ARANKA GOLD LEACH PROJECT

Project Summary

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1.0: Site Location

The Aranka Gold Leaching Project (AGLP), being developed by ORAVA Mining, Equipment and General Sales Inc is located within Cuyuni-Mazaruni Region of Guyana. The Aranka Project is located at position Longitude 059.627425°W and Latitude 06.925386°N, within Mining District Number Four (4) (see Fig 1). It lies approximately 160 km west of Georgetown, the capital city, and falls within Cuyuni-Mazaruni mining area.

Geographically, the project area is in the Amazon rainforest, located on the left bank of the Aranka River, a tributary of the Cuyuni River. The terrain is heavily forested, and access depends largely on the type of material being transported and seasonal weather pattern. During the rainy season with high water conditions, it is preferrable to use river transport from Bartica along the Cuyuni River and then up the Aranka River. During the dry season it is more logical to use the road from Burke Hall on the Essequibo River to Aranka Backdam, a journey of approximately 145 km. The latter route is also preferably used for the transport of heavy equipment and spares. Topographically, the project area is defined by steep and rugged hills with elevations exceeding 200 feet. The land is dissected by a dendritic drainage system of small streams and creeks. Hills and ridges are predominantly aligned with a west–east structural trend, reflecting the underlying geology. The higher elevations display sharp, resistant slopes underlain by hard rock, while the lower elevations are mantled with fluviatile deposits. Vegetation consists of intact tropical lowland forest, with canopy heights ranging from 15 to 20 meters. The forest has largely been disturbed, having experienced extensive mining and large-scale logging. Vegetation is also dissected by numerous logging and mining access roads.

Currently, the area remains an active mine site with medium and small-scale mining being conducted within and on adjoining mining properties. Although selective logging has been practiced in earlier years, the broader area has long been designated as mining land. Several medium-scale prospecting permits for gold have been allocated in the surrounding region.

Climatically, the area is influenced by the Inter-Tropical Convergence Zone (ITCZ), which drives a bimodal rainfall pattern across Guyana. Two wet and two dry seasons are observed annually, although even the drier months average more than 150 mm of rainfall. The longer wet season typically extends from May to August, while a shorter wet season occurs between December and February. October is generally the driest month, but recent weather patterns have been erratic and

do not necessarily confirm to the normal weather pattern. November marks a transitional period, when low thermal pressure over the Amazon basin weakens the usual ITCZ convergence, resulting in a less intense December rainy season. Regional rainfall patterns are also shaped by orographic effects of the Pakaraima Mountains to the west and the Wilhelmina Mountains to the east. The eastern mountain flanks receive as much as 4,400 mm of rainfall annually, while the western slopes experience reductions of up to 1,700 mm.

Within the Aranka Project area, the climate is classified as tropical rainforest, with an average annual rainfall of approximately 3,000 mm. Temperatures along the creeks range between 29°C and 31°C. Beneath the forest canopy, conditions are cooler though consistently humid, reflective of the dense vegetation and high rainfall regime characteristic of the region.

