/Preparation

Identified uses Manufacture of substances, Distribution of substance, Formulation & (re)packing of substances and mixtures, Use in Oil and Gas field drilling and production operations, Laboratory activities, Water treatment chemical.

Company/Undertaking identification

Supplier
TOTAL FLUIDES S
24, cours Michelet
92800 PUTEAUX
FRANCE
Tel: +33 (0)1 41 35 40 00
Fax: +33 (0)1 41 35 82 88

For further information, please contact:
E-mail Address rmfs.fds@total.com

Emergency telephone

Malaysia: 1-800-815-308 (toll-free in country)

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Aspiration toxicity - Category 1

GHS Label elements, including precautionary statements

Symbol(s)

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Signal Word **DANGER**

Hazard Statements
H304 - May be fatal if swallowed and enters airways

Precautionary Statements - Response
• IF SWALLOWED: Immediately call a POISON CENTER/doctor
• Do NOT induce vomiting

Precautionary Statements - Storage
• Store locked up

Precautionary Statements - Disposal
• Dispose of contents/container to an approved waste disposal plant

Other hazards which do not result in classification

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature A complex and variable combination of paraffinic and cyclic hydrocarbons having a carbon number range predominantly of C15 to C20 and boiling in the range of approximately 240°C to 335°C
The aromatic content is < 0.03%

Chemical Name	CAS-No	EC-No	Weight %
Hydrocarbons, C15-C20, n-alkanes, isoalkanes, cyclics, < 0.03% aromatics	^	934-956-3	100

Additional information Related CAS: 64742-46-7

4. FIRST AID MEASURES

Description of necessary first-aid measures

General advice IN CASE OF SERIOUS OR PERSISTENT CONDITIONS, CALL A DOCTOR OR EMERGENCY MEDICAL CARE.

Eye contact Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing.

Skin contact Remove contaminated clothing and shoes. Wash off with soap and water.

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Inhalation In case of exposure to intense concentrations of vapours, fumes or spray, transport the person away from the contaminated zone, keep warm and allow to rest.

Ingestion Do not ingest If swallowed then seek immediate medical assistance.
Risk of product entering the lungs on vomiting after ingestion. In this case, the casualty should be sent immediately to hospital.

Protection of First-aiders Use personal protective equipment.

Most important symptoms/effects, acute and delayed

Skin contact Prolonged or repeated contact may dry skin and cause irritation.

Eye contact Burning feeling and temporary redness.

Inhalation Vapors inhaled in strong concentration have a narcotic effect on the central nervous system.
The inhalation of vapours or aerosols may be irritating for the respiratory tract and for mucous membranes.

Ingestion If swallowed accidentally, the product may enter the lungs due to its low viscosity and lead to the rapid development of very serious pulmonary lesions (medical survey during 48 hours).
Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash point See chapter 9. PHYSICAL AND CHEMICAL PROPERTIES

Suitable Extinguishing Media

Suitable Extinguishing Media Foam. Dry powder. Carbon dioxide (CO_2). Water spray.

Unsuitable Extinguishing Media Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Special Hazard Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot. These may be highly dangerous if inhaled in confined spaces or at high concentration.

Advice for fire-fighters

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Special protective equipment for fire-fighters Wear self-contained breathing apparatus and protective suit. In case of a large fire or in confined or poorly ventilated spaces, wear full fire resistant protective clothing and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Other information

Other information Cool containers / tanks with water spray.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

General Information Ensure adequate ventilation, especially in confined areas. Use personal protective equipment.

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Evacuate non-essential personnel.

Do not touch or walk through spilled material.

General Information

General Information Prevent further leakage or spillage if safe to do so. Dike to collect large liquid spills. The product should not be allowed to enter drains, water courses or the soil. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up

Methods for cleaning up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Following product recovery, flush area with water.

Other information

Other information Remove all sources of ignition.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling
For personal protection see section 8. Avoid contact with skin, eyes and clothing. Use only in well-ventilated areas. Do not breathe vapors or spray mist.

Technical measures Ensure adequate ventilation
Do not spray at high pressure (> 3 bar)

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Prevention of fire and explosion Handle away from any source of ignition (open flame and sparks) and heat (hot manifolds or casings). Do not smoke
Take precautionary measures against static discharges

Conditions for safe storage, including any incompatibilities

Technical measures/Storage conditions Design the installations in order to avoid accidental emissions of product (due to seal breakage, for example) onto hot casings or electrical contacts.
Storage installations should be designed with adequate bunds so as to prevent ground or water pollution in case of leaks or spills.
Keep in a bunded area. Keep in a dry, cool and well-ventilated place.
Keep away from open flames, hot surfaces and sources of ignition. Ground/bond containers, tanks and transfer/receiving equipment. Store at room temperature.
Keep containers tightly closed and properly labelled.

Materials to Avoid Strong acids. Oxidizing agents.

Packaging material Keep only in the original container or in a suitable container for this kind of product steel
Stainless steel

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits Ingredients with workplace control parameters

Appropriate engineering controls

Engineering Measures When working in confined spaces (tanks, containers, etc.), ensure that there is a supply of air suitable for breathing and wear the recommended equipment.
Apply technical measures to comply with the occupational exposure limits.

Individual protection measures, such as personal protective equipment (PPE)

Personal Protective Equipment

General Information Protective engineering solutions should be implemented and in use before personal protective equipment is considered.
These recommendations apply to the product as supplied.
If the product is used in mixtures, it is recommended that you contact the appropriate protective equipment suppliers.

Respiratory protection For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
In an emergency or for exceptional short-lasting jobs in an atmosphere polluted by the product, it is necessary to wear protective respiratory equipment.
The use of breathing apparatus must comply strictly with the manufacturer's instructions and the regulations governing their choices and uses.

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Eye Protection If splashes are likely to occur, wear: Safety glasses with side-shields
Skin and body protection Wear suitable protective clothing. Protective shoes or boots.
Hand Protection Impervious gloves, aliphatic hydrocarbon resistant

Repeated or prolonged exposure			
Glove material	Glove thickness	Break through time	Remarks
Nitrile rubber	> 0.55 mm	> 480 min	EN 374
Fluorinated rubber Viton (R)	(*)	> 480 min	EN 374 (*) any thickness
PVA	(*)	> 480 min	EN 374 (*) any thickness

In case of contact through splashing:			
Glove material	Glove thickness	Break through time	Remarks
Nitrile rubber	> 0.38 mm	> 60 min	EN 374
Neoprene	> 0.75 mm	> 60 min	EN 374

Hygiene measures Ensure the application of strict rules of hygiene by the personnel exposed to the risk of contact with the product. When using, do not eat, drink or smoke.
Regular cleaning of equipment, work area and clothing is recommended. Do not dry hands with rags that have been contaminated with product. Do not use abrasives, solvents or fuels.
Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

General Information

Color colorless
Physical State @20°C liquid
Odor none

Important health safety and environmental information

Property	Values	Remarks	Method
pH		Not applicable	
Boiling point/boiling range	**250 - 330 °C**		ISO 3405
	482 - 626 °F		ISO 3405
Flash point	**115 °C**		ASTM D 93
	239 °F		ASTM D 93.
Evaporation rate		No information available	
Flammability Limits in Air			
upper	6 %		
Lower	1 %		
Vapor Pressure	0.003 hPa	@ 20 °C	
Vapor density		No information available	
Density	814 kg/m³	@ 20 °C	ISO 12185
Water solubility		Not applicable	

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Solubility in other solvents		No information available	
logPow		Not applicable	
Autoignition temperature	**> 230 °C**		ASTM E 659
	> 446 °F		ASTM E 659
Viscosity, kinematic	3.5 mm2/s	@ 40 °C	ISO 3104

Explosive properties Not considered explosive based on chemical structure and oxygen balance considerations
Oxidizing Properties This product is not considered oxidising based on chemical structure considerations
Possibility of hazardous reactions Not applicable

Other information

Pour point -27 °C ASTM D97

10. STABILITY AND REACTIVITY

Reactivity

No dangerous reaction known under conditions of normal use

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

None under normal processing.

Conditions to Avoid

Heat, flames and sparks. Take precautionary measures against static discharges.

Materials to Avoid

Strong acids. Oxidizing agents.

Hazardous Decomposition Products

Incomplete combustion and thermolysis may produce gases of varying toxicity such as carbon monoxide, carbon dioxide, various hydrocarbons, aldehydes and soot.

11. TOXICOLOGICAL INFORMATION

Acute toxicity - Product Information

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Skin contact Prolonged or repeated contact may dry skin and cause irritation.
Eye contact Burning feeling and temporary redness.
Inhalation Vapors inhaled in strong concentration have a narcotic effect on the central nervous system.
The inhalation of vapours or aerosols may be irritating for the respiratory tract and for mucous menbranes.
Ingestion If swallowed accidentally, the product may enter the lungs due to its low viscosity and lead to the rapid development of very serious pulmonary lesions (medical survey during 48 hours).
Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Acute toxicity - Component Information

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hydrocarbons, C15-C20, n-alkanes, isoalkanes, cyclics, < 0.03% aromatics ^	LD50 > 5000 mg/kg bw (rat - OECD 401)	LD50 (14h) > 5000 g/kg bw (rabbit - OECD 402)	LC50 (4h) > 5266 mg/m³ (aerosol) (rat - OECD 403)

Aggravated Medical Conditions Not known.

Subchronic toxicity

Chronic toxicity

Sensitization Not classified as a sensitizer.
Neurological effects No information available.
Target Organ Effects (STOT) No information available.
Other adverse effects Frequent or prolonged skin contact destroys the lipoacid cutaneous layer and may cause dermatitis.

Specific effects

Carcinogenicity The current toxicological knowledge allows to not classify the product as a carcinogen.

Chemical Name	IARC	European Union	ACGIH
Hydrocarbons, C15-C20, n-alkanes, isoalkanes, cyclics, < 0.03% aromatics ^		-	

Mutagenicity
None known.

Chemical Name	European Union	Japan
Hydrocarbons, C15-C20, n-alkanes, isoalkanes, cyclics, < 0.03% aromatics ^	-	

Reproductive toxicity
Studies in rats with the substance did not show any effect on reproductive performance
Developmental Toxicity Results of guideline developmental toxicity studies on the substance and OECD developmental toxicity screening studies showed no evidence of developmental toxicity in rats.

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12. ECOLOGICAL INFORMATION

Ecotoxicity

Acute aquatic toxicity - Product Information

Not applicable.

Calculation method
EC50 No information available
0% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

Acute aquatic toxicity - Component Information

Chemical Name	Toxicity to algae	Toxicity to daphnia and other aquatic invertebrates	Toxicity to fish	Toxicity to microorganisms
Hydrocarbons, C15-C20, n-alkanes, isoalkanes, cyclics, < 0.03% aromatics ^	ErL50 (72h) > 10000 mg/l (Skeletonema costatum - ISO 10253)	LL50 (48h) > 3193 mg/l (Acartia tonsa - ISO 14669)	LL50 (96h) > 1028 mg/l (Scophthalamus maximus - OECD 203)	

Chronic aquatic toxicity - Product Information
Not applicable

Chronic aquatic toxicity - Component Information
There are no chronic toxicity data available

Effects on terrestrial organisms

No information available

Persistence and degradability

Readily biodegradable (74 % after 28 days).

Biodegradation						
Type	Method	Sampling time	Specific effects	Values	Unit	Biodegradability
	OECD 306	28 days		74	%	Readily biodegradable

Bioaccumulative potential

Product Information Substance is a UVCB. Standard tests for this endpoint are not appropriate.

logPow Not applicable

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Component Information

Mobility

Soil Substance is a UVCB. Standard tests for this endpoint are not appropriate

Other adverse effects

No information available

13. DISPOSAL CONSIDERATIONS

Waste from Residues / Unused Products Dispose of in accordance with the European Directive on waste and hazardous waste.
Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORT INFORMATION

ADR/RID Not regulated

IMDG/IMO Not regulated

ICAO/IATA Not regulated

ADN Not regulated

DOT Not regulated

TDG Not regulated

MEX Not regulated

15. REGULATORY INFORMATION

REACH registration No 01-2119827000-58

Related CAS 64742-46-7

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International Inventories

The substance is listed or exempted from listing in the following inventories:
Europe (EINECS/ELINCS/NLP)
U.S.A. (TSCA)
China (IECSC)
Canada (DSL/NDSL)
Japan (ENCS)
Korea (KECL)
Australia (AICS)
Philippines (PICCS)
New Zealand (NZIoC)

Further information

No information available

National regulatory information

16. OTHER INFORMATION

Revision Date: 2014-12-16
Revision Note (M)SDS sections updated: 4, 8, 10, 11, 12, 15, 16.
Further information This product is classified as R65 «Harmful: may cause lung damage if swallowed» and/or H304 «May be fatal if swallowed and enters airways». The risk relates to potential for aspiration. The risk arising from aspiration hazard is solely related to the physico-chemical properties of the substance. The risk can therefore be controlled by implementing risk management measures tailored to this specific hazard. An exposure scenario is not required.

Disclaimer
This safety data sheet serves to complete but not to replace the technical product sheets. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above.It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk.The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity.The user bears sole liability for the precautions required when using the product.The regulatory texts indicated herein are intended to aid the user to fulfil his obligations. This list is not to be considered complete and exhaustive.It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned.

End of Material Safety Data Sheet

TEP Uganda Policies, Codes, Charters and Guides

TOTAL
COMMITTED TO BETTER ENERGY

Fundamental Principles of Purchasing

In accordance with the fundamental principles set out in particular in the United Nations Universal Declaration of Human Rights, the Conventions of the International Labour Organization, the United Nations Global Compact, and the OECD Guidelines for Multinational companies, suppliers are required to comply with - and to make sure that their own suppliers and subcontractors comply with – current laws, as well as principles equivalent to those defined below.

• Respecting human rights at work :

- Ensure that working conditions and remuneration of workers preserve human dignity and are consistent with fundamental principles defined and protected by the Universal Declaration of Human Rights, by the fundamental principles of the International Labour Organization, and in particular with rules relating to the prohibition of forced labour and child labour, workplace safety, the establishment of an employment contract, working time, rest and parental leave, treatment of discrimination and harassment at the workplace, freedom of speech, association and collective bargaining, freedom of thought, conscience and religion;

- Improve their standards and procedures concerning human rights at work.

• Protecting health, safety, and security :

- Perform risk analysis and assessments in these areas and implement appropriate means to prevent those risks;

- Establish a system for monitoring events that occurred in these areas.

• Preserving the environment :

- Implement an appropriate environment risk management system, in order to identify and control the environmental impact of activities, products or services, to continuously improve environmental performance, and to implement a systematic approach to define environmental objectives, achieve them and demonstrate that they have been achieved;

- Undertake the improvements needed for protecting the environment;

- Limit the impact of industrial activities on the environment.

• Preventing corruption, conflict of interests, and fighting against fraud :

- Fight against fraud;

- Prevent and ban any form of corruption: active or passive, private or public, direct or indirect;

- Avoid conflicts of interest, in particular when personal interests may influence professional interests.

• Respecting the competition law :

- Comply with the applicable competition law.

• Promoting economic and social development :

- Create a climate of trust with stakeholders, engaging in a dialogue with local communities, promoting local sustainable development initiatives, and giving local companies the opportunity to develop their business.

Compliance with these laws and principles may be audited.

TOTAL
COMMITTED TO BETTER ENERGY

SAFETY HEALTH ENVIRONMENT QUALITY CHARTER

In accordance with its Code of Conduct, Total has adopted the following principles concerning safety, security, health, the environment, quality and societal commitment:

1
Total holds safety, security, health, respect for the environment, customer satisfaction, listening to all stakeholders by way of an open dialogue, as paramount priorities.

2
Total complies with all applicable laws and regulations wherever it conducts its business and supplements them with specific requirements and commitments when necessary.

3
Total promotes, among its employees a shared culture which the core components are professionalism, the rigorous compliance and application of regulations, skills management, incident feedback and continuous learning. This approach relies on the vigilance and commitment of all.

4
Each and every team member, at all levels, must be aware of their role and personal responsibility in the practice of their duties. Individuals must demonstrate the strictest discipline in preventing accidents and deliberate damage; in protecting health, the environment and product and service quality whilst addressing stakeholder expectations. Rigor and exemplarity in these fields are important criteria in evaluating the performance of each member of personnel, in particular for those in positions of responsibility.

5
Total favors the selection of industrial and business partners on the basis of their ability to apply policies similar to its own concerning safety, security, health, the environment, quality and societal measures.

6
Total implements, for all of its operations, appropriate management policies regarding safety, security, health, the environment, quality, societal commitment and a periodic risk assessment of relevant policies and measures. Any development of a project or launch of a product is undertaken upon full lifecycle risk assessment.

7
Appropriate safety, health, environmental, quality and societal commitment management systems for each business undergo regular assessment involving measurement of performance setting milestones, formulating relevant action plans and instituting suitable control procedures.

8
Total implements incident response plans and means of intervention designed to face different types of events it may encounter. Such measures are periodically updated and reviewed during exercises.

9
Total is committed to managing its energy consumption, emissions in natural environments (water, air and soils), production of final waste, use of natural resources and impact on biodiversity. It develops new processes, products and customer services in order to enhance energy efficiency and reduce environmental footprint.

10
Total adopts a constructive attitude towards safety, security, health, the environment and quality, based on transparency and an open dialogue with stakeholders and outside parties. Through its societal commitment, Total is particularly keen on contributing to the sustainable development of neighboring communities, with a focus on human, economic and social issues. It conducts its operations in such a way as to responsibly ensure security, in compliance with the Voluntary Principles on Security and Human Rights.

Patrick Pouyanné
Chief Executive Officer

December 2014

TOTAL
COMMITTED TO BETTER ENERGY

CODE OF CONDUCT

CODE OF CONDUCT

RESPECT - RESPONSIBILITY- EXEMPLARY CONDUCT

Total is one of the largest integrated oil and gas companies in the world, with activities in more than 130 countries. Its 100,000 employees put their expertise to work in every part of the industry — exploration and production of oil and natural gas, refining, chemicals, marketing and new energies. Total is working to help satisfy the global demand for energy, both today and tomorrow.
www.total.com

Edition February 2015

Operating in more than 130 countries, including complex environments, our growth and long-term viability are based on three shared values that guide all our activities:

Respect, Responsibility, Exemplary Conduct

The Code of Conduct describes how we put these values into practice every day. It explains our commitments and expectations towards stakeholders and provides guidance for employees and everyone who works on our behalf.

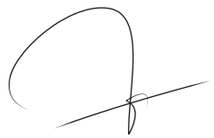
THE THREE FOLLOWING PRIORITY BUSINESS PRINCIPLES ARE EQUALLY CRITICAL TO OUR SUCCESS AS A RESPONSIBLE COMPANY:

- Commitment to the highest levels of **safety** and **security** in our operations as well as protecting **health** and the **environment.**
- Compliance with the highest **integrity** standards, in particular by preventing corruption, fraud and anti-competitive practices.
- Respect for internationally recognized **Human Rights** standards.

In every business unit, management is in charge of instilling these values and ensuring that our business principles are respected.

You can contact the Group Ethics Committee on any concern related to the application of the Code of Conduct, in particular to help you make any sensitive decisions that may arise in the course of your work.

The Executive Committee and I are confident that each and every one of us will do business in line with the Code of Conduct. Working together, we will be able to build sustainable growth, create value for all our stakeholders and reinforce our commitment to better energy.



Patrick Pouyanné
Chief Executive Officer

WHAT IS THE **CODE OF CONDUCT?**

THE CODE OF CONDUCT

- Sets out the values guiding the Group's conduct.
- States Total's business principles and commitments to our different stakeholders.
- Defines our expectations towards employees in their day-to-day decision-making and in their relationships with other stakeholders.
- Explains the role of the Ethics Committee.
- Provides guidance in case of questions or concerns.
- Lists additional resources on the different topics.

INTENDED USERS

The Code of Conduct is a common reference document for all our managers and employees around the world as well as for all our different stakeholders: customers, suppliers and contractors, host countries, local communities, business partners and shareholders.

MANAGERS HAVE SPECIFIC RESPONSIBILITIES

- They are expected to refer to the Code of Conduct with their team members and make sure they understand it.
- They are responsible for creating a speak-up climate that will enable employees to discuss any issues.
- They must ensure that our business principles are implemented and respected.
- They must behave in an exemplary way that embodies our values.

All employees must understand and respect the business principles contained in our Code of Conduct.

Suppliers, contractors and business partners are expected to apply standards that are equivalent to ours, in particular towards their employees.

OUR BUSINESS PRINCIPLES

We respect all applicable national and international laws and norms

As a responsible industrial company, we are committed to supporting efficient and properly managed use of our energy sources and products.

We take into account the needs of today's consumers and the interests of future generations. We have an active policy of environmental stewardship that is an integral part of our sustainable development strategy and we provide regular and transparent reports.

Where there is a difference between a legal requirement and our Code of Conduct, we seek to apply the higher standard.