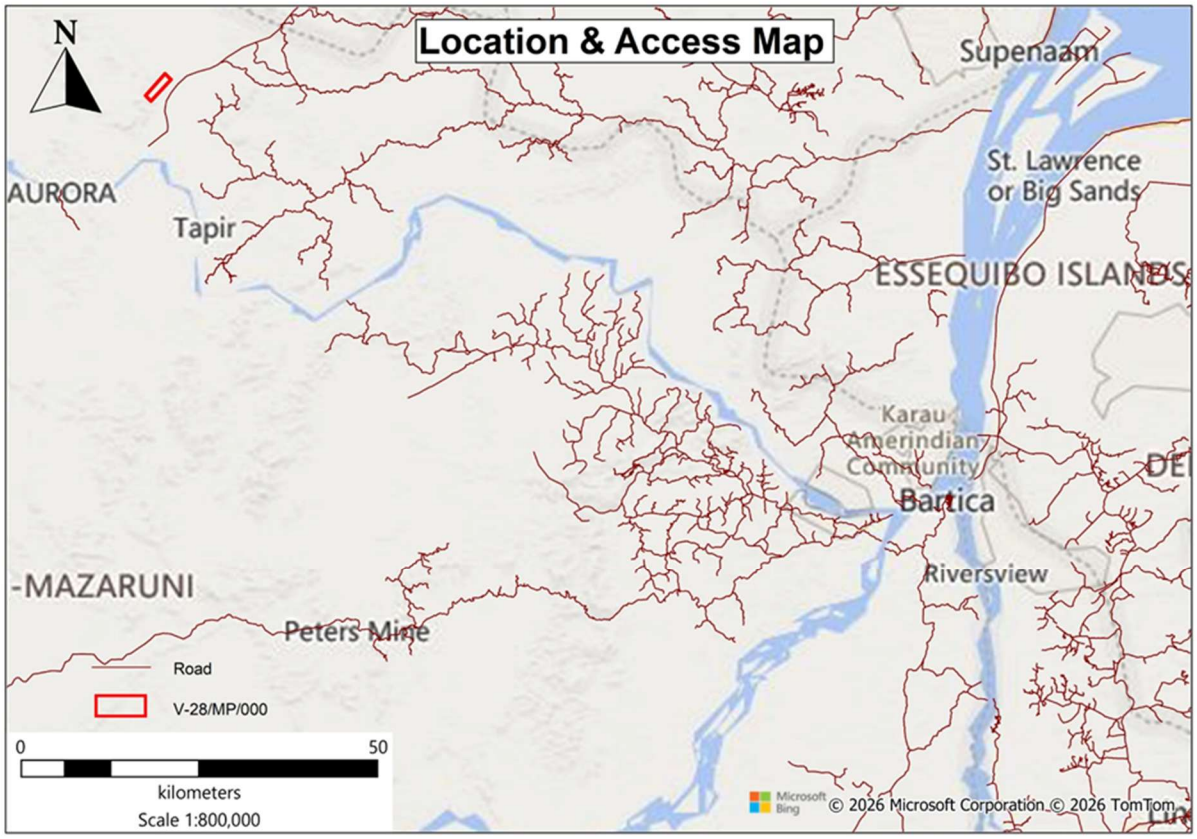

Figure 1: Location and Access Map.

1.1: Site Layout

The AGLP is located approximately 10 km from the Cuyuni River which is the main water body within the area. The mine site itself is located within a heavily mined area where basically all the

natural vegetation has been removed and the topsoil has been disturbed. Within the project area the natural water bodies, mainly the Aranka River have been diverted to allow for mining of the alluvial deposits. As such no natural drainage pattern exists within the project area. The Arangoy Landing, a local business hub, is situated 1.2 km from Project Site. This landing houses several business entities, a Police Outpost and a GGMC Mining Station.