We engage with international, governmental and non-governmental organizations in matters related to our operations and we are responsive to concerns expressed by them.

The following business principles are a reference point and go hand-in-hand with our goals of continued growth, benefiting shareholders, customers and employees whilst contributing to the economic and social development of the countries in which we operate.

3 PRIORITY PRINCIPLES

IN LINE WITH APPLICABLE LAWS AND GROUP RULES, ANY BREACH OF THESE BUSINESS PRINCIPLES CAN LEAD TO INTERNAL AND/OR LEGAL SANCTIONS.

- Total seeks to ensure the highest Safety, Health, Security and Environmental standards wherever we operate.
- Total has a rigorous Compliance Program based on a "zero tolerance" principle designed to prevent and detect violations of applicable anti-trust, anti-fraud, anti-bribery and anti-corruption laws worldwide.
- Total is committed to respecting internationally recognized Human Rights standards within its operations.

The Group Ethics Committee is responsible for the general oversight of the respect of the Code of Conduct within our operations.

OUR EMPLOYEES

We pay particular attention to employees' working conditions, especially the respect for each individual

We have confidence in the loyalty, motivation, competence and sense of responsibility of our managers and employees.

We believe our development depends on trust and respect between the Group and employees and amongst employees themselves.

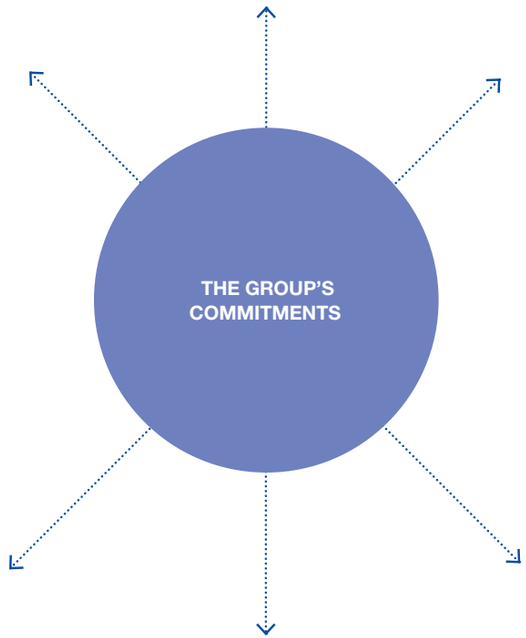
All our staff must bring our values to life through the Total Attitude cornerstone behaviors: listening, mutual support, cross-functionality and boldness.

Employees must ensure that they carry-out their daily activities in compliance with the Code of Conduct.

1. *All employees have an annual appraisal during which objectives are set, performance and the respect of the Code of Conduct are assessed and career development, facilitated by appropriate training, is discussed.*

2. *We pay particular attention to employees' working conditions, especially the respect for each individual, the absence of discrimination, freedom of association and collective bargaining, as well as the protection of their health and safety. No form of harassment is tolerated.*

3. *We include our employees in our development by initiating and facilitating the distribution of relevant information, by consultation and by engaging in ongoing dialogue.*

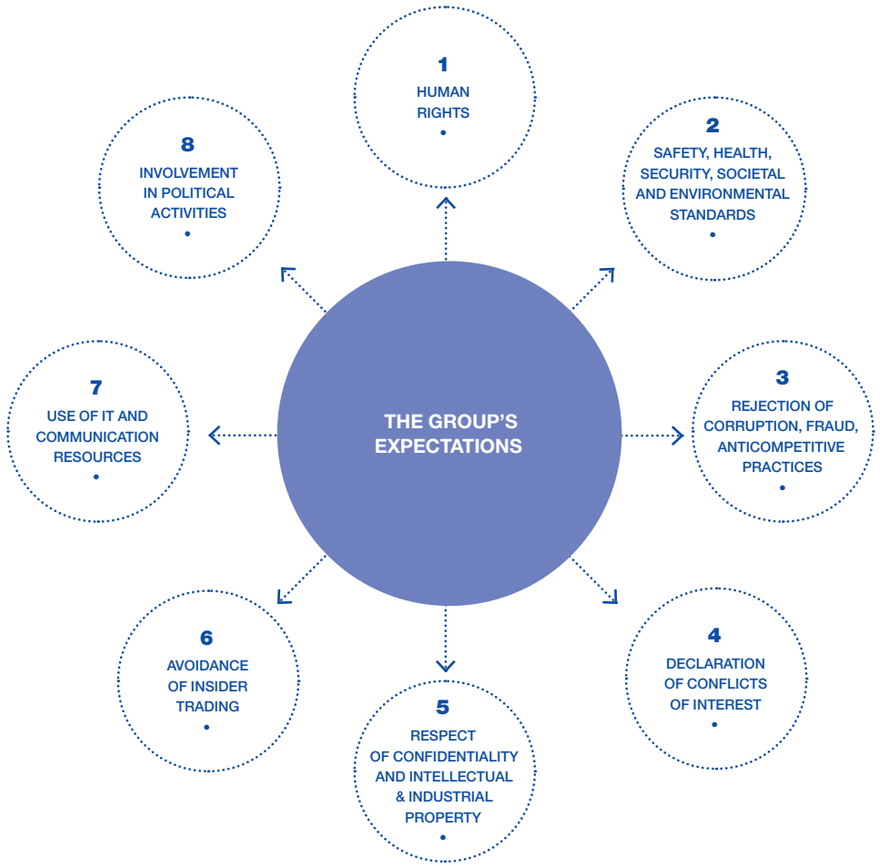


4. *We respect the private lives and more specifically the personal data of all employees and other stakeholders.*

5. *We recruit personnel solely on the basis of our requirements and the specific capabilities of individual applicants.*

6. *Diversity is a decisive factor for our competitiveness, attractiveness and ability to innovate and adapt. We develop our employees' professional skills and careers without any discrimination, whether based on origin, gender, age, disability, sexual orientation, gender identity or affiliation with a political, religious, union organization or minority group.*

EMPLOYEES MUST ENSURE THAT THEY CARRY OUT THEIR DAILY ACTIVITIES IN COMPLIANCE WITH THE CODE OF CONDUCT



1. HUMAN RIGHTS

Employees' vigilance and personal involvement regarding Human Rights in daily activities are essential. The Total Human Rights Guide provides detailed information on our commitments and expectations.

2. SAFETY, HEALTH, SECURITY, SOCIETAL AND ENVIRONMENTAL STANDARDS

Employees must be conscious in their daily activities of their personal responsibility, giving due consideration to the prevention of accidents, harm to health, environmental damage or adverse impacts on local communities. Employees are expected to understand internal standards as well as the impact of our operations and improve risk management.

3. REJECTION OF CORRUPTION, INCLUDING FACILITATION PAYMENTS, FRAUD, ANTICOMPETITIVE PRACTICES

The Group has a zero tolerance approach on these topics and adheres to the highest standards of integrity. Employees must build sound relationships with all stakeholders and prevent, identify and address situations that might cross the line. The Total Business Integrity Guide provides recommendations to comply with applicable rules and we expect employees to turn to their legal department and compliance teams for guidance.

4. DECLARATION OF CONFLICTS OF INTEREST

Employees are expected to disclose conflicts of interest. Identifying and reporting existing or potential conflicts of interest allows risks to be managed.
Employees can minimize potential conflicts of interest by:
- avoiding acquiring any interest in the business of a competitor, supplier or customer without their manager's prior written approval
- not exercising any outside professional activity without first obtaining their manager's written approval if employed by Total on a full-time basis.
Further guidance can be found in the Total Business Integrity Guide.

5. RESPECT OF CONFIDENTIALITY AND INTELLECTUAL & INDUSTRIAL PROPERTY

Employees may not disclose confidential information, whether verbally, in writing or electronically.
They must also observe the rules governing intellectual and industrial property. This obligation remains even after an employee leaves the company.

6. AVOIDANCE OF INSIDER TRADING

Insider trading is a stock market offence concerning the use of privileged information, not yet made public, to buy or sell company shares or other securities.
Employees are expected to contact their legal department in case of doubt.

7. USE OF IT AND COMMUNICATION RESOURCES

IT and communication resources are intended for professional use. Reasonable personal use may be tolerated in line with applicable legislation and internal rules.

8. INVOLVEMENT IN POLITICAL ACTIVITIES

We recognize our employees' rights to take part as individuals in political activities. In that case, we expect our employees:
- to clearly indicate that they do not represent Total
- to inform their manager if their political activities might create a conflict of interest.

You ask employees to respect Human Rights. What are Human Rights for Total and what does it have to do with me?

TOTAL'S ANSWER:
Respecting Human Rights is a key requirement for us, working as we do in varied, often complex environments. We have identified three areas that are relevant to our operations:

Human Rights in the workplace: within our sites, Human Rights concern employment and working conditions of employees as well as suppliers and contractors' employees (for example rejection of discrimination and harassment, access to a minimum wage, freedom of association etc.).

Human Rights and local communities: due to the impact of our operations, special attention must be paid to the rights and concerns of local communities in countries where we work (for example, environmental protection, property rights or other relevant rights).

Human Rights and security: proportionate use of force, risk assessments and interactions with public and private forces in the context of the security of our personnel and sites ensure that the company is better integrated into the local environment.

The Total Human Rights Guide presents concrete examples of Human Rights challenges and provides guidelines. If you need advice, do not hesitate to contact your line manager, the legal department or the Ethics Committee.

OTHER **STAKEHOLDERS**

The Code of Conduct explains our commitments and expectations towards our stakeholders who are key to our long-term success

CUSTOMERS

Total provides customers with quality products and services, and strives at all times to offer them good performance at competitive prices for their particular requirements.

We are attentive to our customers' needs. We continuously monitor, assess and improve our products, services, technology and procedures to deliver quality, safety, energy efficiency and innovation at every stage of the development, production and distribution process.

You want to be perceived as a responsible company. What are you doing to improve the environmental performance of your products and services?

TOTAL'S ANSWER:
Our commitment to sustainable development is a condition of our social license to operate and our long-term viability. In recent years, we have been developing energy-saving solutions that have a lower environmental impact over their production and use stages but offer equivalent or higher quality and performance than competing products and services. For example, we launched in 2009 the Total Ecosolutions labeling program: it aims to develop solutions to help our customers reduce their energy consumption and their environmental impact. You can find more information on our website: www.total.com/en/society-environment/environment/eco-efficient-solutions

SUPPLIERS AND CONTRACTORS

Total's policy regarding suppliers and contractors is to respect each party's interests with transparent and fairly negotiated contract terms. It is built on three pillars: dialogue, professionalism and respect of commitments.

WE EXPECT OUR SUPPLIERS:

- To adhere to principles equivalent to those in our Code of Conduct, which are specified in the Purchasing Fundamental Business Principles, and to accept to be audited.
- To make sure that their own suppliers and subcontractors respect equivalent principles to ours.
- To pay particular attention to their Human Rights standards and procedures, including their employees' working conditions.

As suppliers, you expect us to have standards that are equivalent to yours. What are Total's standards concerning integrity?

TOTAL'S ANSWER:
Our commitment to integrity requires each of us to play an active role in ensuring that we all behave in an exemplary way. Meeting our goals of integrity towards the company and in our business relationships means fighting all forms of corruption, rejecting fraud, avoiding and declaring conflicts of interest, complying with competition law and fulfilling our commitments. These expectations are mentioned in the Purchasing Fundamental Business Principles. To find out more about our integrity standards, you can also read the Total Business Integrity Guide, illustrating these topics with concrete cases and recommendations.

HOST COUNTRIES

The Guiding Principles on Business and Human Rights as endorsed by the UN Human Rights Council in 2011 recognize States'existing obligations to respect, protect and fulfill Human Rights.

In conducting our operations, we respect the natural environment and the culture of host countries.
Total respects the sovereignty of host countries and refrains from intervening in or funding the political processes.
We reserve the right to express to governments, when necessary, our position concerning our operations, employees and shareholders and our belief in the importance of respecting Human Rights.

Total is a member of the Voluntary Principles on Security and Human Rights. What does it imply?

TOTAL'S ANSWER:
Protecting our employees and facilities is one of our top priorities. Public and private security providers are responsible for managing security risks while ensuring that the rights of neighboring communities are respected.

This is why we take all necessary measures to ensure the respect of the Voluntary Principles on Security and Human Rights (VPSHR). The VPSHR promote dialogue between governments, NGOs and businesses and provide recommendations for extractive industries to uphold Human Rights when using public or private security providers.

We have integrated the VPSHR into our Security Policy and five priority areas have been identified:
- establishment of formal relations between subsidiaries and States to organize the deployment of security forces in accordance with our principles
- transfer of equipment that should only occur on an exceptional basis and be strictly controlled
- verification of security companies' recruitment procedures
- specific training
- reporting of incidents

In March 2012, we reaffirmed our commitment by becoming an official participant in the initiative.

LOCAL COMMUNITIES

Total undertakes operations that have social and environmental impacts at the local level and consults with the communities regularly.

Through our operations, we contribute to the social and economic development in countries where we operate.

We pay particular attention to development opportunities for local communities.

We respect the rights of communities by identifying, preventing and mitigating impacts in particular on their environment and way of life and, where appropriate, by providing remedy. We seek to establish dialogue and lasting relationships with these communities at a very early stage.

We design and implement effective local grievance mechanisms and remediation processes in particular towards vulnerable groups, including indigenous peoples.

What is concretely put in place to ensure dialogue with local communities?

TOTAL'S ANSWER:
Our operations may raise various expectations from local communities in terms of employment, local development etc. Total has a Societal Directive that lists our main procedures regarding all our operations, for example regularly consult stakeholders, be familiar with the community context and introduce a societal action plan and governance system.

Local teams are trained to discuss such matters with the local communities and to implement projects that benefit both our activities and host communities. To support our teams in the field, we provide a range of tools like in-house guides on stakeholder dialogue or community grievance mechanisms. We also have implemented SRM+, a stakeholder management tool that helps to identify the views of external stakeholders through discussions with local communities and to develop a joint action plan that meets their expectations.

BUSINESS PARTNERS

We apply our Code of Conduct whenever we control a joint venture. In other situations, we will make ongoing efforts so that the partner who controls the joint venture applies principles that are equivalent to our Code of Conduct.

We are operating a joint venture with Total as a partner. What are your expectations of us concerning safety?

TOTAL'S ANSWER:
Total favors the selection of its industrial and business partners on the basis of their ability to comply with our business principles, in particular regarding safety, health, environment and quality. We seek to be fully informed on the policies and procedures adopted by the joint venture and on how these are applied, raising any concerns through the appropriate governing body of the joint venture. We also work with our joint venture partners to promote and support the adoption by the joint venture of policies and principles concerning safety that are equivalent to our own.

SHAREHOLDERS

We strive to earn the confidence of our shareholders, with the objective of providing them with a profitable and sustainable investment.

We comply with applicable stock exchange regulations and report our activities accurately in our financial statements.

We regularly provide full and transparent information to all shareholders. We maintain an ongoing and constructive dialogue with them through diverse communication channels. We are attentive to their expectations, concerns and questions on any subject.

Total's projects can be exposed to specific risks in terms of Human Rights or integrity. How do you make sure you can apply the principles set out in your Code of Conduct?

TOTAL'S ANSWER:
Prior to any new investment in a challenging environment, we ensure that we can comply with applicable legislation and regulations, and that we can run our operations in line with our Code of Conduct.

To help our employees respect our standards, we provide training and we have published several standards and documents like the Total Human Rights Guide and the Business Integrity Guide. To ensure compliance with our Code of Conduct, we ask an independent third party to carry out ethical assessments of our operations. We also take part in international initiatives, for example the Extractive Industries Transparency Initiative and the Voluntary Principles on Security and Human Rights.

THE GROUP
ETHICS COMMITTEE

The Group Ethics Committee is responsible for the general oversight of the implementation of the Code of Conduct

COMPOSITION AND APPOINTMENT OF COMMITTEE MEMBERS

The Ethics Committee comprises a Chairman, appointed by the CEO and members from the main activities of the Group. Members are appointed by the Executive Committee on the recommendation of the Chairman of the Ethics Committee.

The members are Group employees who collectively have broad experience of the Group's different businesses and have demonstrated the necessary independence and freedom of judgment.

The Chairman of the Group Ethics Committee reports directly to the Chief Executive Officer.

SCOPE OF WORK

THE GROUP ETHICS COMMITTEE

- Ensures that the Code of Conduct is widely communicated and proposes any amendments it considers necessary.
- Listens to, supports and advises employees and other stakeholders.
- Makes recommendations to management on all ethical issues and draws their attention to any risks that activities could be challenged on ethical grounds.

The Ethics Committee may request the assistance of any Group resources in carrying out its responsibilities, and works particularly closely with the Group Legal Department.

- Can review, as necessary, communications relating to ethics in the Group, in particular with international, governmental and non-governmental organizations.
- Assists on request in preparing any specific local practices or policies.
- Advises the training departments on incorporating presentations of the Code of Conduct into training programs, in particular those for new recruits and management.

The Committee is entitled to visit any Group facility or subsidiary. Ethical assessments are performed by third parties to check the implementation of our business principles and the Chairman of the Group Ethics Committee follows-up on the results of these evaluations.

The Chairman of the Group Ethics Committee reports regularly to the Executive Committee and to the Governance & Ethics Committee of the Board of Directors.

SPEAKING-UP

We encourage a culture of openness where you can raise concerns and views concerning our Code of Conduct, confident that you will be supported by management

We are all responsible for ensuring that the Code of Conduct is applied. We understand that you may need advice in order to make sure you are compliant with the Code of Conduct.

If you need guidance on any topic related to the Code of Conduct, contacting your line manager is usually the best option. If you feel more comfortable, ask the local Human Resources or other managers.

All members of the Ethics Committee are committed to protect confidentiality and personal data. We will not tolerate retaliation against employees who raise concerns in good faith. External stakeholders can also contact the Ethics Committee for any questions on the implementation of our Code of Conduct.

How can I decide if a situation raises ethical issues?

TOTAL'S ANSWER:

When facing a question about the respect of our values, you can first ask yourself.

Is the action/decision legal?
Is it free from personal interest?
Does it have a negative impact on stakeholders?
How would it read in a newspaper article?
How would it be judged in five years' time?

You can also read our guides and other documents (see the section "To find out more").

You can always seek advice by contacting the Ethics Committee:

ethics@total.com

TO FIND
OUT MORE
—
TOTAL RESOURCES

The Total ethics policies are presented on the Group intranet site for employees and on the Corporate website **www.total.com**

HUMAN RIGHTS GUIDE

This Guide facilitates the understanding and application of Total's Human Rights policy. It complements the Code of Conduct and other resources used by Total in its due diligence process.

BUSINESS INTEGRITY GUIDE

This Guide spells out the Group's integrity standards which are expressed as five key priorities: the fight against corruption, the rejection of fraudulent practices, the declaration of conflicts of interest, the respect of competition law and fulfilling commitments.

CHARTERS

MAIN POLICIES, DIRECTIVES AND RULES

SIGNATURE OF A GLOBAL AGREEMENT WITH INDUSTRIALL GLOBAL UNION

In January 2015, Total strengthened its commitment as a responsible employer by signing a global agreement with IndustriALL Global Union. This global union represents 50 million workers in 140 countries.

http://www.total.com/sites/default/files/atoms/files/total_global_agreement_va.pdf

TO FIND
OUT MORE
—
EXTERNAL RESOURCES

Consult the websites of these international organizations to find out more about Total's commitments

THE GLOBAL COMPACT
WE SUPPORT

The UN Global Compact is an initiative that brings together thousands of businesses that are invited to issue an annual Communication on Progress related to ten principles on Human Rights, labor standards, the environment and the fight against corruption.

www.unglobalcompact.org

United Nations Guiding Principles on Business and Human Rights: The UN Human Rights Council has endorsed in 2011 a set of principles that clarify the roles and responsibilities of States and companies on business and Human Rights issues.

www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf

United Nations Guiding Principles on Business and Human Rights

ILO
International Labour Organization

The ILO is a UN agency that issues international conventions and standards to promote rights at work, encourage decent employment opportunities, enhance social protection and strengthen dialogue on work-related issues.

www.ilo.org/global/lang--en/index.htm

VOLUNTARY PRINCIPLES ON SECURITY & HUMAN RIGHTS

The VPSHR is an initiative that brings together extractive industries, States and civil society representatives to provide concrete guidance regarding risk assessment and interactions with public and private security forces.

www.voluntaryprinciples.org

The EITI is an initiative that gathers extractive industries, states and civil society representatives to increase the transparency of transactions between governments and the oil and mining industries.

www.eiti.org

EITI Extractive Industries Transparency Initiative

OECD

The OECD Guidelines for Multinational Enterprises are a set of recommendations for companies in areas such as employment, Human Rights, environment, information disclosure, combating bribery, competition, and taxation. The Guidelines have been updated several times since they were first adopted in 1976. The last review was approved in 2011.

www.oecd.org/daf/inv/mne/48004323.pdf

Created in 1974, the Global Oil & Gas Industry Association for Environmental and Social Issues helps the oil and gas industry to improve its social and environmental performance by developing, promoting and sharing best practices. Through its members-led working groups, a number of tools have been published, for instance the Human Rights Training Toolkit or practical guides on how to integrate Human Rights into environmental, social and health impacts assessments or concerning Human Rights due diligence.

www.ipieca.org

IPIECA

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TOTAL
COMMITTED TO BETTER ENERGY

HUMAN RIGHTS
GUIDE

HUMAN RIGHTS

Total is a global integrated energy producer and provider, a leading international oil and gas company, and the world's second-ranked solar energy operator with SunPower. Our 100,000 employees are committed to better energy that is safer, cleaner, more efficient, more innovative and accessible to as many people as possible. As a responsible corporate citizen, we focus on ensuring that our operations in more than 130 countries worldwide consistently deliver economic, social and environmental benefits. **total.com**

Note that in case of discrepancies between the original English text of this Guide and the translated documents the English text will prevail.

Published in December 2015

MESSAGE
FROM THE CEO

"As stated in our Code of Conduct, respect for Human Rights standards is one of our three priority business principles"

The Group is committed to respect internationally recognized Human Rights standards in the countries where we work. In doing so we focus on the following important issues:

- **RESPECT FOR HUMAN RIGHTS IN THE WORKPLACE** for our employees and promotion of these principles in our supply chain, in particular by preventing child and forced labor, avoiding discrimination, observing workers rights and by respecting freedom of expression.
- **ADDRESSING THE POTENTIAL IMPACTS OF OUR OPERATIONS ON LOCAL COMMUNITIES**, in particular on the right to an adequate standard of living, such as the right to water and housing, and by providing access to remedy for unavoidable adverse impacts related to our operations.
- **ENSURING THAT THE SECURITY OF OUR PEOPLE** and facilities is managed in a responsible way and that the rights of neighboring communities are respected; the management of security risks, including the use of government security forces and private security providers, should be in line with applicable international standards related to the proportionate use of force.

Integrating respect for Human Rights at an early stage in our management processes can contribute to avoiding potential abuse, and help to sustain a mutually beneficial relationship with our stakeholders. It can prevent delays in the execution of the Group's operations and improve our Business Units' performance.

It is everybody's concern and it is part of our commitment to better energy.

Patrick POUYANNE
Chief Executive Officer

THE GROUP'S HUMAN RIGHTS **IN PRACTICE**

OBJECTIVES OF THIS GUIDE

This guide complements the Group's Code of Conduct. It provides guidance in case of questions and concerns related to Human Rights issues.

INTENDED USERS

This guide is primarily for internal use but is also made available to our external stakeholders to provide guidelines for everyone and to make our expectations clear.

RESPECT FOR HUMAN RIGHTS IS EVERYBODY'S CONCERN.

- **Managers** have specific responsibilities. They are accountable for making respect for Human Rights part of their business decisions. Practical tools, such as the Human Rights compliance assessment "Quick Check", are available to help them in this task *(see p.13-14).*
- **We expect our suppliers and contractors** to adhere to standards that are equivalent to ours, in particular towards their employees, and to make ongoing efforts so that their own suppliers and subcontractors also respect these principles.
- **As far as non-operated joint ventures are concerned** we make ongoing efforts so that the operating party applies equivalent principles to ours.

SEEKING ADVICE

This guide focuses on some examples, but will not cover every situation that we may encounter in our day to day operations.

If you need guidance on any topic related to Human Rights, speak to your line manager and consult the experts within the Group, such as the Ethics and Human Rights Unit of the Group's Legal Division, the Group's Sustainable Development Division, and the Group's Security Division.

Employees and external stakeholders can seek advice at all times by contacting the Ethics Committee: ***ethics@total.com***

The Ethics Committee

THE GROUP'S **HUMAN RIGHTS COMMITMENTS**

Human Rights are generally defined as basic standards of treatment to which all people are entitled.

As stated in our Code of Conduct, the Group commits to respect internationally recognized Human Rights standards and in particular:

- **The key conventions of the International Labor Organization (ILO)**

The ILO is a United Nations (UN) agency that issues international conventions to protect and respect rights at work. *(See Topic 1, p.16)*

- **The Voluntary Principles on Security and Human Rights (The "Voluntary Principles")**

The Voluntary Principles is an initiative that provides concrete guidance regarding risk assessment and Business units' interactions with government security forces and private security providers. *(See Topic 3, p.35)*

- **The United Nations Guiding Principles on Business and Human Rights (The "Guiding Principles")**

Endorsed by the UN in 2011, this set of principles clarifies the roles and responsibilities of States and Business units on Human Rights issues. *(See p.49)*

BOX 1

Practical examples of Human Rights issues at stake

(These examples are adapted from a workshop organized by Shift Project Ltd. with the Group's lawyers and business development personnel. Shift is a leading centre of expertise on the Guiding Principles).

EXAMPLES OF SITUATIONS AT RISK	HUMAN RIGHTS AT STAKE
▶ The Security providers have detained or threatened members of surrounding communities.	▶ Right to freedom of movement; right to life; right to health.
▶ The permit to build a pipeline has been legally granted but the pipeline will result in the surrounding communities walking a significantly greater distance to access sufficient water for their daily needs. This may impact women in this location severely if they are primarily responsible for gathering water for the family.	▶ Rights to water and sanitation; right to health; right to an adequate standard of living; women's rights.
▶ Contract workers are employed by a labor agency that withholds the workers' salaries in order to offset them against the significant fees it charged to secure employment.	▶ Right not to be subjected to slavery, servitude or forced labor; right to freedom of movement.

The Guiding Principles are based on the following three pillars

Within their territory, States must protect against Human Rights abuse by third parties, including Business units.

This requires taking appropriate steps to prevent, investigate, punish and redress such abuse.

This means that Business units should avoid infringing on the Human Rights of others, and should address adverse Human Rights impacts with which they are involved.

To meet their responsibility to respect Human Rights, Business units should have in place:

a. A policy commitment.

b. A Human Rights due diligence process.

c. Processes to enable the remediation of any adverse Human Rights impacts they cause or to which they contribute.

a. States must take appropriate steps to ensure that when abuses occur within their territory those affected have access to effective remedy.

b. Business units should put in place effective operational-level grievance mechanisms for individuals and communities who may be adversely impacted.

For example, if a sacred cemetery is discovered during the construction phase of a plant, the local communities should be consulted on project impacts. In this situation, respecting local people's Human Rights could mean selecting another location for the project *(See Topic 2, p.26)*.

To meet our responsibility to respect Human Rights, the Group has adopted a Human Rights approach articulated on policy commitments, due diligence, remediation processess, and grievance mechanisms.

THE GROUP'S HUMAN RIGHTS APPROACH

The Group's Human Rights approach is based on:
The Code of Conduct - Training programmes
Internal and external experts - Assessment processes

THE CODE OF CONDUCT

The Group's Code of Conduct is based on business principles that are developed into Ethics and Human Rights policies and agreements. (e.g., The Global Agreement with IndustriALL Global Union; the Group's Societal Policy; the Group's Security Policy, etc.) *(See the Group's resources section below, p.44)*.

The Group's Code of Conduct recognizes that the following actions are critical for the success of our operations:

- **Engagement with stakeholders** in matters related to our operations and responsiveness to concerns expressed by them.
- **Expressing to governments** our belief in the importance of respecting Human Rights when necessary, whilst respecting their sovereignty.
- **Going beyond legal compliance;** when there is a difference between a local law and our Code of Conduct, we seek to apply the higher standard. *(See Topic 1, Box 3, 19 for concrete examples and appropriate recommendations)*

As stated in the Human Rights Strategic Roadmap we integrate respect for Human Rights into our risk and impact management processes, including but not limited to new country entry evaluations, acquisitions and divestitures procedures, environmental and social baselines and impact assessments, purchasing systems, etc. ***(Intranet Human Rights section)***

Any breach of our Code of Conduct business principles can lead to internal and/or legal sanctions. The Chairman of the Ethics Committee reports regularly to the Executive Committee and to the Governance & Ethics Committee of the Board of Directors on the Code of Conduct implementation.

TRAINING PROGRAMMES

Dedicated communication channels, e-learning and training sessions on Ethics and Human Rights are available for the Group's employees and managers. Awareness-raising sessions for external stakeholders are also available in some contexts for specific issues, such as responsible security. *(See Topic 3, p.35)*

INTERNAL AND EXTERNAL EXPERTS

The Group relies on in-house experts and qualified third parties to support the integration of Ethics and Human Rights issues into our management processes, and to assist Business units when facing complex situations. *(See in particular the Group's dedicated organization on Human Rights and the Group's contribution to international initiatives p.43)*

ASSESSMENT AND HUMAN RIGHTS PROCESSES AND RESOURCES

Human Rights due diligence processes are good industry practices to manage potential issues and impacts associated with business operations. *(See, Box 2, graphic illustrating a Human Rights due diligence process)*

BOX 2

Practical examples due diligence process

Graphic concept courtesy of Shift Project Ltd.

In line with the Guiding Principles, Business units should:

ASSESS

Conduct assessments to identify, prevent or mitigate potential Human Rights impacts that may be caused directly by the Business unit's projects or operations, or by project partners and suppliers *(examples of assessments processes and resources available, see below and p.14)*.

INTEGRATE AND ACT

Implement effective measures to address any impacts that have been identified, including by having in place a grievance mechanism to address complaints lodged by stakeholders, and integrate lessons learnt.

TRACK

Adapt processes to manage any Human Rights impacts that have been identified, including unanticipated impacts, and monitor and track the effectiveness of responses.

COMMUNICATE

Explain to stakeholders how these issues are being addressed, including through public reporting on due diligence steps taken.

Ethics and Human Rights risks and impacts in the countries where we operate are assessed by the Group's Business units through various processes. Examples of such processes are described below.

CDA COLLABORATIVE LEARNING PROJECTS (CDA) SOCIETAL ASSESSMENTS

To analyse and improve the impacts of our projects on local communities and external stakeholders, the Group may engage CDA, an independent US non-profit organisation, expert in community relations and company-community conflict. CDA has a programme that helps extractive companies identify and manage **the impacts of their activities** in complex regions or conflict zones. CDA is working with many major oil and gas and mining companies as well as with the United Nations and civil society representatives.

The Group supports this programme, which is of great value for our own deliberations. For example CDA case studies have been carried out on the Group's Business units in Myanmar, Nigeria, Bolivia, Uganda and Argentina. The final reports are posted and available on CDA's website.

(To access reports, go to ☛ www.cdacollaborative.org)

ETHICAL ASSESSMENTS

An external assessment process of the application and understanding of the Code of Conduct was drawn up in partnership with a service provider, GoodCorporation, specialized in ethical issues.

This assessment process is based on a review of a number of important "evidence points" on Human Rights, labor law, fair competition rules, and other ethics-related issues. A large number of our Business units exposed to ethical risks have been assessed, with appropriate action plans and follow up actions defined. The objective of these assessments is to raise awareness, build ethical leadership, and review the ethical processes in place locally. The assessors also interview employees, customers, business partners, and other stakeholders to evaluate local perceptions of the way these issues are managed by the Business units.

A final report is issued, and a progress review is planned a few months after the evaluation, to support the Business units in taking on board key recommendations.

The Chairman of the Ethics Committee and the Ethics and Human Rights Unit of the Group Legal Division validate this process to provide a "tone from the top" and future technical support needed by the Business units evaluated.

ASSESSMENT OF HUMAN RIGHTS COMPLIANCE IN BUSINESS UNITS

The Danish Institute for Human Rights (The "Danish Institute") is an independent National Human Rights Institution mandated to promote and protect Human Rights. As part of its work, the Danish Institute partners with Business units and other stakeholders to promote business respect for Human Rights and the implementation of due diligence, for example, through integrating Human Rights into Business units management systems, capacity building and training, and Human Rights risk and impact assessment.

THE HUMAN RIGHTS COMPLIANCE ASSESSMENT (HRCA)

The Human Rights Compliance Assessment (HRCA), a tool developed by the Danish Institute to assist Business units in identifying and addressing Human Rights risks in Business units operations, was adapted to the Group's specific context and needs. It is implemented in some complex operating environments, either as a standalone HRCA assessment or as a joint Human Rights and Ethics Assessment in coordination with the Group's ethical assessments mentioned above.

A shorter version of the tool, the "HRCA Quick Check" gives an overview of common Business and Human Rights risks at stake. The tool is available in many languages, including English, Chinese, Spanish, Danish, and Dutch.

(See more information)

THE IMPORTANT **HUMAN RIGHTS ISSUES** FOR THE GROUP

The Group has identified three important Human Rights issues related to the risks and impacts of our operations which are described in this guide.

1. Human Rights in the workplace
Human Rights concern not only our employees, but also the employees of our suppliers, contractors, business partners and their subcontractors. ***(Internal IPO Shanghai Video)***

2. Human Rights and local communities
Owing to the footprint our activities have in the countries where we work, special attention must be paid to the rights of local communities.
(Internal Myanmar Video)

3. Human Rights and security
Security involves protective measures taken against threats to both individuals and property. Correct management of Human Rights issues in line with the security of our projects ensures the Business units are better integrated into the local environments, and the Human Rights of employees and local communities are respected.
(Internal Uganda Video)

For each of these topics, this guide provides guidelines and real life examples of commonly encountered situations where we operate.

TOPIC 1
HUMAN RIGHTS IN THE WORKPLACE

The Group pays special attention to employees' working conditions, respect for individuals and their privacy, a discrimination-free environment and health and safety, irrespective of the political and social context or any complexities encountered in the countries where we operate.

In January 2015, the Group signed a global agreement with IndustriALL Global Union (The "Global Agreement"), which covers respect for Human Rights in the workplace. IndustriALL Global Union represents over 50 million workers in the mining, energy and industry sectors.

The Global Agreement applies to the Business units in which the Group holds more than 50% of the share capital. Where the Group is present but does not control the operations, we make ongoing efforts to promote the principles of this agreement. We also make sure that the Global Agreement's principles related to the promotion of Human Rights and health and safety in the workplace are communicated and promoted among our contractors and suppliers. If these principles are not respected, we take the necessary actions, which may go as far as terminating the contract.

A follow up committee (the "FAIR Committee") has been set up to check the implementation of the Global Agreement. *(See the Group's resources session, p.44)*

As stated in our Code of Conduct:

- The Group's employees must respect Human Rights.
- We expect our suppliers and contractors to adhere to the principles specified in the Group's Fundamental Principles on Purchasing or to equivalent principles, and to make ongoing efforts so that their own suppliers and subcontractors respect equivalent principles.
- As far as non-operated joint ventures are concerned we make ongoing efforts so that the operator applies equivalent Ethics and Human Rights principles to ours.

Within the Group, the Human Resources, Legal, and Purchasing/Contract & Procurement Divisions have the primary responsibilities for monitoring these issues.

PRINCIPLES AND EXAMPLES OF HUMAN RIGHTS

Labor rights are protected by many international conventions, including the eight key International Labor Organization (ILO) conventions which focus on forced labor, child labor, non-discrimination, freedom of association and collective bargaining ***(☛ ILO core conventions website)***.

Human Rights and labor issues at stake in the workplace are decent working conditions and remuneration, prohibition of forced labor and child labor *(See p.22 for a Focus on Child Labor)*, workplace health and safety, the establishment of an employment contract, working hours, rest and parental leave: ensuring that the workplace is free from discrimination and harassment; freedom of speech, association and collective bargaining, freedom of thought, conscience and religion, respect for private life and personal data.

AVOIDING DISCRIMINATION

Diversity is a decisive factor for the Group's competitiveness and attractiveness, and for our ability to innovate and adapt.

Any form of discrimination, as characterised by unfair and unfavourable treatment of certain individuals, because of their origin, gender, age, disability, sexual orientation and gender identity, or affiliation with a political, religious, union organization or minority group is unacceptable.

Discrimination negatively impacts a person's employment opportunities and results in unequal treatment in the workplace.

To comply with international and national law on anti-discrimination, any form of discrimination in the workplace, in particular against vulnerable employees (e.g., young workers; pregnant women, etc.), must be prevented.

Please refer to Box 3 (p.19): Respect for Human Rights goes beyond legal compliance

All workers must be treated fairly with respect to all policies, conditions and benefits of employment, such as hiring, advancement, placement, training, remuneration and dismissals.

This means that:

- All employment-related decisions should be based on relevant and objective factors (such as merit, experience, tasks, skills, etc), and consistent procedures should be followed in decision-making processes.
- Employee compensation should be based on the concept of equal work for equal value, and differences in rates of remuneration between workers must correlate specifically to objective job criteria and performance.

Practically, when benefits are offered (such as health insurance or pension schemes) to spouses and dependents of employees, these benefits are also extended to same sex couples and employees with adopted children.

For example, prohibiting candidates from working in Group's Business units based on criteria such as appearance (e.g., high body mass index, piercings, long hair, etc.), gender, and disability is not allowed. Any limitation for objective reasons (e.g., safety) should be strictly documented.

The implementation of local legal requirements or affirmative action by a Business unit on matters such as local content policies should be in line with the applicable local law and Human Rights standards.

For example, local content recruitment processes, hiring of local businesses for works and/or services, community investment decisions etc, should be based on clear, objective, transparent and fair criteria. For practical examples of "Do's and Don'ts" in the supply chain to consider in this domain, please check the Sustainable Purchasing Awareness Card on Discrimination ***(☛ SPAC)***.

BOX 3

Respect for Human Rights goes beyond legal compliance,
as illustrated in the example below:

In some countries, Business units may be required by law or public officials to withhold migrant workers' Identification Documents. In such circumstances, to avoid forced labor, restriction on freedom of movement or discriminatory practices - without being in breach of the local law - dedicated procedures should be put in place to make sure that the workers agree to leave their passports, and in particular can have them back at any time.

AVOIDING AND ADDRESSING ANY FORM OF HARASSMENT

Harassment is defined as a repeated action of a harmful, cruel, threatening or humiliating nature directed at one individual or group of individuals. This offence constitutes an infringement of human dignity and of the right to fair and decent working conditions.

Sexual harassment and other forms of harassment and discrimination in the workplace play a significant role in inhibiting in particular the advancement of ethnic or gender minorities and women in the workplace. Therefore, a working environment where people are treated with respect and dignity and without fear of intimidation or harassment should be put in place.

To protect workers against harassment from both co-workers and management prevention policies, open communication, training and a speak-up climate to allow workers to report any incidents of harassment to a complaints mechanism, should also be implemented and ensured.

If a complaint of harassment is made, it is of utmost importance for managers to respond to the complaint in an efficient, timely and responsible manner, and ensure that the employee does not suffer any retaliation as a result of the complaint made in good faith.

FREEDOM OF OPINION AND EXPRESSION, FREEDOM OF THOUGHT, CONSCIENCE AND RELIGION

By virtue of internationally recognized Human Rights standards, every individual has the right to freedom of opinion and expression. The right to freedom of opinion guarantees that no one should be discriminated against due to his/her opinions.

All individuals have the right to freedom of expression, which includes the freedom to seek, receive and disseminate information, provided that all aspects of the Group's Code of Conduct are respected.

Maintaining a work environment that is culturally respectful and sensitive to the rights and needs of all employees is critical, in particular to attract talented people where we work.

Any restrictions on cultural or religious practices in the workplace must be applied in a non-discriminatory manner; it should also be reasonable (e.g., necessary for the safety of employees or the operations of the company) and should not be used in order to attempt to restrict certain beliefs or viewpoints over others.

Employees may take part as individuals in political activities, provided that they clearly indicate that they do not represent the Group, and that they inform their manager if their political activities might create a conflict of interest.

COLLECTIVE BARGAINING AND FREEDOM OF ASSOCIATION

Collective bargaining is one form of social dialogue. It refers to a process whereby employee representatives and employers, or their representatives, negotiate the actual application of employment terms and working conditions (salary, working time, vocational training, welfare, etc.) and enter into mutually acceptable collective agreements.

Freedom of association represents the workforce's right to form and join organisations to promote and protect their interests in the workplace.

Collective bargaining and freedom of association help to ensure fair employment terms and working conditions.

Unfair communication from a Business unit which is intended to influence employees' decisions with regard to union representation and/or membership is prohibited.

In some regions, the right to unionize and bargain collectively may be restricted. Under such circumstances, other forms of workers meetings and independent representation should be implemented by the Group's Business units (e.g., ensuring that informal channels of communication between management and employees concerning work related issues are in place with identified contacts).

ACTIONS AND RECOMMENDATIONS

In the event of alleged harassment or discrimination or any other infringement of Human Rights linked to the working environment, the Ethics Committee is available to all Group employees and other stakeholders.

Special contact points are also available to employees:

- **Line management:** the immediate superior and line management are tasked in particular to identify behaviour of employees that is contrary to the Code of Conduct, and to act where there are issues. Managers are also required to protect confidentiality and personal data.
- **Human Resources and Legal Divisions** play a key role when informed of an infringement, and may listen to and advise individuals. The occupational health practitioner and employees' representatives can also be consulted when needed.