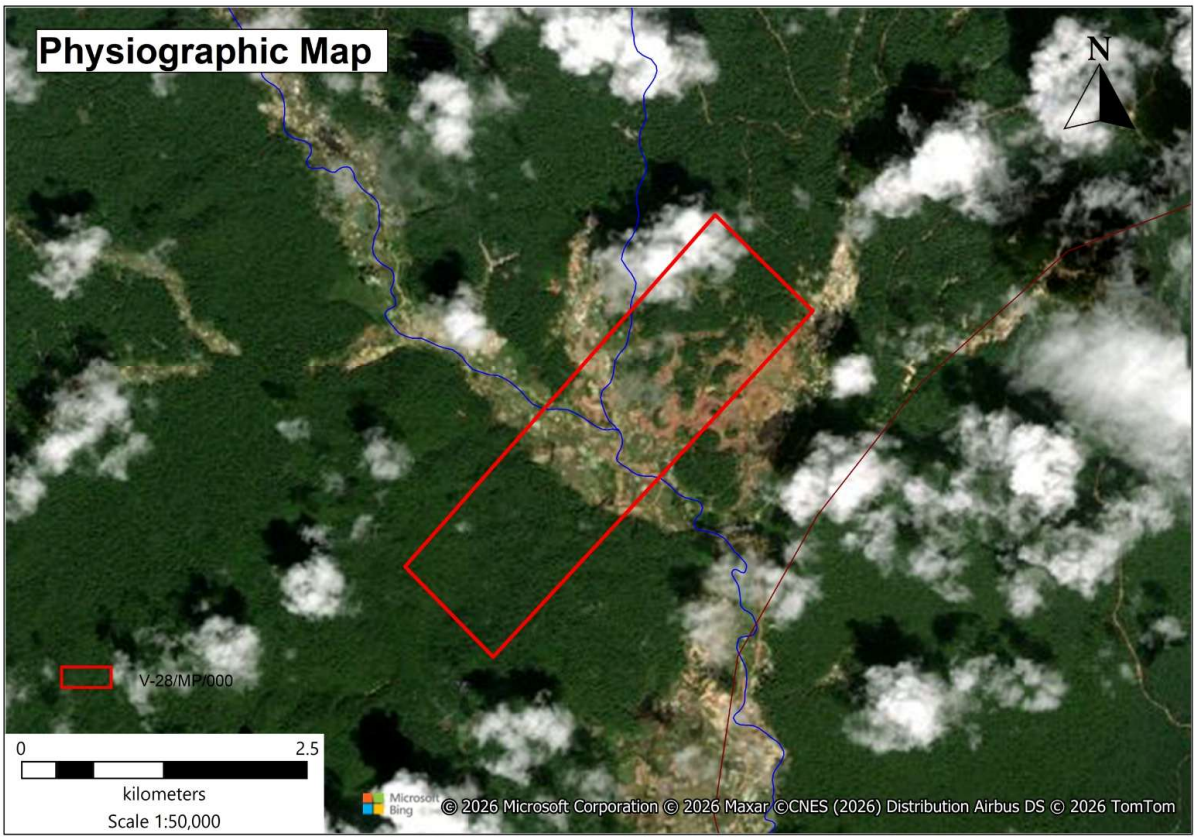

Figure 2: Physiographic map of the Aranka Area.

The leach pad will be constructed with a high berm to prevent any spillage into the environment and to avoid loss of valuable lixiviant and gold ore. The Area covers 4,800 m^2, its dimensions are 80 m by 60 m with a height of 4 m, while the walls will have a slope angle of 45 degrees. Berm widths of 6 m will be utilized based on the operating track width of XCMG excavators. This allows the excavators to simultaneously operate and compact berms. Each leach pad will be constructed with a 3 m berm above ground level and 1 m below ground level with a nominal capacity of 19,200 m^3. The concept of construction above ground level is to allow for gravity flow of lixiviant to the pregnant solution pond under gravitational forces.

ORAVA will ensure that the construction of leach pads will be based upon guidelines of environmental management systems (ISO 14001), quality management (ISO 9001), and health and safety (ISO 45001). These guidelines can influence the operation of heap leach facilities, their integrity and productivity, as such it is pertinent that ORAVA confirm to these international standards:

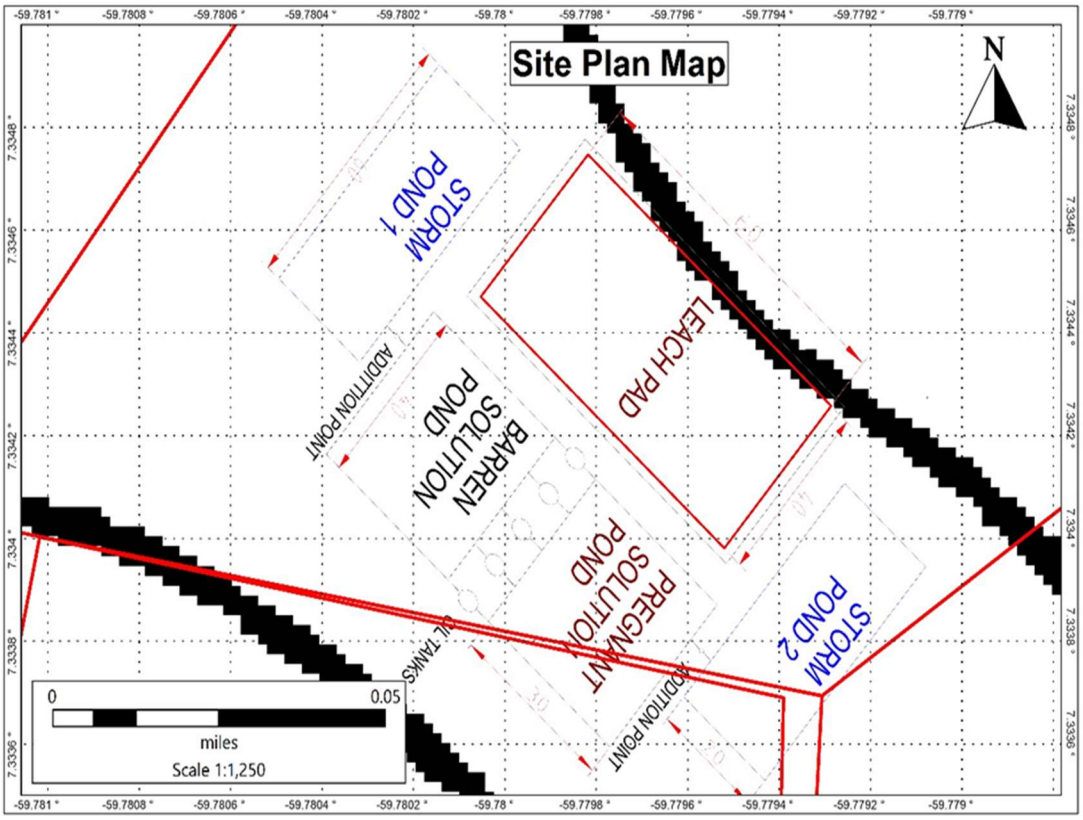

Figure 3: Heap Leach Facility Layout.

2.0: Health Safety and the Environment (HSE) Plan

ORAVA will develop and enforce a HSE plan that complies with Guyana's Occupational Safety and Health Act (Cap 99:06) where it "provides for the registration and regulation of industrial establishments, for occupational safety and health of persons at work and, for purposes connected therewith or material thereto". Moreover, it will observe Section 41 which "prohibits the employment of persons under the age of 15 ("children") in factories."

Figure 4: Aranka Project Site.

3.0: Project Description

The AGLP processing facility is designed to treat 98,000 m^3 of ore/tailings per annum. Preliminary tests have shown that the mine tailings in the Aranka area are readily amenable to conventional Jin Chan leaching. Jin Chan or Metallic Ore Dressing Agent/SHJCA02 is a brand of leaching reagents specifically designed by Guangxi Senhe High Technology Co LTD of Guangxi, China for the extraction of gold from ores. Since the tailings/ore consist primarily of hammer mill tailings that have already been stockpiled there is no requirement for a milling circuit. There is also no requirement for pre-treatment or washing to remove clays since the tailings have not been contaminated by siltation due to surface run off. Leaching will be done in batches of 19,200 m^3 or 32,640 tons. Pregnant leach solutions will be treated in carbon- in columns (CIC) circuits to recover gold from the lixiviant by adsorption to activated carbon. The barren lixiviant will then be recycled into the leaching process after the pH and leaching agent concentrations have been adjusted. Gold will be recovered by direct smelting of the loaded carbon. All the processes outlined will follow proven industry standards.

All the tailings derived from the heap leach process will be treated using the alkaline chlorination cyanide neutralization method prior to tailings disposal. Tailings from the leach pad will then be excavated, loaded and hauled to an engineered tailings management area (TMA) for safe disposal. Further neutralization of the cyanide if present will be achieved here with aging and natural

degradation by direct exposure to sunlight. The chlorine solution will be diverted to the chlorine pond where it will be recycled through neutralization systems.

Before neutralization, a minimal analysis will be conducted using silver nitrate and potassium iodide. This analysis helps determine if any residual cyanide is still present in the solution. The goal is to ensure that the cyanide concentration is reduced to 100% absence in the solution. It should be noted that the barren solution will be reintroduced into circuit and discharge will only occur in extreme circumstances. Once the absence of cyanide is confirmed, the solution can be safely discarded. This process is crucial to prevent any potential environmental impact and ensure the responsible management of cyanide solutions in the mining industry.

It is important to note that the use of cyanide in gold cyanidation requires careful handling and adherence to strict safety protocols, only trained and certified handlers of Cyanide will be doing the supervision. Cyanide is a highly toxic substance, and proper measures must be in place to prevent its release into the environment. Mining operations employ various safety measures, such as containment systems and appropriate waste management, to ensure responsible use and disposal of cyanide solutions.

The overall strategy for the gold process facility design is to engineer and construct an efficient, safe, robust process facility to recover the maximum amount of gold using industry proven equipment and processes. Process control will employ standard industry techniques including onsite laboratories and instrumentation. Protection of the public, employees, and the environment will be implemented in every step of the mining and recovery processes.