FOCUS

PROHIBITION ON FORCED LABOR AND CHILD LABOR

- **Forced labor** means any work or service exacted from any individual under the threat of some penalty or punishment and for which the individual did not volunteer. In particular, it is characterised by a restriction on freedom of movement, coercion of the worker and lack of free consent from the worker.

  In accordance with international guidelines and standards, each Business unit must ensure that its employees have **freely** chosen their jobs and they are free to leave them under their terms of employment.

  For instance, requesting deposit guarantees from employees to have access to safety protection equipment or other material is not allowed. Every employment contract must state the component parts of the job (salary, working conditions, working time and especially the issue of overtime, etc.). Business units must pay fair and equitable remuneration, regularly and personally to each of their employees.

- The Group demonstrates special vigilance regarding the **prevention of child labor,** in particular by supporting initiatives aimed at its elimination. Child labor undermines children's dignity and is harmful to their schooling, their health and their physical and intellectual development.

  In accordance with the International Labor Organization (ILO) standards, the hiring of employees aged under 15 is prohibited. In addition, any hiring must also comply with local laws that set a higher minimum working age.

  In line with the ILO standards, the minimum age for admission to any kind of hazardous work (e.g., underground work or handling hazardous goods) which, by its very nature or by virtue of the conditions under which it is carried out, is liable to compromise the health, safety or moral well-being of adolescents, **must not be less than 18 years of age.**

The Group applies these provisions universally, including in countries where these ILO standards have not been implemented into national law.

Should incidents of child labor be discovered for example at the site of one of our commercial or industrial partners, suppliers or service providers, it is advisable in the first instance to ensure that the children are removed from the position or the workplace. Their salary may continue to be paid to them for a set period pending the putting in place of an alternative solution.

To this end, remedial measures, such as, encouraging the replacement of children with adult members of their families, or developing a cooperation scheme with relevant international organizations or local NGOs, should be put in place. In the event that the employer concerned refuses to make any commitments or to comply with the remedial measures, the Group may suspend or terminate contractual relations.

CASE STUDIES

These following scenarios illustrate the application of the Group's **Human Rights in the workplace** approach, including practical considerations to prevent abuse and safeguard the Group's reputation:

I run the Sales Division of a Business unit in a country where women are forbidden to drive. I am looking to recruit a sales representative. A female employee has applied.

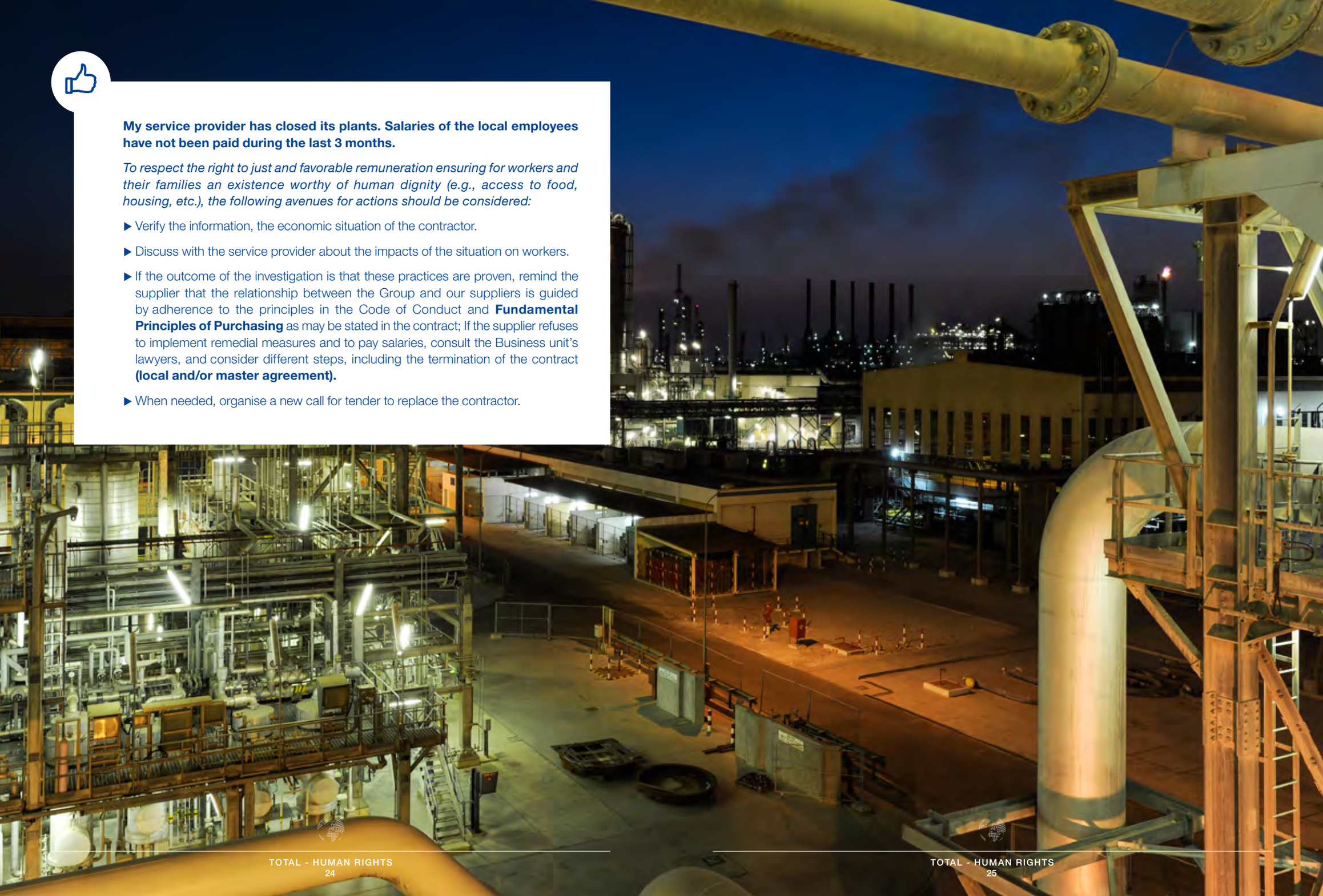
To avoid discriminatory practices, the following avenues for actions should be considered:

- Supply full and transparent information to all employees on the principles in the Code of Conduct.
- Explain that the Group cannot adopt practices running counter to national law but will explore alternative ways to apply our Code of Conduct.
- Consider facilities to adapt the job role (meetings organised remotely using conference calls, use of busses).
- If applicable, offer employees equivalent positions with identical career development prospects.

My service provider has closed its plants. Salaries of the local employees have not been paid during the last 3 months.

To respect the right to just and favorable remuneration ensuring for workers and their families an existence worthy of human dignity (e.g., access to food, housing, etc.), the following avenues for actions should be considered:

- Verify the information, the economic situation of the contractor.
- Discuss with the service provider about the impacts of the situation on workers.
- If the outcome of the investigation is that these practices are proven, remind the supplier that the relationship between the Group and our suppliers is guided by adherence to the principles in the Code of Conduct and **Fundamental Principles of Purchasing** as may be stated in the contract; If the supplier refuses to implement remedial measures and to pay salaries, consult the Business unit's lawyers, and consider different steps, including the termination of the contract **(local and/or master agreement).**
- When needed, organise a new call for tender to replace the contractor.



TOPIC 2
HUMAN RIGHTS AND LOCAL COMMUNITIES

The Group undertakes activities that have social and environmental impacts at the local level. The Group acknowledges our corporate responsibility, and pays special attention to managing these impacts which can strengthen our Business units' social licence to operate.

In line with internationally recognized Human Rights standards, Business units should:

1. **Engage with stakeholders on a regular basis,**
2. **Avoid, minimize, mitigate and remedy negative impacts on local communities related to their operations.**

These two axioms are included in the Group's Societal Policy:

1. The Group seeks to establish dialogue with affected communities at a very early stage, and maintain constructive relationships with them and other stakeholders. ***(☛ SRM+)*** Regular and meaningful consultation, transparency regarding operational activities, listening to stakeholder concerns, needs and perceptions, consulting communities about impacts and mitigation measures are all critical to establishing and maintaining constructive relationships with stakeholders throughout the life cycle of our operations. The Group has developed internal guidance and a set of principles to support staff participating in stakeholder engagement.
2. Through due diligence and other processes, the Group respects the rights of communities by **identifying, and addressing** impacts, particularly on their environment and way of life, and where appropriate **by providing remedy for adverse impacts that could not be avoided**. The Group's Business units design and implement effective local grievance mechanisms and remediation processes. Access to these mechanisms for vulnerable individuals and groups (e.g., illiterate people, minorities, etc.) should be ensured.

Our responses to Human Rights issues with local communities are coordinated by the Group's societal teams working closely with the security and environment teams.

EXAMPLES OF HUMAN RIGHTS AND PRINCIPLES

ENVIRONMENTAL PROTECTION

The Rio Declaration (1992) defines the right to a healthy environment of a quality that permits a life of dignity and well-being. This right includes, for example, the right to be informed of the risks connected to the Business units' activities and protection against possible nuisances (pollution, odours, noise, etc.).

Access to clean water: The United Nations General Assembly explicitly recognized the Human Right to water and sanitation and acknowledged that clean drinking water and sanitation are essential to the realization of all Human Rights ***(☛ Resolution 64/292)***. The United Nations Committee on Economic, Social and Cultural Rights also defined the right to water as the right of everyone to sufficient, safe, acceptable and physically accessible and affordable water for personal and domestic use ***(☛ General Comment No. 15 on the right to water)***.

PROPERTY RIGHTS, ACCESS TO LAND AND CULTURAL HERITAGE

Property rights are covered by Article 17 of the Universal Declaration of Human Rights, to which the Group's Code of Conduct refers:

1. **"Everyone has the right to own property alone as well as in association with others.**
2. **No one shall be arbitrarily deprived of his property.»**

Access to land: Business units' operations may have a specific impact on land and property rights, as temporary or permanent land access may be necessary. Depending on the specific societal context such as population density, land occupation and use, livelihood patterns etc. there may be negative impacts on livelihoods including the possibility of economic and/or physical displacement. The Group applies international best practice in its land access and acquisition process in order to avoid or minimize Human Rights impacts. This includes avoiding any physical displacement whenever possible, establishing clear and transparent procedures in consultation with affected people, proposing replacement land of equal quality whenever possible, providing support for livelihood restoration, ensuring people are compensated appropriately and by paying specific attention to vulnerable people and households.

Cultural heritage: Certain territories may have essential value in terms of cultural and natural heritage. Cultural and natural heritage includes sites that have architectural, archaeological, artistic, historical and unique natural environmental features that embody cultural values and hold particular historical, anthropological, artistic or scientific values. Cultural heritage may not only have significant value to the local community and users of the cultural heritage, but may also have universal value from the point of view of history, art or science. Before accessing land, the potential impacts both on natural and cultural heritage are identified. Consultation with specialists such as archeologists, local communities and local NGOs who are knowledgeable on the local heritage of the land is undertaken. The perspectives of the local community who have used and/or use the tangible or intangible cultural heritage to develop and preserve their cultural identity should be taken into account.

THE RIGHT TO AN ADEQUATE STANDARD OF LIVING

In accordance with internationally recognized Human Rights standards, the right **to an adequate standard of living** is understood to establish a minimum entitlement to food, clothing and housing. ***(☛ Article 25 of the Universal Declaration of Human Rights (UDHR) and ☛ Article 11 of the International Covenant on Economic, Social and Cultural Rights).***

Business units' operations may require intensive use of resources such as water, and of other infrastructure and essential services like sewage treatment which can place them under strain. In such situations, Business units should investigate to what extent the local community will be affected by their activities in order to ensure that the operation's use of locally provided resources does not negatively affect the local population.

Stakeholder consultations should be held and the local authorities responsible, for example for water, should also be consulted so that a plan is put in place before initiating operations. Particular attention should be paid to identifying and including disenfranchised individuals in the community, such as women, persons of disadvantaged-caste, ethnic origins, and immigrants. The needs of these individuals and their dependence on local natural resources might not always be taken into account by government and local leaders during negotiations with the Business units over land usage and natural resources.

The Group's partnership with International Alert in the Democratic Republic of Congo (DRC) The Group commissioned a UK based NGO - International Alert (IA) - to conduct an impact study focusing on Human Rights in the DRC. IA relies locally on a network of local representatives. Even though the Group had not yet conducted any operations in the area in question, 300 people – a quarter of whom were women – were consulted by IA. The aim of this study was to enable us to better understand the potentially negative impacts of our operations on Human Rights and maximize any positive impacts. Based on these interviews, IA proposed a list of concrete actions to mitigate the impacts identified. For example, putting in place a fair recruitment process accessible to all affected communities which is critical to avoid exacerbating existing ethnic conflicts. This report is available online (☛ ***IA site***).

ACCESS TO REMEDY

Anyone adversely affected by our Business units' activities should have access to a grievance mechanism where they can report any complaint about our operations, without discrimination or fear of repercussion.

Effective grievance mechanisms should be put in place by Business units. The grievance procedure should be designed in collaboration with representatives from the local community to reflect their needs and interests and to create ownership and trust in this mechanism.

To be effective, grievance mechanisms should be accessible to, and understood by, local people and communities including isolated and/or vulnerable groups and illiterate people. The mechanism should be well known, transparent (e.g., the complainant is informed of the progress in the management of his/her complaint), and based on participation and dialogue with the complainant and with local communities. It should also be compliant with local laws and internationally recognized Human Rights, and a source of continuous learning.

Any individual or organization filing a grievance should receive notification of the findings regarding the particular complaint and whether corrective action will be taken.

If the individual or organization disagrees with the decision, he or she should have recourse to some reasonable form of dispute resolution process to settle the claim.

EXPLORATION & PRODUCTION

Exploration & Production Business units are setting up community grievance mechanisms for local communities impacted by industrial projects. A guide is available, inspired by the Guiding Principles, that covers this procedure for the handling of grievances. This procedure is an integral part of our Business unit's societal management plan and represents a concrete expression of the first requirement of the Group's societal policy.

MARKETING & SERVICES

Marketing & Services Business segment published a brochure designed to raise awareness of grievance management issues across operating sites. The brochures helped the operating sites to get familiar with this subject and introduce their own systems for the handling of grievances separate from those used for dealing with commercial complaints.

ACTIONS AND RECOMMENDATIONS

As stated in the Group's Societal policy, our Business units should engage with local communities and other stakeholders, and manage their impacts.

ENGAGEMENT WITH STAKEHOLDERS

The Group commits to developing **transparent and constructive relationships with our stakeholders**. Business units should consult their stakeholders regularly to gain a clearer understanding of their expectations and concerns, and to establish future possibilities for meaningful engagement. Specific tools have also been developed internally to map and interview our stakeholders, such as "Stakeholder Relationship Management +" (SRM+) *(see below the Group's resources session, p.44)*.

MANAGEMENT OF IMPACTS

The Group seeks to reduce the negative socio-economic impacts related to our operations. Business units are required to **assess societal risks and opportunities**, in particular for any Greenfield industrial project. There must be an in-depth analysis of the societal context (Social Baseline Survey) and an evaluation of the project's potential socio-economic impacts (Social Impact Assessment), and related avoidance and mitigation measures.

These evaluations are often carried out jointly with Environmental Baselines and Impact Assessments.

IPIECA Guide See the IPIECA Guide "Integrating Human Rights into Environmental and Social and Health Impact Assessments" for examples of good practices and case studies.

REFINING & CHEMICALS

Refining & Chemicals' operations have environmental and social impacts at the local level, in particular in urbanized zones. Refineries and petrochemicals sites are certified ISO 14001 and have in place grievance mechanisms that ensure traceability and feedback from stakeholders. Structured voluntary committees are available in some countries for local communities, regional administration, and sites representatives, to facilitate dialogue and consultation, and address potential concerns related to our activities (Community Advisory Panels - CAP - in the USA; equivalent structured committees in France and Belgium).

FOCUS

INDIGENOUS PEOPLES

There is no universal definition of indigenous peoples. In fact, the international community has not adopted a formal definition, and the term is still controversial in some countries. The main criterion to identify indigenous peoples is self-identification. Several characteristics of indigenous peoples have been outlined, including by the United Nations:

- Historical and geographical pre-establishment of these people within a given area of land;
- Past or present experiences of marginalization and discrimination;
- Cultural difference – in terms of use of a language or way of life that differs from the rest of the majority population;
- Self-identification – recognising oneself and being locally recognised as such.

Indigenous people's specific rights are recognised in particular by the ***ILO Convention No. 169*** adopted in 1989, the United Nations 2007 Declaration on the Rights of Indigenous Peoples, and various World Bank standards, including the International Finance Corporation's "Performance Standards". In accordance with these documents, indigenous peoples have the right to Free, Prior and Informed Consent **(FPIC)** for developments affecting them. Specifically, FPIC means:

- **Free**—people are able to freely make decisions without coercion, intimidation, punishment or manipulation.
- **Prior**—sufficient time is allocated for people to be involved in the decision-making process before key project decisions are made and impacts occur.
- **Informed**—people are fully informed about the project and its potential impacts and benefits, and the various perspectives regarding the project (both positive and negative).
- **Consent**—there are effective processes for affected indigenous peoples to approve or withhold their consent, consistent with their customary decision-making processes, and their decisions are respected and upheld.

FPIC is more than just a process of consultation. It is a negotiated process involving all interested parties, the aim of which is to allow indigenous peoples to be involved in decision making about future developments affecting them and ultimately, to give or withhold their consent.

The Group recognizes indigenous peoples traditional attachment and close proximity to land and natural resources such as rivers, trees and forests.

This connection to land and natural resources means they may be particularly affected by those operations which transform the landscape and affect their access to such resources. ***The Group Charter of Principles and Guidelines regarding Indigenous and Tribal People*** requires Business units to engage in meaningful consultation with indigenous peoples, minimize negative impacts on them and ensure they have access to the benefits of our activities including employment and economic development.

Within the industry, there is an ongoing debate on the definition of Consent. Regardless of this, Business units benefit from ongoing and meaningful engagement with indigenous peoples in the places where we operate, and from their broad support and participation. (For examples of good practices, see the oil and gas industry association for environment and social issues, ***IPIECA Guide on "Indigenous Peoples and the oil and gas industry")***.

CASE STUDIES

These following scenarios illustrate the application of the Group's Human Rights and Local communities approach, including practical considerations to prevent abuse and safeguard the Group's reputation:

- Understand the context where we operate
- Identify and engage communities to establish constructive relationships
- Manage the negative impacts of our activities on communities
- Respect the rights of indigenous peoples
- Pay special attention to vulnerable groups
- Deal with any complaints from communities through appropriate procedures.

Local community representatives are blaming me for not employing them during an exploration project carried out in the area where they live.

To avoid undermining trust in the Business unit's assurances that affected communities will benefit from the project, risks of conflicts and perception of discrimination, the following avenues for action should be considered:

- Review the project's Social Baseline Study (SBS) and Environmental and Social Impact Assessment (ESIA) and any identified local employment opportunities.
- Review previous stakeholder engagement and any commitments made to local employment.
- If one does not exist, develop a local recruitment and employment plan in consultation with affected communities.
- Put in place a fair recruitment process accessible to all affected communities to avoid exacerbating potential existing ethnic conflicts and perception of discrimination.
- Develop a local goods and services supply plan to be sent to suppliers.
- Engage all relevant stakeholders – suppliers, community representatives and authorities (labor office, local representatives) etc. – on the definition and implementation of these plans.
- Put in place a monitoring system for contractors to track local employment.
- Manage expectations by communicating widely, accurately, and openly about employment opportunities that are and will be available.

A local Non Governmental Organization (NGO) is accusing a Group Business unit of polluting a nearby river, harming the environment and infringing the communities' right of access to water. The NGO is resolved to make contact with the media.

To avoid harming the health of local populations and worsening relationships with the local community and NGOs, the following avenues for actions should be considered:

- Verify the allegations with the Health Safety Societal Environment (HSSE) Division including on the ground verification.
- Identify any technical intervention needed to stop further pollution and remediate if necessary.
- Meet with affected communities and their representatives to identify any damage done, ongoing risks and their concerns.
- If needed, ensure people have access to alternative potable water sources.
- Arrange to meet the head of the NGO to understand the allegation in detail.
- Prepare a public response.
- Set up the necessary structures making it possible in future to inform NGOs and communities of the actions put in place to monitor water quality.
- In the event of proven pollution, make contact with the Legal Division with a view to considering compensating communities.
- Meet with concerned communities and their representatives to explain the background to the complaint and findings of the investigation.
- Review the Business unit's stakeholder engagement plan with a view to ensuring regular dialogue with concerned communities and other civil society stakeholders such as NGOs
- Whether the pollution is proven or not, prepare a communication plan in order to communicate the facts.

TOPIC 3
HUMAN RIGHTS AND SECURITY

Security management is based on risk identification and prevention, anticipating crisis situations and reporting of incidents. Prevention of risks includes training and dialogue with all stakeholders.
Provision of security is a state responsibility. In some contexts, the intervention of government security forces or private security providers may be necessary to protect Business units' activities including personnel and assets.

Respect for the rights of local communities and other stakeholders by security forces is essential. The Group seeks to prevent incidents when conducting security activities. The Group's approach, reiterated in our security policy, is based on internationally recognized Human Rights and industry standards including the Voluntary Principles. These Principles aim to guide Business units so that where they provide and ensure provision of operational security this is done in a manner that is consistent with respecting Human Rights.

- As a member of the Voluntary Principles, the Group has included the implementation of these principles in our policies, and assigned experts within the ☛ ***Security Division (Internal)*** to ensure their effective implementation.

EXAMPLES OF HUMAN RIGHTS AND PRINCIPLES

The Voluntary Principles are a set of principles agreed by a group comprising: governments, extractive companies and non-governmental organisations.

They rely on three key concepts:

- the necessity of a comprehensive risk assessment for informing Business units' operations and their ability to mitigate risks of Human Rights abuses;
- the importance of communication, consultation and transparency, particularly with regard to relationships with local communities;
- the importance of monitoring the conduct of government security forces particularly as regards proportionality in the use of force and to respond to alleged Human Rights abuses ***(☛ See the full text)***.

THE USE OF FORCE

The UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials (The "Basic Principles") provide guidance to governments and law enforcement officials as to the use of force and firearms. Force should be used as a last resort, and when used, should be used in a restrained and proportionate manner to minimise injury. The Basic Principles also emphasize the importance of giving assistance and medical aid to those injured by the use of force, and the necessity of notifying both the relevant authorities and friends and family of the status of such persons ***(☛ See the full text)***. See also the UN Code of Conduct for Law Enforcement Officials ***(☛ See the full text)***.

ACTIONS AND RECOMMENDATIONS

The Group's objective is to raise awareness and train the people involved in security management. This includes the Group's staff and security forces, either government forces or private security providers. The Group also expects the arrangements under which security forces intervene, particularly in complex situations to be clarified and formalized (e.g., contracts to be signed with governments, etc.).

For the Voluntary Principles implementation, the Group established 5 main axes:

1. **Establishment of formal relations** between Business units and governments to organize the security of our employees and facilities in accordance with our principles;
2. **Transfer of equipment** (e.g., fuel, transportation) from the Group's Business units to government security forces should only occur on an exceptional basis and be strictly controlled;
3. **Verification of security providers' recruitment procedures** *(See the Focus box below, p.38)*;
4. **Specific training** for all security personnel;
5. **Reporting of incidents** *(See the Focus box below, p.38)*.

Coordination between the Group's security teams and those in charge of community relationships within societal teams is essential so that concerns and questions from communities are addressed before they can become security issues. Identifying early and appropriate responses to community concerns will ensure better relations with communities, help reduce tensions, and mitigate the risk of Human Rights abuses *(See Topic 2, p.26)*. As stated in the Voluntary Principles, risk analysis and planning for security arrangements and rules of engagement should be done in consultation with local communities.

For example, in Uganda the security team works very closely with the societal team. When Community Liaison Officers (CLOs) identify signs of emerging conflict between communities, they relay such information to security staff who encourage local governments or traditional leaders to try and resolve the conflict before it escalates into a security situation for local people and the Company. In a case of theft of some technical equipment, the CLOs managed to convince local leaders to spread the message that if the equipment was returned there would be no police or legal follow up. Several pieces of equipment were returned and increasing trust established between the CLOs and the community.

Voluntary Principles training in Myanmar

In June 2015 the Group organized a seminar focusing on the Voluntary Principles guidelines at Yangon. Myanmar Government representatives supported the event with an important and pro-active delegation including the Minister of Security and Border Affairs and Regional Police commissioners. National companies, NGOs and Embassies also constructively contributed to the open discussions throughout the workshop based on practical situations related to security incidents.

FOCUS

RECRUITMENT PROCEDURES OF SECURITY PROVIDERS' EMPLOYEES:

This guide and the Corporate Security Policy provide our managers with specific guidelines on the selection of private security companies.

In particular, means and resources used by security personnel should prevent the occurrence of incidents and be in line with the Group's security requirements. The Group's Business units are required to conduct due diligence when recruiting personnel.

This means that when recruiting security personnel or when using private security companies, it is advisable to:

- Check, via a preliminary survey of potential security providers, the selection criteria for their employees to ensure that no-one involved in Human Rights abuses has been recruited;
- Analyse the security providers' in-house regulations and ethical commitments;
- Ensure the security providers are fully aware of the Group's principles and in particular of the Business units' security policy;
- Point out clearly the primarily protective and defensive nature of this work;
- Record every step in writing and demand written responses to the requests made to document the Group's procedures;
- Include in the contract clauses that expressly mention the respect of Voluntary Principles commitments and expectations for conduct of personnel.

REPORTING OF INCIDENTS

In the event of security-related incidents with Human Rights implications in which our Business units are involved, the following steps must be taken:

- Ensure that appropriate medical care is provided to any injured person;
- Immediately report the incident to the relevant authorities at Group and Business unit levels – follow-up actions will be taken depending on the local context and type of incident;
- Ensure the protection of any witnesses from internal or external pressure;
- If applicable, conduct internal investigations to establish facts and responsibilities, and monitoring and follow up;
- Ensure that remediation actions are put in place for affected stakeholders (e.g., compensation, etc.)

CASE STUDIES

These following scenarios illustrate the application of the Group's Human Rights and Security approach, including practical considerations to prevent abuse and safeguard the Group's reputation:

- Keep our employees and operational sites secure whilst ensuring that the resources used to protect our Business units do not exacerbate existing tensions.
- Ensure that security forces protecting our employees and assets respect the Human Rights of local communities.
- Circulate our security commitments to our external contractors.
- Raise awareness on Human Rights and share our principles with government security forces and private security providers.
- Respond appropriately when our standards are not observed.

A demonstration against the Business unit is organised by some members of the neighbouring local community. The police officers, already in position, are known for brutally clamping down on demonstrators. The demonstration is growing larger.

To avoid threatening the security of our people and facilities, and the communities' rights to freedom of expression and assembly, the following avenues for actions should be considered:

- Throughout the life of the project, communicate to relevant government officials the Business unit's interest in Human Rights and encourage professional conduct of police and army units operating near the Business unit.
- Anticipate any issue arising from local communities (coordinated actions between societal and security teams should be developed) , and address them.
- Dialogue with government security forces in advance and during the demonstration.
- Dispatch active and reliable negotiators during the demonstration to resume dialogue.
- Liaise with protestors' leaders during the demonstration and recommend that protestors do not use weapons to avoid any incident.
- Recommend that the Business unit's security forces take appropriate measures to avoid incidents and trigger events, and insist on the fact that force should only to be used proportionately if absolutely necessary.

Once the event is over:

- Evaluate lessons learnt from the event and adapt training themes and drills scenarios.
- Review the accuracy of the Business unit's procedure to deal with complaints from communities.
- Debrief the event directly with government security forces representatives, and adapt management best practices accordingly.

One night, a group of four men attempts to break into an operational site. They are stopped by our site security provider. They are then handed over to the local authorities after having been ill-treated.

To respect the rights of the apprehended individuals not to be subject to torture or degrading treatment, the following avenues of actions should be considered:

- Elaborate a clear and detailed procedure related to "behaviour with apprehended persons" for security providers, including immediate report to the Group' Business unit management of such event.
- Collect testimony and establish the victims' state of health.
- Formally remind the security provider about our principles and demand that the employees concerned are suspended from the site pending the investigation of the allegations.
- Ensure that the security provider responds appropriately to the objectionable behaviour of its employees.
- Organize awareness raising and training sessions on Human Rights for the security provider's employees.
- If the guards' misconduct continues, suspend or terminate the contract with the security provider.

A Business unit is considering new oil & gas activity in a region with poor Human Rights records including allegations of harassment and sexual abuses associated with government security forces in the region.

To reduce the risk of acts of sexual and gender based violence while the government security forces are protecting the Business unit's personnel and facilities in future, the following actions should be considered:

- Carry out an assessment to evaluate potential human rights risks (including risks of sexual and gender based violence) associated with the new activity. Clearly ccommunicate to government security forces the Group's Security policies and standards as well as its expectations in terms of security forces' conduct in their areas of operations and beyond.
- Set up a procedure to respond urgently to allegations of sexual and gender based violence involving government security forces or private security providers' personnel working for the Business unit. The procedure should include ways of protect the identity of the alleged victim, maintain confidentiality and ensure that victim is able to access immediate physical or psychological care and to be safe from the risk of retaliation.
- Set up, in partnership with government forces command chain, a training plan for all personnel (both private security providers' personnel and government security forces) securing our personnel and facilities, in which issues related to misuse of force and Human Rights sexual abuses are addressed.

For further practical measures on how to prevent sexual and gender based violence in conflict affected areas, see the International Alert report on the Democratic Republic of Congo ***(☛ IA RDC)***.

APPENDIX

THE GROUP'S ORGANIZATION ON HUMAN RIGHTS

GROUP LEGAL DIVISION

In-house lawyers specialized in Ethics and Human Rights are working within the Group Legal Division, Compliance and Social Responsibility Department, to provide expertise and anticipate emerging trends on these issues.

HUMAN RIGHTS COORDINATION COMMITTEE

The Group created a Human Rights Coordination Committee managed by the Ethics Committee chair in cooperation with the Group's Human Rights lawyers. This information and decision-making forum meets three or four times a year. Corporate and Business segment representatives including security, communication, purchasing and sustainable development are part of this forum. This initiative also coordinates the activities undertaken internally and externally by the Group's Business units in this domain. External advisors such as the Danish Institute for Human Rights may attend some of these sessions in order to inform and advise the Committee on specific topics related to Human Rights.

THE ETHICS COMMITTEE

Respect for internationally recognized Human Rights standards is one of the priority business principles of the Code of Conduct. Consequently, the Ethics Committee gives advice on this subject and integrates Human Rights into the ethical assessment process.

The Ethics Committee comprises a Chairman appointed by and reporting to the CEO and members from the main activities of the Group. Members are appointed by the Executive Committee.

The Ethics Committee ensures in particular that the Code of Conduct is widely communicated. It also listens to, supports and advises employees and other stakeholders.

The Committee is entitled to visit any Group facility or subsidiary.

The chair of the Ethics Committee reports regularly to the Executive Committee and the Board of Directors.

THE GROUP'S CONTRIBUTION TO INTERNATIONAL HUMAN RIGHTS INITIATIVES

The Group is a member of a number of initiatives to advance our work on Business and Human Rights. For example:

- The Group is a member of the **United Nations Global Compact** (UNGC) which gathers more than 10,000 companies committed to implementing 10 principles related to Human Rights, labor, environment and anti-bribery. The Group has contributed to various guidance documents issued by the UNGC Human Rights Working Group. The UNGC LEAD initiative for sustainable leadership focuses on reporting. The Group has contributed to this forum, alongside a number of sustainability leaders from all regions and sectors.
- The Group is a founding member of the **Global Business Initiative on Human Rights** (GBI) which is a multi sector association with an outreach focus to companies headquartered in developing countries. The Group shares learning experiences with many GBI members such as retailers and other Business sectors on various issues related to Human Rights.
- The Group actively takes part in the work of **IPIECA**, (the global oil and gas association for environmental and social issues), through various working groups on social and environmental issues, including co-chairing activities of the IPIECA Human Rights Task Force.
- The Group joined **Shift's Business Learning Program** when it was established in 2011, immediately after the UN Guiding Principles were endorsed. Through our participation, we have received tailored advice and support on our priorities for implementing the UN Guiding Principles. This has involved guidance on integrating Human Rights into our CORISK and merger and acquisition processes as well as revising our Code of Conduct to make human rights the cornerstone of the Code. We also participate in Shift's collective, cross-industry workshops that explore in depth shared challenges with regard to business and human rights. Shift is the leading center of expertise on the UN Guiding Principles on Business and Human Rights. Shift's team was centrally involved in shaping and writing the Guiding Principles, and Prof. Ruggie is Chair of Shift's Board of Trustees.
- The Group is a member of the **Voluntary Principles on Security and Human Rights** (Voluntary Principles). This multi-stakeholder initiative gathers major international oil and mining companies, Human Rights and development Non-Governmental Organizations and States. Among other activities, guidance documents on responsible security issues related to interactions with public and private security providers in complex environments have been issued.

TO FIND
OUT MORE

THE GROUP'S RESOURCES

TOPIC 1
HUMAN RIGHTS IN THE WORKPLACE

INDUSTRIALL GLOBAL FRAMEWORK AGREEMENT

In January 2015, the Group strengthened our commitment as a responsible employer by signing a global agreement with IndustriALL Global Union representing over 50 million workers in the mining, energy and industry sectors. The purpose of this global framework agreement is to ensure the protection of the rights and working conditions of our people. ***(IndustriALL Global Union)***

FUNDAMENTAL PRINCIPLES OF PURCHASING

Fundamental Principles of Purchasing must be attached to or transposed in the various processes of selection of suppliers of goods, services and works, and in the contracts with these suppliers.These principles concern the various areas that are priorities for the Group, including:

1. Respecting Human Rights at work,

2. Protecting health, safety, and security,

3. Preserving the environment,

4. Preventing corruption, conflict of interests, and fighting against fraud,

5. Respecting competition law,

6. Promoting economic and social development.

(Detailed principles)

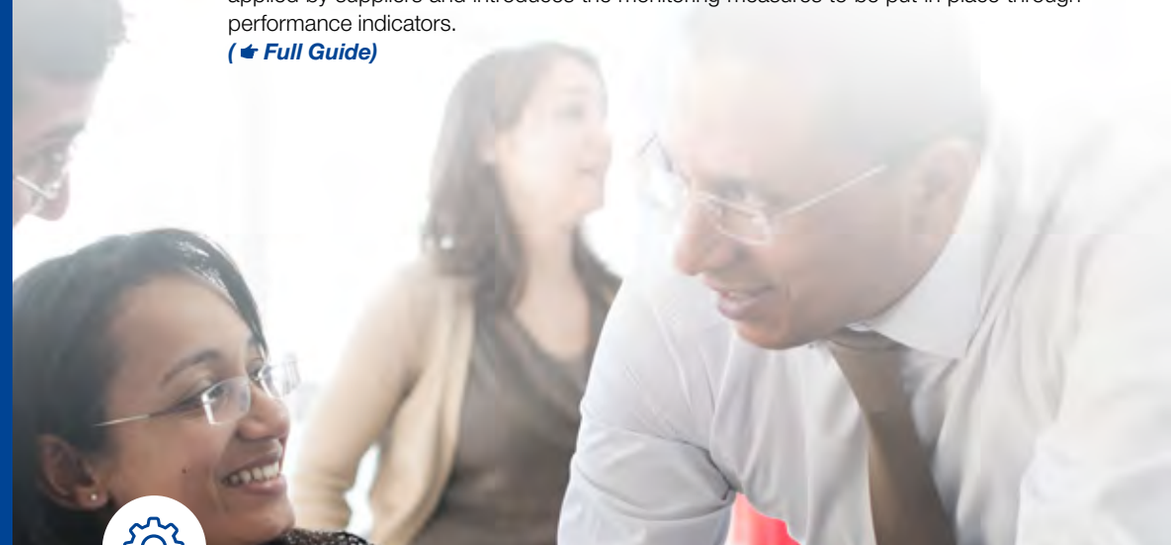
DIVERSITY POLICY

Through this Policy, the Group enhances our commitment to develop employees' professional skills and careers without discrimination. Our Business units implement Diversity action plans, in accordance with the Diversity roadmap methodology proposed by the Group.
(Full Policy)

Internal Guidance "recruiting without discrimination"

Guide for the respect of minimum living conditions in base camps

The Group demonstrates special vigilance regarding living and working conditions of our suppliers' employees who are present on the Group's construction sites. To this end, it endeavours to ensure that industry standards relating to health and safety are observed. This guide accordingly lists the minimum conditions that the Group would like to see applied by suppliers and introduces the monitoring measures to be put in place through performance indicators.
(Full Guide)



HUMAN RESOURCES' E-LEARNING ON HARASSMENT

This online course helps employees to identify harassment situations and understand the procedures to follow when employees are victims or witnesses of harassment, e.g., reporting to line management, confirmation of the facts, and disciplinary measures proportional to the offence. ***(e-learning)***

SUSTAINABLE PURCHASING AWARENESS CARDS (SPACS)

These Cards aim at raising social awareness within the Group's supply chain. A range of issues related to Human Rights are covered, including child labor, forced labor, working hours, harassment, discrimination, freedom of association, minimum wages. Practical examples of "Do's" and "Don'ts" are provided. ***(SPACs)***

INDUSTRIALL GLOBAL UNION AGREEMENT "FAIR" COMMITTEE

As stated in the Global Agreement, a dedicated Committee is set up to "Facilitate the Application, Involvement of all and regular measurement of the Results of the agreement" (The "FAIR" Committee). This Committee meets regularly to assess the way the Global Agreement is implemented. It is chaired by the Group's Human Resource Division, and composed of representatives from trade unions affiliated to IndustriALL Global Union.

SAFETY HEALTH ENVIRONMENT QUALITY CHARTER
The Group charter includes reference to our societal and responsible security principles, including the Voluntary Principles on Security and Human Rights guidelines. ***(☛ Full Safety Health Environment Quality charter)***

THE GROUP'S CHARTER OF PRINCIPLES AND GUIDELINES REGARDING INDIGENOUS PEOPLES AND TRIBAL PEOPLES
The purpose of the principles set forth in this charter is to encourage the Group's Business units to take into account the legitimate requirements of indigenous peoples. Business units are accordingly bound to observe the highest domestic and international standards in force and, in particular, to conduct impact assessments, initiate meaningful consultation with indigenous and tribal peoples by keeping them informed of project progress, and to ensure that the project has a positive impact on such communities. ***(☛ Total policy regarding indigenous people)***

MAESTRO MANAGEMENT SYSTEM
Maestro is the Health Safety Environment Management System used by the Group upstream and downstream Business segments as a basis for internal audit. It includes principles dedicated to societal issues.

SOCIETAL POLICIES
The Group's societal policy and processes regulate our interactions with local communities and other external stakeholders, and focus on four main axes : stakeholder engagement, prevention and mitigation of negative impacts, shared value creation, and access to energy.

EXPLORATION AND PRODUCTION (EP)

- **E&P General Specification on Social Baseline Study:** defines our requirements for establishing a Social Baseline Study. A SBS is an initial evaluative study of the socio-economic and Human Rights context prior to any operational activity, formalized in the framework of the EP process.
- **E&P General Specification on Social Impact Assessment:** defines our guidelines for conducting a Social Impact Assessment. A SIA is a study assessing and/or analysing the actual and potential social or Human Rights impacts on the population affected by an oil and gas project. For more information, please refer to the IPIECA guidance document on integrating Human Rights into Environmental and Social Impact Assessments. ***(☛ SIA)***
- **E&P General Specifications on Human Rights Impact Assessments:** defines our guidelines for conducting a dedicated Human Rights Impact Assessment. The circumstances and the way such assessment should be conducted are developed in this document. ***(☛ HRIA)***
- **E&P Guide and Manual on community grievance mechanisms:** this guide sets out the business case for establishing grievance mechanisms and proposes an approach which meets the Guiding Principles effectiveness criteria.

STAKEHOLDER RELATIONSHIP MANAGEMENT+ (SRM+)
SRM+ is an internal tool developed by the Group for societal dialogue, and used by all Business segments. It enables the sites or the Business units to identify and map their main stakeholders, schedule meetings with them and better understand their perceptions and issues, and then define an appropriate action plan for building a long-term relationship.
This mechanism represents a unique opportunity to explain the Group's activities, but also to listen to the expectations of local stakeholders and address their concerns.

TOPIC 3
HUMAN RIGHTS AND SECURITY

Security policies include both instructions and recommendations through dedicated guides and manuals that are applied to support the implementation of the Voluntary Principles by the Group's Business units.

THE GROUP'S INTRANET RELATED TO VOLUNTARY PRINCIPLES
A page is dedicated on the Group intranet to promote Human Rights best practices within the Business units, including the Voluntary Principles guidelines. This page raises employees' awareness on Human Rights concepts, the standards applicable to security operations and stakeholder relationships. It offers a series of practical documents together with suggested responses to issues. ***(Group's Intranet)***

THE GROUP'S ANNUAL REPORT FOR THE VOLUNTARY PRINCIPLES SECRETARIAT
Each year, as a member of the Voluntary Principles Initiative, the Group reports to the Secretariat on our activities regarding the implementation and the promotion of the Voluntary Principles.

SELF ASSESSMENT & RISK ASSESSMENT TOOLS
Following an evaluation of lessons learned process with other members and observers of the Voluntary Principles initiative (e.g., IPIECA, the global oil and gas industry association for environmental and social issues) we have developed specific tools adapted to our context and needs to support the implementation of the Voluntary Principles within the Group's Business units.

The Risk and Self assessment tools enable us to evaluate the compliance of Business units with the Group's commitments in this domain. These tools have been developed to be used in a simple and autonomous manner by our Business units, and are expected to lead to the development of action plans to mitigate identified Human Right risks.

EXTERNAL RESOURCES

- **THE UNITED NATIONS GUIDING PRINCIPLES ON BUSINESS AND HUMAN RIGHTS (THE "GUIDING PRINCIPLES")**
  A set of principles that clarify the roles and responsibilities of States and Business units on and Human Rights issues.
  (Guiding principles)

- **THE UN GLOBAL COMPACT**
  An initiative that brings together thousands of businesses that are invited to issue an annual Communication on Progress related to ten principles on Human Rights, labor standards, the environment and the fight against corruption.
  (UN Global compact)

- **INTERNATIONAL FINANCE CORPORATION (IFC) PERFORMANCE STANDARDS ON ENVIRONMENT AND SOCIAL SUSTAINABILITY IFC**, a member of the UN World Bank Group, is the largest global development institution focused exclusively on the private sector in developing countries. IFC's Environmental and Social Performance Standards define IFC clients' responsibilities for managing their environmental and social risks. The 2012 edition of IFC's Sustainability Framework, which includes the Performance Standards, applies to all investment and advisory clients whose projects go through IFC's initial credit review process after January 1, 2012.
  (IFC's standards)

- **IFC'S RESOURCE CENTER**
  (IFC)

- **THE VOLUNTARY PRINCIPLES**
  (Voluntary Principles)

- **EITI**
  (EITI)

- **IPIECA**
  (IPIECA)

- **BUSINESS AND HUMAN RIGHTS RESOURCE CENTRE**
  The Resource Centre is an independent non-profit organization. This Centre is tracking the Human Rights policy and performance of over 6000 companies in over 180 countries, making information publicly available. It engages with companies and governments to urge them to share information publicly. It's website is a global business and Human Rights knowledge hub, delivering news in many languages.
  (Business and Human Rights Resource Centre)

TILENGA PROJECT ESIA - APPENDIX F: Cumulative Impact Assessment – Consultation on Candidate Priority ***Valued Environmental and Social*** Components (VECs)

May 2018

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EA-1/1A, EA-2 North Development Project ESIA

Cumulative Impact Assessment

Consultation on Candidate Priority Valued Environmental and Social Components (VECs)

Final

27 March 2017

Table of Contents

1 Introduction

1.1 Background and Purpose of Report

As part of the Environmental and Social Impact Assessment (ESIA) for the EA1/1A and EA2 North Development Project (the Project) Tilenga ESIA team is undertaking a cumulative impact assessment (CIA). A key stage in the CIA process is the identification of the valued environmental and social components (referred to as VECs). VECs are defined as 'sensitive or valued receptors whose desired future condition determines the assessment end points to be used in the CIA process' (Good Practice Handbook to Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (IFC, 2013).

An initial list of VECs was set out in the TEP Uganda/TUOP (2015) EA-1/EA-1A and EA-2 North Development Project ESIA Scoping Report / Terms of Reference. This initial list was based on the results of the Project scoping process and a review of previous studies. In November 2016, the list was amended and extended prior to a VEC stakeholder consultation workshop in Kampala. Thresholds and indicators were also drafted for selected VECs. In addition to the workshop in Kampala, further consultation was undertaken with local stakeholder groups in the Project study area in November and December 2016 as part of the ongoing ESIA process. At these meetings opinions were sought on key issues and concerns in order inform the prioritisation of VECs.

The purpose of this report is therefore to update and amend the list of priority candidate VECs for the Project informed by stakeholder opinions. The structure of the report is as follows:

- Chapter 2 provides a summary of the process followed to arrive the list of VECs presented to stakeholders at the workshop in Kampala;
- Chapter 3 provides summary of the consultation responses on the candidate priority VECs and the recommended amendments to the VECs; and
- Chapter 4 provides a revised list of candidate priority VECs.

1.2 Why 'Candidate Priority VECs'?

VEC selection and definition is an iterative process that is informed by the results of the ESIA, the likely effects of other projects and the opinions of stakeholder. The VECs described in this report are subject to modification and we have therefore used the term 'candidate VECs'.

With respect to prioritisation, IFC guidance advises that 'if the number of VECs is too large to conduct an analysis of all, then priority for analysis should be given to those for which there is existing regional concern'. As part of this report we have highlighted where there is a need to prioritise VECs and the rationale for prioritisation. This is based on both stakeholder feedback and knowledge of existing regional concerns e.g. where a VEC is at risk of exceeding a critical threshold.

2 Selection of VECs

2.1 Introduction

This Chapter summarises the process followed to arrive at the list of VECs set out in the Scoping Report (as amended prior to stakeholder consultation in November 2016). It provides background information on the CIA process and the Project in order to explain the rationale for the selection of VECs.

2.2 What are VECs?

The IFC's CIA Good Practice Handbook defines VECs as 'sensitive or valued receptors whose desired future condition determines the assessment end points to be used in the CIA process'. 'VECs are environmental and social attributes that are considered to be important in assessing risks; they may be:

- Physical features, habitats, wildlife populations (e.g. biodiversity)
- Ecosystem services
- Natural processes (e.g. water and nutrient cycles, microclimate)
- Social conditions (e.g. health, economics), or
- Cultural aspects (e.g. traditional spiritual ceremonies).'

For the purpose of this study VECs are synonymous with the terms used to describe environmental and social attributes in the ESIA. It is necessary for the ESIA and CIA to use the same terms and definitions in order that the studies can be aligned – only in this way can effects of the Project be combined with the effects of other projects and activities to determine cumulative effects.

2.3 IFC Guidance on the Identification of VECs

IFC Performance Standard 1 (PS1) defines cumulative effects as those that 'result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted'.

Impacts of the Project

As the IFC guidance says 'VECs to include are those that would be affected by the project. Thus VECs for which an impact was deemed insignificant in the ESIA are not to be included in the CIA'.

The ESIA Scoping Report identifies a wide range of both direct and indirect impacts from the Project that will affect VECs. Example direct impacts include:

- The physical Project footprint from infrastructure.
- Emissions associated with construction and operation (e.g. traffic related pollution).
- The movement and activity of people and equipment during construction and operation.
- Direct employment of people to work on the Project during construction and operation.

Examples indirect impacts are secondary or induced changes resulting from the Project e.g.:

- In-migration of people.
- Indirect employment and economic development.
- Pressures on community resources from in-migration e.g. education, health facilities.
- Increased poaching/hunting and fishing.
- Increased pressure on other natural resources, such as biomass and water.

Impacts from other projects

For there to be a cumulative impact there also needs to be impacts on the same VECs from other developments within an agreed study area for the CIA.

Stakeholder Opinions

The IFC guidance stresses the importance of stakeholder consultation in the CIA process, and that the agreement on the selected VECs for the assessment should be discussed with affected communities and stakeholders. Stakeholder opinions on what is of value to them or is an existing concern have been established by both documentary review and through consultation. Chapter 3 below summarises stakeholder opinions based on recent consultations.

Prioritisation

The standard approach to defining the scope of an ESIA is to assess all impacts that are likely to be significant. A similar approach has been used to identifying the VECs to be covered by the CIA. However, it is recognised that there are numerous potential VECs. The IFC's guidance is as follows:

- 'Because it is unrealistic to think that every environmental and social aspect that can be subject to cumulative impacts can be appropriately factored into a CIA, it is good practice to focus the assessment and management strategies on Valued Environmental and Social Components.'
- 'If the number of VECs is too large to conduct an analysis of all, then priority for analysis should be given to those for which there is existing regional concern.'
- 'Priority should be given to those VECs that are likely to be at the greatest risk from the development's contribution to cumulative impacts'.

The VECs recommended in this report do not cover every possible receptor group, process, service etc that may be subject to cumulative effects – they have been selected because they are at greatest risk from the development's contribution to cumulative impacts; there is an existing regional concern; and they have been identified by stakeholder as being of particular importance.

It should be noted that while the focus of the assessment is on the adverse consequences of multiple developments, there are also opportunities for positive outcomes i.e. there are VECs which may be positively impacted and/or will benefit from a multi-stakeholder, collaborative approach to implementing management actions.

2.4 The ESIA Scoping Report and Initial List of VECs

The EA-1/EA-1A and EA 2 North Development Project ESIA Scoping Report and Terms of Reference was published in December 2015 and approved by NEMA in April 2016. The Scoping Report included a chapter setting out the proposed approach to the CIA and an initial list of candidate priority VECs. This list was informed by the results of the Project scoping process and the initial stakeholder consultation held during the scoping stage. The CIA chapter of the Scoping Report was also informed by the Company's report A Cumulative Impact Assessment (CIA) Framework for Proposed Oil Development Activities in the Albertine Rift, Uganda (eCountability, 2014) (the CIA Framework) and other Ugandan government reports.

This CIA Framework identified a long list of potential VECs based on a documentary review. VECs identified as important to operational performance or documented by stakeholders were described and from this list a recommendation was made on which should be prioritised based on:

- The extent to which the projects and activities might have a cumulative impact on the VEC.
- VECs already affected by oil-related development from more than one source or project.
- VECs already in an unsustainable or unsatisfactory state and/or declining towards a critical threshold.

The CIA Framework took a strategic approach and was based on all oil related development in the Albertine Rift. This list is therefore adapted based on the results of the Project scoping process. In addition, the following governmental reports were reviewed to inform the selection of VECs for the Project CIA:

- The Environmental Monitoring Plan for the Albertine Graben 2012-2017 (Ugandan Government, 2012).

- Strategic Environmental Assessment (SEA) of the oil and gas activities in the Albertine Graben of Uganda (approved by Ugandan Government in 2015).
- Strategic Plan for the Northern Albertine Rift of Uganda 2011 – 2020.

Following from the publication of the Scoping Report a number of other studies were completed that further informed the selection of VECs including:

- Critical Habitat Assessment (WCS and eCountability 2016),
- Block EA1, EA1A and EA2 North: Critical Habitat Assessment: Results and interpretation (TBC, FFI 2016).
- Ecosystem Service Review in the Landscape which was completed following several engagements with stakeholders (Treweek and Advisian 2015).

Based on the above review, a list of VECs was prepared and presented to stakeholders in November 2016 (and included in Appendix A of this report). In addition, thresholds and indicators for each VEC were also drafted for selected VECs. The approach to defining appropriate thresholds and indicators is provided below.

3 Feedback from Stakeholder Consultation

3.1 Introduction

Stakeholder engagement aimed to provide focused preliminary consultation to inform the selection of candidate priority VECs. Two levels of consultation were undertaken:

- A workshop in Kampala with national level stakeholders focused on selecting priority candidate VECs.
- Consultation meetings in the Project study area with a wide range of groups and communities.
- Consultation meetings with national level stakeholders in Kampala.

A summary of the comments made during these consultation activities is provided below.

3.2 National Stakeholder Workshop in Kampala

A workshop was held in Kampala on 16 November 2016. The list of the organisations attending the workshop is provided in Appendix B. The objectives for the meeting were:

- To provide the invited stakeholders with an introduction/update on the CIA.
- To get feedback from stakeholders on the proposed VECs and their opinions on which should be prioritised.

At the workshop all attendees were provided with a handout containing a description of the draft candidate priority VECs (see Appendix A). Through a combination of presentations, discussion sessions and written responses the stakeholders were given the opportunity to provide comments on the draft list of VECs. Stakeholders were also asked to prioritise the VECs, as far as possible.

General Comments from Workshop

A number of comments were made by stakeholders that are important in guiding the selection of VECs, and the CIA process in general:

- Several stakeholders noted that the opinions expressed on what should be prioritised during the workshop should be treated with caution as there will be a bias resulting from the responsibilities and professional backgrounds of those attending. A comment was made that all of the VECs presented at the workshop are likely to be of value to one group or another.
- Several stakeholders stressed the importance of obtaining the opinions of local stakeholders and communities. They are the people most directly affected and they will have different priorities and concerns from those of Government officials and NGOs based in Kampala.
- The definition of some of the VECs presented needs to be clarified to better explain what the VEC is and the risks to VEC conditions resulting from multiple developments.
- There are a number of overlaps between the list of VECs presented at the workshop and they need to be rationalised and/or better grouped together. However, several stakeholders noted the complexity and interdependence is a feature of the environment. Some overlap between VECs is inevitable, but we need to be careful not to create conflicting objectives and there needs to be a clear understanding of outcomes of the CIA.
- It was recognised that this is a complex subject and that further work is needed to finalise the VECs. Stakeholders should be involved at all key stages.

Comments on VECs at Workshop

There was no overall consensus on which specific VECs presented should be prioritised, however a number of VECs were highlighted by multiple attendees as being of particular importance:

- Both protected areas and critical habitat were widely identified as a high priority, and some suggested that there is an overlap between these VECs. Another opinion was that protected areas shouldn't be a VEC but rather the VECs should focus on values /functions of that protected areas provide i.e. protected areas are valuable for biodiversity, tourism, landscape and various ecosystem services and that these need to be considered separately to properly understand the cumulative effects and in order to develop appropriate mitigation and management measures.
- Both flagship species and species of conservation interest were identified as being a priority by many of the stakeholders. Several notes that many of the same species would fall within both VECs and that they could be combined, perhaps focussed on a more select group of indicator species. Flagship species were also identified as important to tourism.
- While many agreed that woodlands and forests are under significant threat and should be assessed as part of the CIA, they noted that their biodiversity values may be covered by protected areas and critical habitat.
- Woody biomass was identified by many as a priority but some stakeholders asked whether the VEC should be focussed on the source (woodland) or the end use (energy) as the effects are different, and management measures may have conflicting objectives. The biodiversity value of woodland is largely covered under protected areas and critical habitat.
- Wetlands were highlighted as a VEC that is under represented but it was noted that wetlands are also covered under protected areas (e.g. the Ramsar site) and critical habitat.
- Several noted ecological corridors as a priority and that while there is overlap with other VECs. However, critical habitat areas also cover key corridors in the broader landscape (e.g. savannah, forests, wetlands).
- Productive agricultural land was identified by many as a priority, with a large proportion of the population dependent on agriculture.
- There were divergent views on bushmeat. Many stating it was a low priority (and an illegal activity) while others felt it needed to be prioritised as the effects need to be understood in order that management measures can identified and implemented.
- Recreation and tourism were highlighted by several stakeholders and links to protected areas and flagship species were noted.
- Sustainable economic development was highlighted by a number of stakeholders. One commented that local economic development would support other VECs such as education, shelter, health, access to drinking water.
- Other VECs that were identified as being a priority by a number of attendees included fisheries, safe drinking water and gender equality.

3.3 Feedback from Stakeholder and Community Meetings in the Study Area

During November to December 2016, as part of the ESIA baseline study phase stakeholders were invited to participate in meetings with environmental and social specialists to discuss the Project's baseline environment and share their knowledge and views on potential sensitivities within that environment that may be affected by the Project. The opportunity was taken to also gain feedback to inform the CIA and prioritisation of VECs.

Consultation meetings included government agencies, local communities including vulnerable groups (such as women and youth), formal and traditional leaders, community and civil society representatives, NGOs and research and academic organisations. A list of stakeholder groups is provided in Appendix B. The consultation meetings were undertaken within the area defined for the Project Social Impact Assessment[1]. The detailed results of these consultation events will be reported separately; a summary of

[1] The Project Study Area defined for the Social Impact Assessment (SIA) includes:

- Buliisa District (Ngwedo, Kigwera, Buliisa TC, Buliisa SC): Kirama Village ; kakindo ; Kisomo; Kityana; Kibambura; Ngwedo TC; Ngwedo Farm; Bikongoro; Katodio; Kasansya W; Kakoora; Waiga; Kigoya;
- Nwoya District, Purongo subcounty: Got Apwoyo, Pabit East; Lagaji
- Biso Town
- Hoima Town
- Masindi Town

issues raised that are relevant to the CIA and identification of VECs is provided below. The headings used in the summary below reflect the issues raised by local stakeholders and the titles of the proposed VECs may differ where the VEC needs to also encompass other issues raised by national stakeholders, or to cover the impacts of development identified during the scoping process.

Protected Areas

Concerns were expressed that protected areas will be encroached because of pressure placed on land as people are resettled and due to influx (some newcomers reportedly do not understand importance or cultural value of protected environments and try to practise livelihood activities there). Local people were relatively open about the existing usage of ecosystems services within protected areas. This included fishing and the collection of papyrus within the Ramsar Site, and collection of ingredients for traditional medicine within the MFNP.

There are concerns about illegal fishing and hunting within the Murchison Falls-Albert Delta Ramsar site and MFNP. In particular, stakeholder engagement suggests that over-fishing in Lake Albert may be pushing people to fish in the relatively less fished waters of the Ramsar site and Victoria Nile. Boat trip operators stated that illegal fishing activities were largely undertaken in the southern branch of the Nile within the delta. They also stated that on occasion illegal fishing boats were seen as far up the river as Paraa Lodge.

Flagship Species

Tourism operators highlighted the importance of flagship species, particularly the 'Big Four' (buffalo, elephants, leopard, and lion). More generally, other game species like Uganda kob, hartebeest and giraffes are relatively widespread in MFNP, especially north of the Nile and tourism operators highlighted their importance to the visitor attraction. Shoebill and other birds in the Nile Delta Ramsar site are also tourist attractions, and boat operators stated that bird watching in the delta area is an increasingly important income stream.

Air, Noise, Dust, Waste from Oil Development

There are concerns that oil development will increase noise and vibration, dust and air pollution mainly due to project traffic and use of heavy trucks. A small number of stakeholders complained of light pollution during the exploration phase and were concerned that this would be a problem again. Many stakeholders also complained about waste management particularly during waste transportation during early phases of exploration. While it was acknowledged that the oil companies did a good job of addressing this issue, there are still concerns about impacts from waste management in the next phase.

Woodland /Trees

Many stakeholders are concerned that oil development will lead to the removal of trees that are important to them either for firewood collection or for other reasons (most trees were reported to have some value as either a source of food, medicine, building material or cultural and/or spiritual value). They think trees will be removed directly by development and also due to in-migration causing increased demand for firewood, and as people clear forested areas for agricultural land. Several requests were made to oil companies during consultations to replant trees that were removed during the last phase of the project, as well as requests to help communities to plant trees to help improve their environment and address climate change. Villagers in Kibambura complained that, although the oil company had planted trees, it had done so during the dry season and so the trees had died. Local people were well-informed as to the value of trees for the environment, and often stated linkages between trees and climate change.

With respect to charcoal production, this was seen as a low paid, labour intensive and undesirable activity. As such this activity was undertaken by those who had few alternative sources of incomes.

- Pakwach Town

Availability of grazing land affecting free range grazing

Stakeholders expressed concern that land take required for oil infrastructure will reduce the availability of communal land for grazing. This will be exacerbated by the individualisation and fragmentation of land as more people try to convert customary land into privately owned and titled land due to speculation around compensation for land acquisition for the project. Reduced grazing land will in turn affect pastoralist livelihoods. However, pastoralists stated that there is already competition for communal land for grazing.

Food security

There are concerns that land needed for oil development will reduce the availability of productive land and thereby affect farming activities and reduce agricultural production. There were reports that some women had already stopped cultivation in anticipation of being relocated. There are also concerns that fewer people will work in the agricultural sector as they look for 'quick money' by getting casual jobs for oil companies. There are also concerns that food security will be threatened because of increasing food prices.

Land Access

There are concerns that individuals and families will lose access to land and there will be an increase in landlessness especially for poor households. The main concerns are that a) those who opt for cash compensation will either not be able to afford land or will not invest the money wisely (i.e. won't buy replacement land); b) Increased fragmentation of land and transition from a communal land ownership system to individual ownership system means that some members of clans and families are losing access to what was previously communal land c) Increased land speculation is pushing prices up meaning some people will not be able to afford to buy land in future and/ or cannot afford feed associated with getting customary ownership certificates and therefore will not be able to defend their rights to the land.

Bushmeat

Stakeholder engagement highlighted poaching is still widely practiced by local people and people that come in from further afield. There is reported to be a big market for bush meat. As such the combination of multiple oil development projects and improved infrastructure (such as road enhancements etc.) is likely to increase poaching activity. Hunters however felt that increased security and patrols in the Murchison Falls National Park due to oil activities would most likely reduce poaching in this protected area.

Tourism

Views of the oil development varied significantly between tourism operators in Murchison Falls National Park. Some lodges were concerned by oil development and believed it would have an impact on tourism due to effects on the wider ecosystems of the Park. One lodge felt it was possible that the lodge would eventually serve as accommodation for oil workers rather than tourists and that wildlife and landscape-based tourism would be affected. However, other lodges and/or tourist operators were indifferent about the development, or even enthusiastic about it. The clients of these lodges and operators had not commented on oil activities.

There were also concerns amongst tourism operators that the 'wildness' and sense of place within the MFNP and its pristine setting will be affected by the oil development and so discourage tourists from visiting. Tourism operators highlighted that visitors from North America, Europe and elsewhere had an idealised expectation of what Africa should look like, which parts of the National Park fulfilled. As such this was seen as a key element of the visitor experience, which oil development might adversely affect.

As noted above, tourism operators highlighted the importance of flagship species as a visitor attraction.

Fishing

Fish catches in Lake Albert have already been significantly affected by overfishing. A small number of stakeholders think that oil development could negatively affect fisheries (due to pollution in the lake from spills or vibration, noise and light chasing fish away). In addition, some fishermen expressed a concern that

access to fishing grounds near well pads in the Lake would be restricted. Some people stated that they are looking to move away from fishing-based livelihoods to alternative livelihoods, which is placing pressure on land as many try to move into livestock keeping or crop production. Equally, other people (i.e. a youth group and a group of papyrus harvesters) said that they would prefer to earn their livelihoods from fishing but are unable to do so because they do not have enough capital to purchase fishing equipment.

Whilst returns from fishing had been decreasing since c.2005, and some of those engaged in fishing may be looking at alternatives, there is still a strong desire to undertake fishing as a livelihood in the area. Significantly, many of those who were not currently engaged in fishing stated that they were keen to get involved in the activity. In this context a perceived barrier to the take-up of fishing as a livelihood is a lack of capital for equipment.

Water

The main concern expressed in relation to water was the risk of water pollution due to poor waste management or oil spills. Access to clean drinking water at present is not a widespread concern. Hopes were expressed that the oil development will lead to improved access to water for both domestic and agricultural use through investment in water infrastructure as part of Project) campaigns.

Health

Concerns expressed about communicable disease relate primarily to high existing rates of HIV/AIDS and concerns that this will increase due to influx related to oil development activities. This was one of the most widely expressed concerns during stakeholder consultations. The Most at Risk Populations (MARP) to HIV/AIDS are considered to be commercial sex workers, boda boda drivers, truck drivers, fishing community, and youth. There were also some concerns about potential increases in Hepatitis B – a trend that has already been observed.

Access to healthcare was frequently raised by stakeholders both as a challenge they currently face and also as an issue that they hope may be improved through Project activities undertaken by oil companies. Some improvement in access to healthcare in recent years was noted (due to opening of new health centres and establishment of village health teams), although most health centres are still understaffed, frequently have shortages in drugs supplies, and lack sufficient infrastructure and equipment to meet patient and staff needs. The elderly, persons with disabilities and those living far from health centres face the most challenges accessing healthcare.

There were some concerns about increased risk of traffic accidents – currently most accidents involve boda boda riders and are due to speeding, unqualified drivers (driving without a license), poor quality roads, overloading of vehicles and drink driving. Tarmacking of roads reportedly leads to increases in accident rates as it encourages people to speed.

Education

There are concerns that resettlement will disrupt children's education and that children will be tempted to drop out of schools early to earn money in activities either directly or indirectly brought about by oil development. Early school dropout is already a problem due to early marriage and pregnancy, poverty (families cannot afford to send their children to school and there is pressure for children to help support families economically), and low value placed on education (particularly girls' education). The opportunity to improve access to education is, however, also a key positive impact expected from the Project.

Housing and Sanitation

Availability of good quality housing and sanitation was raised as an issue in Hoima, Pakwach and Purongo. These areas experienced high levels of in-migration during the last exploration phase, which reportedly led to unplanned, slum like settlements in some places. Availability of housing did not arise as a concern in Buliisa.

Employment and local economy

By far the most widely expressed expectation from stakeholders was that the next phase of oil development will create direct and indirect economic opportunities for local communities. Most local stakeholders do not have high expectations for skilled jobs as they recognise that they do not have the necessary qualifications but they do hope to benefit from casual labour (mainly youth). There is also a hope that local farmers and other businesses (including fishermen) will be able to supply produce to oil companies and their contractors. Stakeholders recognise that at present they do not meet the oil companies' standards but they hope / expect that there will be measures taken to address this and help them meet the necessary standards (e.g. investment in training / equipment for improved farming techniques). The greatest economic opportunity, however, is expected to come from a general increase in local spending power due to influx and presence of contractors, which will create a bigger market and boost activity for local businesses.

Prices of goods and services are already perceived to be increasing and further inflation was raised as a concern by a number of stakeholders. Inflation of food prices is thought to be a risk as people begin to move away from farming to earn 'quicker money' in other industries; cost of fish is increasing as fish catches go down and/or the size of fish landed decreases; in Masindi more cash crops are being grown, which means there are less food crops available for consumption/sale; and, influx of people and increased demand for food will drive prices up further. Land prices are also increasing due to Project related land take and related land speculation. There are concerns that the poor will not be able to afford land, which may lead to an increase in landlessness. The general transition to a cash based economy is also seen as a risk for poorer and subsistence based households

A small number of stakeholders expressed concerns that their business activity would be negatively affected due to loss of customer base as people are resettled and increased regulation which might place pressure on some informal businesses (e.g. those not currently paying tax).

Gender Equality

Several concerns were raised in relation to women's rights and gender equality, including:

- Domestic violence: This is already reported to be a serious issue in the region and reportedly worsened during previous phases of oil activities due to family disputes over compensation payments.
- 'Economic violence': This was a term used to describe when husbands abandon their wives and children or fail to provide money for the family, placing more pressure on women to look for ways of providing food and money for education and healthcare. During the exploration and appraisal phase there were reportedly many cases of men abandoning their families after receiving compensation money, or else taking and spending all of the compensation money and leaving women without land or an alternative income to provide for their families. There were also reported to be many cases of fatherless children – that is men (contractors on oil projects) who got local women pregnant and then left them.
- Early school drop-out for girls: Early school drop-out because youth look to make 'quick money' through oil related job opportunities was raised as a concern for both boys and girls but is thought to be a greater risk for girls, who it is feared will be tempted into prostitution or to marry 'rich' oil workers. Early pregnancy and marriage is currently one of the main causes for early school drop out for girls.
- Prostitution: Increased prostitution was reported during the last phase of oil activities and was raised by several stakeholders as a concern for the next phase. Commercial sex workers are a particularly vulnerable category of women due to stigma and high health and safety risks associated with their work. There are also concerns that young women and girls from the local area will be tempted into prostitution to make quick money if there is high demand from influx of male workers.
- Defilement: This is a term used to refer to sexual activity with a minor (under 18). There is a widespread concern that under-age girls will be at risk due to influx of contractor workers.
- Unequal distribution of employment opportunities: Women stated that they feel most of the job opportunities with oil companies go to men but stressed that they would also like to work for the project and believe they can do any type of work men can do.

Community safety

Stakeholders are concerned that crime rates will increase with the next phase of the project due to population increase and increased money in the area, which they believe will attract more thieves. Some stakeholders also expressed concern that those who come to look for oil related work but don't find jobs will turn to crime, and also that if youth lose access to agricultural and grazing land they will lose their livelihoods and therefore turn to crime. There is a concern that conflicts will also increase (mainly land related).

Stable and Cohesive Communities

Several concerns were raised in relation to this issue:

- Land conflict is one of the main aspects impacting community stability and cohesiveness. Land conflict is driven by the increased value attached to land, which in Buliisa is mainly attributed to oil and gas activities, although in Hoima and Nwoya increased demand for land is also driven by in-migration for agricultural and fishing activities. Land conflict manifests in a number of ways. In most cases it remains a non-violent dispute that is mediated by local chairpersons, local elders, NGOs and, as a last resort, local courts. In some cases, however, it involves violence and there were reports of deliberate poisoning and threatening behaviour including use of weapons, as well as reports of crop and property destruction. Land conflict is eroding community cohesion - disputes are within families, between families and between villages - and placing pressure on local leadership and courts who are involved in trying to mediate and resolve the disputes.
- Resettlement and compensation also threatens community stability and cohesiveness. People are worried about where they will be moved to, whether families and clans will be separated, and whether they will be able to continue their current livelihoods. During the last phase compensation was linked to family and community disputes and poor management of compensation payments was linked to impoverishment of some families.
- Disputes between farmers and pastoralists (due to cattle destroying crops) are already common and there are some concerns this issue could worsen as less land is available for each of these activities due to project land take.
- There are no major concerns about ethnic conflict as there is a long history of migration in the Albertine region and local populations are already ethnically diverse. Stakeholders reported that different ethnic groups live together peacefully. There were concerns, however, that migrants would introduce new behaviours and norms that would erode traditional values (the main example given of this was changes in dress code and hairstyles).
- Some fishermen also commented that migrants from the Democratic Republic of Congo who had started fishing in the Ugandan half of Lake Albert were weakening local fisheries management arrangements.

Cultural Identity

Many local leaders (traditional and formal) are concerned that the Bunyoro / Bugungu cultural identity is being threatened by the influx of migrants to the area. They are particularly worried that the Lugungu language will be lost as people introduce new languages. Other risks to their cultural identity are perceived to be from intermarriage with people from other tribes (becoming more common as more migrants move into the area); the breaking up of families and clans and changing settlement patterns due to resettlement; and change in traditional land tenure system from communal to individual ownership.

3.4 Comments from National Level Stakeholder Groups in Kampala

Meetings were held with stakeholders in Kampala in November 2016 and January – March 2017. A summary of the main concerns relevant to cumulative impacts and VECs that were made during those meetings is outlined below. It should be noted that the key objective of these meetings was to gather social and health baseline data and therefore the targeted stakeholders were social and health focused rather than environmental. This is reflected in the types of comments raised.

Gender Equality

A number of concerns were raised in relation to gender equality including:

- Risk that women will be excluded from decision making and consultation processes due to lower education levels and traditional cultural norms, which exclude women from decision making.
- Risk that women will be disproportionately affected by land take but will be excluded from compensation as they do not have the same land ownership rights as men and yet they are the main land users.
- Risk of increases in commercial sex work and risk of sex trafficking of underage girls.
- Increased vulnerability to gender based violence due to family conflict over compensation and resettlement issues.
- Risks to women of sexual harassment due to influx of casual workers.
- Risk that men will abandon their families after receiving compensation for land and leave women to provide for their families but without access to land or compensation.
- Workplace discrimination against women and exclusion of gender considerations in national and local content strategies.
- Increased rates of girls dropping out of school as they are attracted by commercial sex work or casual labour.

Vulnerable Groups

Concerns were expressed about impacts on certain vulnerable groups including:

- The elderly and people with disabilities: more likely to face challenges readjusting following resettlement due to loss of social support networks and access to social support services / amenities
- Children: Increased risks of school dropout due to demand for cheap labour and also risk of trafficking of children for sex work and child labour. Children may also be particularly impacted by any loss of access to education and health facilities due to land take.
- Refugees: risk that the status of asylum seekers could be threatened due to influx of economic migrants from neighbouring countries.
- Minorities: risk that minorities will become more vulnerable if they are moved as they might not be accepted by other groups and they will become more dispersed placing greater pressure on them to assimilate and give up their own identities. Minority groups are also more vulnerable because their land rights are not as secure as the dominant ethnic groups.

Land Issues

A number of issues related to land access and ownership, and compensation issues were raised including:

- Rising number of land conflicts.
- Increasing incidence of land grabbing and vulnerability of those claiming customary ownership rights against people with formal land titles.
- Overlapping complexities between different land tenure systems and ethnic issues, and lack of land access or rights for ethnic minorities perpetuating their vulnerable status.
- Challenge of compensating and ‘relocating’ communal grazing land.

Food Security

Concerns were raised about the vulnerability of the project area to drought and the effects of climate change. Concerns were also raised about the risk that land speculation and land grabbing will increase the vulnerability of poor households to food insecurity as they risk losing access to land to grow crops.

Education

The main concerns expressed in relation to education were that children would lose access to schools during the resettlement process and that school dropout rates would increase due to increased demand for casual labour.

Health

There are concerns about increases in rates of communicable disease due to influx of workers, particularly TB and HIV/AIDS. It was noted that water, sanitation and hygiene practices along the shores of Lake Albert, especially among fishing communities, are poor and that there is likely to be increased waste generation due to influx, which could worsen this issue. Concerns were also raised about communities' access to health services after resettlement.

Cultural Heritage Issues

A few stakeholders emphasized the importance of identifying and protecting cultural sites and cultural resources including burial sites, sacred sites used for ancestor worship (trees, rivers, springs), and features within the Park that have cultural attachments especially wildlife and trees. The challenge of maintaining and preserving indigenous resource knowledge, within the context of resettlement and influx, was also raised as a concern.

Economic Development Opportunities

The opportunity for direct and indirect employment was again the most widely expressed expectation amongst national stakeholders. Limits on the capacity for local stakeholders to benefit from direct jobs due to gaps in education/skills were recognised and emphasis was placed on the need to invest in skills development and skills transfer, and also to support local farmers to link to the project's supply chain.

Community Cohesion

Some concerns were expressed about the potential loss in social capital and social support networks due to resettlement. There are also concerns about the potential increase in family conflict and marriage breakdown due to arguments over compensation payments, as well as concerns about changes in cultural values and norms due to influx.

Local Government Capacity

The issue of limited local government capacity to monitor the impacts of oil and gas activities was raised by a number of stakeholders at the national level. This issue should be taken into consideration when considering capacity to manage cumulative impacts and options for mitigation. The district and sub county environmental offices and community development offices were identified as in particular need of additional capacity building and resources, and a need to build capacity for disaster preparedness and response in Buliisa and Nwoya Districts was also noted.

3.5 Conclusions

Table 3.1 below provides a summary of whether the VEC should be prioritised, as informed by the by stakeholder consultation. Generally, the list of candidate priority VECs presented in the Scoping Report reflects the opinions raised by stakeholders during consultation. This is as expected given that the list was based on a detailed scoping process (which included consultation) and a documentary review of previous studies which considered stakeholder concerns and priorities. There are some VECs that have been

removed from the list because of overlaps with other VECs. A few other VECs were not raised by stakeholders as a priority and have also been removed. An explanation is provided below.

Table 3.1 Comment of whether VEC should be prioritised

Proposed VEC	Comment of whether should remain candidate priority VEC
Protected areas	Yes, identified by many stakeholders as a high priority. Some stakeholders stated that there was an overlap with critical habitat. It was also suggested that the VEC should not be protected areas but instead the VECs should relate to the values /services of that protected areas provide i.e. they are valuable for biodiversity, tourism and various ecosystem services. Given the high number of stakeholders that highlighted the importance of protected areas this should be considered a priority VEC. Tourism and ecosystem services should also be covered under separate VECs.
Critical and Natural Habitat	Yes, identified by many stakeholders as a priority. The proposed DMUs provide comprehensive coverage of habitats within the study area including, ecological corridors, wetlands, woodlands and forests and other threatened ecosystems.
Populations of wildlife or species of conservation concern	Identified by many stakeholders as a priority. Overlap with flagship species noted and recommendation that this VEC is combined. Given the high number of species it may be necessary to select a group of key indicator species.
Flagship species	Identified by many stakeholders as a priority but was also noted that it overlaps with species of conservation concern and therefore recommended that these VECs are combine. A number of responses suggested that tourism is largely focussed on flagship species. This should be considered in relation to the tourism VEC (i.e. thresholds and indicators could be linked to populations of flagship species).
Woodland and forest ecosystems	Highlighted as a key issue of concern by stakeholders given the critical state of habitat and increased risks associated with population change and energy demands. However, it was also noted that the biodiversity values of woodland and forests are covered by protected areas and critical habitat. Sustainable woodland as a source of biomass should be covered by a separate VEC.
Characteristic threatened ecosystems	Highlighted as a concern by stakeholders but it was felt that this issue would be covered by protected areas and critical habitat.
Ecological corridors	Highlighted as a concern by stakeholders but it was felt that this issue would be comprehensively covered by protected areas and critical habitat (which includes a number of ecological corridors including savanna, forest corridors and wetland corridors).
Landscape character	Limited stakeholder concern expressed for landscape character. Concerns were focussed on the Project rather than on cumulative effects of multiple projects and activities. Stakeholder's concerns were also related to how a deterioration in landscape quality would affect tourism. Not recommended as a priority VEC but landscape character should be considered in relation to the tourism VEC below.
Global air quality linked to carbon emissions	Divergent opinions expressed by stakeholders. In the context of global emissions contributions from oil infrastructure are small. However, in the context of regional, and to an extent, national emissions, these are more significant. Recommended that it is retained as a candidate priority VEC subject to further consideration (see section 4.1 below which explains the next stages of the CIA).

Proposed VEC	Comment of whether should remain candidate priority VEC
Local air quality	Mixed views from stakeholders expressed. Cumulative effects are less likely to be linked to the large emitters from oil activities, but instead relate to the incremental increases in emissions from transportation activities, particularly in built up areas. It is uncertain that cumulative emissions from traffic would result in significant adverse effects. Therefore not considered to be a priority.
Woody biomass for building, cooking, medicinal products and cultural uses.	This priority candidate VEC remains appropriate. Pressure on forests and loss of trees was repeatedly raised as an issue by stakeholders, mainly related to project removing trees and influx leading to increased demand for firewood and agricultural land. The title of the VEC should be changed to focus on sustainable woodland as a source of woody biomass.
Productive agricultural land	This priority candidate VEC remains appropriate. However food security has been removed from this VEC and described as a separate VEC. Pressure on agricultural land was raised as a concern during stakeholder consultations.
Livestock production from open-access grazing land	This priority candidate VEC remains appropriate. The loss of communal grazing land is a key stakeholder concern. Also now included within this VEC are elements relating to pastoral ways of life from customary access to open grazing land.
Crop products from subsistence farming	We have changed this priority VEC to 'Food Security' and split out the multiple issues threatening food security.
Livestock products (meat, milk)	Issue about competition for grazing land with indirect impact on livestock productivity should be linked to 'livestock production' VEC; issue about cattle keepers being deprived of milk did not come up.
Biological raw materials	Only issue raised in relation to grass was that it should be compensated along with other crops as it has a value both in house construction (roofing) and for cattle. As such this VEC is not considered to be a priority candidate VEC.
Wildfood (bushmeat, nuts, fruit, mushrooms)	Stakeholder engagement highlighted poaching is still widely practiced by local people and people that come in from further afield. There is reported to be a big market for bush meat. As such the combination of the project with other projects and improved infrastructure (such as road enhancements etc.) is likely to increase poaching activity. The VEC also considered other wildfoods such as nuts, fruit and mushrooms. However, the availability of these wildfoods was not highlighted as a key stakeholder concern. As such this element is no longer considered within this VEC.
Natural medicines	Concerns about increased scarcity of natural medicines were not raised by stakeholders. This was raised more as a compensation issue as people want the plants and trees that have medicinal value to be included in the compensation matrix. As such this VEC has been removed as a priority candidate VEC.
Ethical and spiritual values (sense of place and pride in Uganda's wildlife)	Yes, some concerns were raised about negative impacts in the national park and on cultural sites outside the park. (Not just sacred natural sites but also places of historical significance e.g. burial sites).
Educational values	Limited concern raised by stakeholders. Many of the elements encompassing this VEC will be considered through the other VECs therefore this has been removed as a priority VEC.

Proposed VEC	Comment of whether should remain candidate priority VEC
Pastoral way of life from customary access to open grazing land	Due to the significant overlaps between the two, this VEC has been combined with the 'open access grazing land and pastoral way of life' VEC above. The issue relating to conflict between farmers and pastoralists will also be considered through the 'Stable and cohesive communities' VEC.
Recreation and ecotourism	This priority candidate VEC remains appropriate. Engagement with stakeholders from the tourism sector highlighted the importance of wildlife populations. It was also repeatedly stated that a major aspect of the tourism experience relates to the sense of place /landscape quality provided by the MFNP. This is with respect to delivery of the expectations of visitors from outside Africa with regards to what they 'expect' from the 'African experience'.
Lake Albert Capture Fisheries	This priority candidate VEC remains appropriate. Fish catches in Lake Albert have already been significantly affected by overfishing. This was borne out by the outcomes of stakeholder engagement.
Safe drinking water resources	Yes, study area is considered a water-stressed area (not in terms of water scarcity but in terms of water quality) and stakeholders expressed some concerns about sanitation and impacts on water quality due to poor waste management practices both by project and due to influx.
Healthy Communities	This remains a priority VEC. Increased rate of HIV/AIDS and TB are top concerns raised by stakeholders. Impacts on access to healthcare was not as big a concern but it was clear that health services are already stretched and communities place high importance on access to healthcare. Investment in health care is one of most common requests to oil companies.
Educated communities	This remains a priority VEC. Stakeholders raised concerns about early school drop-out due to economic opportunities and concerns that resettlement would disrupt education. Investment in education was also a top request to oil companies.
Access to land and affordable shelter	This remains a priority VEC. Landlessness for poorer households was raised as a concern during stakeholder consultations. Poor housing due to influx and rapid, unplanned construction of settlements was also raised as a concern.
Sustainable economic development	This remains a priority VEC. Opportunity for direct and indirect employment was raised by almost all stakeholders and is one of the main expectations associated with oil and gas development. Concerns over rising cost of living were also raised as well as risks to poorer and subsistence households due to general transition to a cash based economy.
Gender equality	This remains a priority VEC. Gender equality is a key issue and several concerns related to gender equality and women's rights were raised during stakeholder consultations.
Safe communities	This remains a priority VEC. Many stakeholders consider increased crime levels to be a risk associated with influx driven by the project and concerns over increased traffic accidents were also raised a number of times.
Stable and cohesive communities	Remains a priority VEC. Stakeholders raised many issues in relation to how developments in the area are changing or will change existing community stability and cohesiveness. The main issue affecting stable and cohesive communities at present is land conflict.

4 Revised List of Candidate Priority VECs

4.1 Introduction

Table 4.1 below sets out the revised priority candidate VECs based on the feedback from stakeholders summarised in Chapter 3 above. As noted in the Introduction to this report, VEC selection and definition is an iterative process and the VECs described below are therefore subject to modification as the CIA and ESIA processes progress. The next stages in the CIA that will further inform the definition of VECs are as follows:

- Gap analysis – during the gap analysis we will further define thresholds and indicators and in doing so we will update, where necessary, the description of VECs to ensure that the description fully align.
- Assessment stage – during the assessment stage we will have a more detailed understanding of the impacts of the Project which in turn will inform the VECs that should be prioritised for assessment and collective management. We will also have more information on the other developments which together with the Project will result in cumulative effects.
- Further consultation with stakeholders – as presented to stakeholders at our workshop there will be further consultation during assessment phase of ESIA.
- The Company proposes to work with Government to set up a regional cumulative impacts management mechanism. In addition, other oil development ESIA and CIAs will be undertaken for other projects. There may be opportunities to align our Project CIA methods and approaches with those of other Projects CIAs. This may mean adjusting the VECs to ensure consistency between different projects to more accurately assess and manage cumulative impacts.

Table 4.1: Description of Candidate Priority VECs

Proposed VEC	Description of VEC
Protected areas	Protected Areas include statutory National Parks, Wildlife Reserves and Ramsar sites. Cumulative effects could result from other developments directly and indirectly affecting Protected Areas. Indirect impacts are primarily associated with in-migration and the economic development of areas linked to oil development. *This VEC covers the biodiversity values of Protected Areas. Other functions of Protected Areas are also covered under other VECs e.g. eco-tourism.*
Critical and Natural Habitat	Critical Habitats are areas with high biodiversity value as defined by IFC Performance Standard 6. Cumulative effects could arise from habitat loss, construction disturbance, habitat fragmentation, introduction of invasive species or may be result with wider indirect effects associated with in-migration and economic development.
Species of conservation concern	There are numerous species of conservation value in the Project study area including those that are endangered, protected, endemic or considered to be flagship or landscape species. Cumulative effects could arise from habitat loss, construction disturbance, habitat fragmentation, or may be result with wider indirect effects associated with in-migration and economic development.

Proposed VEC	Description of VEC
Global air quality linked to carbon emissions	Contribution to changes in greenhouse gas emissions and therefore to global warming.
Sustainable woodland and trees for building, cooking, medicinal products and cultural uses.	Trees and woody biomass have multiple uses for local communities including fuel, building materials, source of food and traditional medicinal products, spiritual value and cultural value (including, for example, serving as meeting points). Potential for loss of areas used to collect biomass and loss of trees or greater restrictions on access to these areas due to removal or restriction from new infrastructure. Cumulative effects could also occur as a result of in-migration and increased demand for access to land suitable for crop-growing with consequences for rates of land conversion throughout the Study Area and conversion of forested areas into agricultural land. Reduced viability of other land based livelihoods may also force more people to rely on charcoal making as an alternative source of income.
Productive agricultural land	Cumulative effects could occur as a result of the loss of productive land (including land for crops and grazing) at the same time as an increase in demand for agricultural products from in-migration. This may encourage the opening up new agricultural land, with associated deforestation and conversion of wetlands.
Open-access grazing land and pastoral way of life	Livestock grazing is an important livelihood for many people in the Albertine and is a key aspect of cultural identity for many people. The existing livestock system depends on open access to communal grazing lands. Grazing lands are dispersed across the landscape and could be further fragmented by new development. The process of land acquisition and compensation for developments in the area is also driving a transition from a communal ownership land tenure system to individual ownership, which will further fragment the existing communal grazing lands.
Food Security	Food security for the population depends on provision of foods from subsistence farming, fishing and livestock keeping activities as well as ability to purchase food items. Food security may be affected in a number of ways: ▪ There will be loss of agricultural land due to land take for the project. ▪ More demand for crops as population and access to markets increase incentives to shift to cash crops, depriving the family of food. ▪ Decreased sizes of farm holdings, due to population pressure from influx and increased land sales due to speculation driven by oil and gas developments, can lead to more intensive farming on smaller plots leading to lower yields and also means families will have smaller overall quantity of land and therefore smaller quantities of food. ▪ Inflation of food prices due to increased demand from developments and due to influx ▪ Depleting fish stocks due to overfishing driving up price of fish ▪ Reduction in livestock products due to loss of open access grazing land

Proposed VEC	Description of VEC
Bushmeat	Overharvesting of wildlife through hunting threatens achievement of full benefit from nature based tourism and threatens populations of species of conservation concern. Although illegal in the protected areas, hunting benefits hunters and their families and many people who purchase it as a preferred meat. Bushmeat is also relied on by some people from communities that no longer keep livestock and use bushmeat as a source of protein. Bushmeat therefore adversely affects supply of the service of nature-based tourism, whilst also being considered a priority service by some who depend on it for food and income.
Ethical and spiritual values	Ethical and spiritual values – natural forest, grassland, wetland, Lake Albert, rivers. Sacred Natural Sites have special spiritual values to communities and are widely regarded as sources of life for biodiversity and ecosystems. The scale of change in the environment will be such that people will be affected in their sense of place.
Recreation and ecotourism	Tourism resources are located in and around Murchison Falls National Park and also in the Budongo Forest Reserve and are primarily focussed on wildlife. Oil development together with other projects (such as major hydro in the National Park), have the potential for cumulative effects on tourism numbers, revenue or tourist's experience.
Lake Albert capture fisheries	Potential beneficial cumulative effects could result from alternative employment opportunities created by the oil industry. Indirect cumulative effects could occur as a result from in-migration, greater access to markets from improved roads, and compensation being used to fund fishing gear.
Safe drinking water resources	In-migration and development of temporary accommodation could lead to increased pressure on drinking water resources and poorer sanitation practices that threaten water supplies.
Community health	In-migration of workers and others, and changes in living conditions and working practices could lead to increased incidences of communicable diseases. Increase in rates of HIV/AIDS of particular concern due to likely increase in commercial sex work. Increase in sanitation and hygiene related disease due to low capacity to deal with high levels of increased waste from influx. In-migration and the presence of temporary workers will lead to increased demand for community health services, and this may affect the availability and cost of services for local residents.
Primary and secondary school education	The completion of primary and secondary school is important for personal and community level development. Increased family incomes may help support children in the completion of schooling, but economic opportunities could also prompt some children to end education in favour of work.
Land and affordable shelter	In-migration, increased incomes, and requirements for land for major projects and other developments could lead to increased demand for land and residential property and increased prices. While this may benefit owners of land and property it would create negative impacts for those who rent land and property. Access to land may be further impacted due to increased individualisation and privatisation of land meaning loss of access to customary / communal land, and misuse of compensation payments (not investing in replacement land).

Proposed VEC	Description of VEC
Sustainable economic development	Cumulative effects could occur as a result of direct employment creation or employment within the wider supply chain. Wider indirect effects associated with economic development may be positive (e.g. new jobs and markets) or negative (e.g. increased cost of living, increased cost for labour, widening inequality as poorer and subsistence based households struggle to adapt to more cash based economy).
Gender equality	Women may not benefit from the benefits of economic activity in the region, and may be disproportionately affected by the adverse impacts. Adverse impacts include increased gender based violence, abandonment of women and children, early school drop out for girls, increase in prostitution, and sexual exploitation of minors.
Safe communities	Economic activity is often associated with in-migration, differences in the relative income and wealth of local residents, and increased traffic, all of which can lead to increased incidence of crime and road traffic incidents.
Stable and cohesive communities	Community cohesiveness and stability may be affected by a number of factors: land conflict driven by increased value attached to land (mainly attributed to O&G activities in Buliisa District); poor management of compensation payments has been linked to family breakdown and increases in gender based violence; excessive growth and changes in community composition can affect the real and perceived standard of living between local residents; disputes between farmers and pastoralists (due to cattle destroying crops) are already common and could worsen as less land is available for each of these activities due to project land take; and breakdown in community support networks due to resettlement.
Cultural identity	This VEC has been added to the list. Changing demographic composition of communities may threaten cultural identity of original inhabitants of the area through introduction of other languages, breaking up of families and clans due to resettlement and loss of communal land ownership systems, and changing settlement patterns.

APPENDICES

Appendix A: VECs Presented at the Workshop

Bio-physical VECs

Proposed VEC	Description of VEC and reason for selection
Protected areas	Protected Areas include statutory National Parks, Wildlife Reserves and Ramsar sites. Cumulative effects could result from other developments directly and indirectly affecting Protected Areas. Indirect impacts are primarily associated with in-migration and the economic development of areas linked to oil development. Protected areas include: • Murchison Falls National Park /Protection Area, including • Bugungu WR • Murchison Falls-Albert Delta Wetland System Ramsar Site • Budongo CFR& IBA • Bugoma CFR • Semuliki WR • Kabwoya WR ***This VEC covers the biodiversity objectives of Protected Areas. Other functions of Protected Areas are also covered under VECs e.g. landscape and eco-tourism.***
Critical and Natural Habitat	Critical Habitats are areas with high biodiversity value as defined by IFC Performance Standard 6. Cumulative effects could arise from habitat loss, construction disturbance, habitat fragmentation, introduction of invasive species or may be result with wider indirect effects associated with in-migration and economic development. 10 Discrete Management Units identified, based on the landscape-level ecology and distribution of species that might qualify the area as Critical Habitat: 1. Lake Albert and wetlands 2. Savanna corridors 3. Forests and corridors 4. Mixed habitats landscape 5. Budongo 6. Bugoma 7. MFPA 8. Murchison Falls-Albert Delta Wetland System Ramsar Site 9. Chimpanzee 10. Nahan's Francolin
Populations of wildlife or species of conservation concern	There are numerous species of conservation value in the Project study area including those that are endangered, protected, endemic or considered to be flagship or landscape species. Cumulative effects could arise from habitat loss, construction disturbance, habitat fragmentation, or may be result with wider indirect effects associated with in-migration and economic development. Note: there are over 100 CH trigger species, and others of conservation value.
Flagship species	Including e.g. elephants, lions, giraffe, chimps, Uganda Kob, shoebill, grey-crowned crane. Cumulative effects could arise from habitat loss, construction disturbance, habitat fragmentation, or may be result with wider indirect effects associated with in-migration and economic development.
Woodland and forest ecosystems	Woodland and forest ecosystems are already under pressure from clearance, fuel gathering and charcoal making. However, many of these woodlands and forests are important areas of Critical Habitat as well as providing a reservoir for threatened populations and ecological corridors between other habitats for a variety of species.
Characteristic threatened ecosystems	The Albertine Rift contains a number of characteristic ecosystems such as lakes, rivers and wetlands (permanent and seasonal), savannah, wooded grasslands, woodlands and high tropical forest. Cumulative effects could result from multiple developments affecting these habitats directly or indirectly.
Ecological corridors	Loss of habitat resulting in risk of habitat fragmentation and severance of existing ecological corridors.
Landscape character	Potential for multiple developments to affect the character and quality of the landscape within the study area, with specific reference to Murchison Falls Protection Area and landscape corridors.

Proposed VEC	Description of VEC and reason for selection
Global air quality linked to carbon emissions	Contribution to changes in greenhouse gas emissions and therefore to global warming.
Local air quality	Cumulative effects could arise in areas where the emissions of multiple developments and activities overlap e.g. increased traffic emissions in urban areas.

Social & Ecosystems VECs

Proposed VEC	Description of VEC and reason for selection
Woody biomass for building and cooking	Potential for loss of areas used to collect biomass (for fuel, housing etc.) or greater restrictions on access to these areas. Cumulative effects could also occur as a result of in-migration and additional pressure on available resources.
Productive agricultural land and food security	Cumulative effects could occur as a result of the loss of productive land (including land for crops and grazing) at the same time as an increase in demand for agricultural products from in-migration. This may encourage the opening up new agricultural land, with associated deforestation and conversion of wetlands.
Livestock production from open-access grazing land	Some very vulnerable people rely on livestock production from open access grazing land for their livelihoods and wellbeing: displaced pastoralists and people employed as cattle herders, who are paid very low wages and have little access to alternatives. Others have a strong cultural attachment to owning cattle and see them as an important form of capital and savings. Grazing lands are dispersed across the landscape and could be further fragmented by oil related development, especially linear infrastructure.
Crop products from subsistence farming	Increased demand for access to land suitable for crop-growing with consequences for rates of land conversion throughout the Study Area. More demand for crops as population and access to markets increase incentives to shift to cash crops, depriving the family of food.
Livestock products (meat, milk)	Population growth and access to markets lead to competition for grazing land. Likely to be exacerbated by land enclosure and land use controls, resulting in exceedance of carrying capacity and reduced productivity of animals. Impacts on level of effort needed to maintain benefit by taking cattle further to find sufficient grazing. New markets and improved infrastructure such as refrigerated milk storage and paved roads throughout the Study Area and reduced yields due to declining pasture supply mean cattle keepers potentially deprived of milk (previously given in lieu of payment) as it has sale value. Income insufficient to buy alternative protein.
Biological raw materials	Overharvesting of grass used for thatching as an alternative source of income to selling firewood, primarily harvested from protected areas. Improved transport (paved roads) could drive further over-harvesting. Income and/or quality of housing affected.
Wildfood (bushmeat, nuts, fruit, mushrooms)	Overharvesting of wildlife through hunting threatens achievement of full benefit from nature based tourism and threatens populations of species of conservation concern. Although illegal in the Protected Areas, hunting benefits hunters and their families and many people who purchase it as a preferred meat. Bushmeat is also relied on by some people from communities that no longer keep livestock and use bushmeat as a source of protein. Bushmeat therefore adversely affects supply of the service of nature-based tourism, whilst also being considered a priority service by some who depend on it for food and income.
Natural medicines	There is already scarcity. More population will increase the demand and indirectly worsen scarcity, which will affect ability to use natural medicines. population increase expected to worsen existing scarcity due to decline of natural habitats and increasing demand for medicinal plants that are already over-harvested.
Ethical and spiritual values (sense of place and pride in Uganda's wildlife)	Ethical and spiritual values – natural forest, grassland, wetland, Lake Albert, rivers. Sacred Natural Sites have special spiritual values to communities and are widely regarded as sources of life for biodiversity and ecosystems. The scale of change in the environment will be such that people will be affected in their sense of place.
Educational values (Research centres with a focus on biodiversity)	Natural forest could become so degraded due to fragmentation and other impacts that it risks losing some of its educational value.
Pastoral way of life from customary access to open grazing land	Pastoral way of life from having open access to grazing land -natural forest, woodland, shrubland, wooded. More people, more conversion to private use of land; there are already tensions between nomadic pastoralists and farmers. Any constraint in their movement affects nomadic pastoralists. There have been deadly conflicts between farmers and settled nomads.

Proposed VEC	Description of VEC and reason for selection
Recreation and ecotourism based on wildlife populations	Tourism resources are located in and around Murchison Falls National Park and also in the Budongo Forest Reserve. Oil development together with other projects (such as major hydro in the National Park), have the potential for cumulative effects on tourism numbers, revenue or tourist's experience.
Lake Albert Capture Fisheries	Potential beneficial cumulative effects could result from alternative employment opportunities created by the oil industry. Indirect cumulative effects could occur as a result from in-migration, greater access to markets from improved roads, and compensation being used to fund fishing gear.
Safe drinking water resources	In-migration and development of temporary accommodation could lead to increased pressure on drinking water resources and poorer sanitation practices that threaten water supplies.
Healthy Communities	In-migration of workers and others, and changes in living conditions and working practices could lead to increased incidences of communicable diseases. In-migration and the presence of temporary workers will lead to increased demand for community health services, and this may affect the availability and cost of services for local residents.
Educated communities	The completion of primary and secondary school is important for personal and community level development. Increased family incomes may help support children in the completion of schooling, but economic opportunities could also prompt some children to end education in favour of work.
Affordable shelter	In-migration, increased incomes, and requirements for land for major projects and other developments could lead to increased demand for land and residential property. While this may benefit owners of land and property it would create negative impacts for those who rent land and property.
Sustainable economic development	Cumulative effects could occur as a result direct employment creation or employment within the wider supply chain. Wider indirect effects associated with economic development may be positive (e.g. new jobs) or negative (e.g. increased cost of living, increased cost for labour).
Gender equality	Women may not benefit from the benefits of economic activity in the region, and may be disproportionately affected by the adverse impacts.
Safe communities	Economic activity is often associated with in-migration, differences in the relative income and wealth of local residents, and increased traffic, all of which can lead to increased incidence of crime and road traffic incidents.
Stable and cohesive communities	Excessive growth and changes in community composition can affect the real and perceived standard of living for local residents. In-migration will alter the demographic composition of the community and could alter the social dynamics and cohesion of the community.

Appendix B: Stakeholders Consulted

Organisations Attending the CIA Stakeholder Workshop in Kampala on 16 November 2016

- National Fisheries Resources Research Institute (NAFIRRI)
- National Environment Management Authority (NEMA)
- Uganda Wildlife Authority (UWA)
- Association of Uganda Tour Operators (AUTO)
- National Forestry Authority (NFA)
- Ministry of Lands Housing and Urban Development (MLHUD)
- Directorate of Water Resource Management (DWRM)
- Ministry of Gender Labour and Social Development (Gender)
- Ministry Tourism Wildlife and Antiquities (MTWA)
- BLAC (with representatives from: Wetlands International, Flora and Fauna International (FFI), WCS)
- Willdlife Conservation Society (WCS)
- Total E&P Uganda B.V (TEPU)
- Tullow Uganda Operations Pty Ltd (TUOP)
- China National Offshore Oil Company (CNOOC)
- Environmental assessment practitioners from AECOM
- Eco & Partner

Local and Community Organisations Consulted in the Project Study Area

Local community organisations consulted as per table below. In addition to these organisations Tilenga ESIA team also consulted with District Governments in Hoima, Buliisa, Nwoya, Nebbi and Masindi; Sub County / Municipal authorities in Hoima Municipality; Biso Sub County; Buliisa Sub County; Buliisa Town Council; Kigwera Sub County; Ngwedo Sub County; Got Apwoyo Sub County; Purongo Sub County; Pakwach Town Council; and Masindi Municipality. And then we had various community level focus group discussions with women, youth, elders, migrants and different livelihood groups as well as key informant interviews with police and health centres. Tilenga ESIA team also met with tourist lodges in MFNP.

Organisations	Date
▪ Uganda Human Rights Commission, Hoima Branch	22 November 2016
▪ Bunyoro Inter-religious Committee	22 November 2016
▪ Kakindo Orphange	26 November 2016
▪ Buliisa Initiative for Rural Development Organisation (BIRUDO)	24 November 2016
▪ Lake Albert Children's and Women's Development Organisation (LACWADO)	8 December 2016
▪ Acholi Chiefdom	30 November 2016
▪ Bunyoro Kitara Kingdom	6 December 2016

Meetings with National Stakeholders in Kampala

Organisations	Date
▪ Directorate Gender – Commissioner for Community Development	15 November 2016
▪ Ministry Health – Environmental Health Division	16 November 2016
▪ Directorate Gender – Commissioner for Youth and Children's Affairs	17 November 2016
▪ Uganda Human Rights Commission	17 November 2016
▪ Minority Rights Groups International	17 November 2016
▪ International Alert	18 November 2016
▪ Uganda Bureau of Statistics (UBOS)	30 January 2017
▪ Directorate Labour, Employment and Occupational Safety	31 January 2017
▪ Uganda TB Control Programme	17 January 2017
▪ Uganda AIDS Commission	18 January 2017
▪ Directorate Gender & Community Development	31 January 2017
▪ Office Prime Minister (Department Disaster Preparedness and Response)	1 February 2017
▪ Directorate Social Protection	1 February 2017
▪ Ministry Internal Affairs (Uganda Police Force)	2 February 2017
▪ International Organisation for Migration (IOM)	2 February 2017
▪ Africa Institute for Energy Governance (AFIEGO)	3 February 2017
▪ Ministry of Internal Affairs, Directorate Citizenship and Immigration Control	3 February 2017
▪ Department of Museums and Monuments	7 and 9 March 2017
▪ Cross Cultural Foundation	10 March 2017