The AGLP process facilities will incorporate the following unit operations:

- Heap Leach Facility,
- Storm water ponds 1-2
- Chlorine water pond
- Carbon Adsorption (Carbon-in-Column)
- Pumps
- Gold room/Smelting Facilities

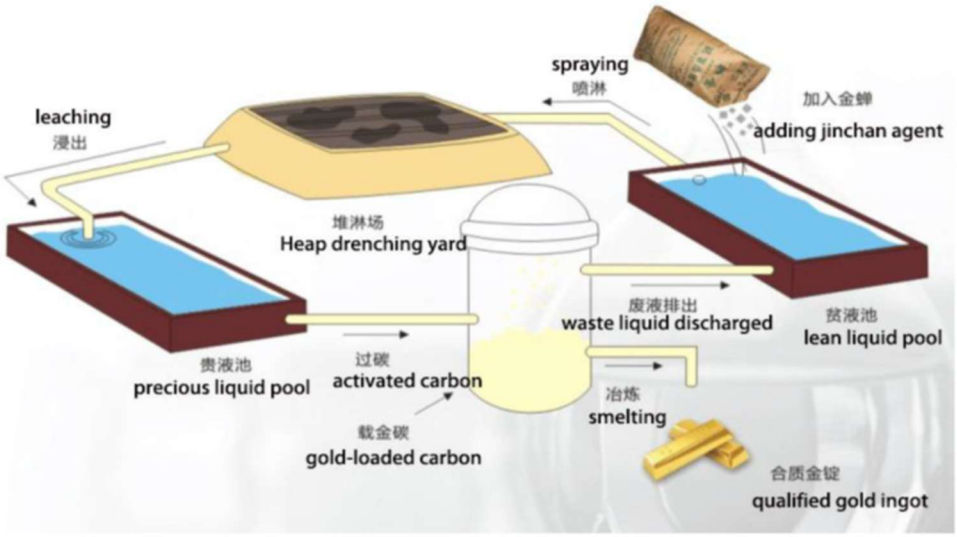

Figure 5: Simplified Diagram of the Leaching Process.

3.1: Leaching Agent

Jin Chan or Metallic Ore Dressing Agent/SHJCA02 is a brand of leaching reagent specifically designed by Guangxi Senhe High Technology Co LTD of Guangxi, China for the extraction of gold from ores. It has been developed as an alternative leaching agent to Sodium Cyanide. Jin Chan is considered a more environmentally friendly lixiviant and has a less complex operating procedure than sodium cyanide. It is also patented as a product for "environmentally friendly gold extraction". Jin Chan has advantages such as low toxicity, environmental protection, high recovery, low cost and safer storage and transportation (See Appendix 1 Material Safety Data Sheet).

The physical and chemical properties of Jin Chan are:

- Appearance: Solid (powder)
- Smell: Odorless
- Boiling Point: 1496 °C
- Potential Hydrogen (pH): Alkaline
- Density: 1.05 g/m^3

The chemical composition of Jin Chan chemical ore dressing is:

Component/Substance	Percentage by weight %
Carbon (C)	22.0
Sodium (Na)	3.3
Ammonia (NH_3)	155.42
Oxygen (O)	22.92
Ferrum (Fe)	0.96
Chlorine (Cl)	0.36

Table 1: Chemical Composition of Jin Chan.

Jin Chan is comprised of two main components carbonized sodium cyanurate ($C_6H_3N_6Na_3O_3$) and thiourea ($SC(NH_2)_2$). While Jin Chan is composed of 70 percent carbonized sodium cyanurate and 30 percent thiourea, the carbonized sodium cyanurate is known to be more reactive than thiourea, however, thiourea complements the carbonized sodium cyanurate

Jin Chan utilizes a leaching mechanism similar to sodium cyanide, however the cyanide within the carbonized sodium cyanurate is not easily dissociated thus making Jin Chan much less toxic. Since there is less dissociated cyanide as is the case with sodium cyanide, the use, handling and mitigation measures are different. However, since the use of Jin Chan as a leaching agent is new by industry standards in Guyana, the Cyanide Standard Codes of Practice will be adhered to.

Figure 6: Heap Leach Facility under Construction.

3.2: Tailing/ore Preparation

The tailing is mixed with water and any necessary additives, such as lime, to adjust the pH, once it has been stacked on the peach pad. Lime is often added to maintain alkalinity. This promotes the stability of the leaching agent solution and increases the efficiency of the leaching process.

ORAVA will be continuously testing the ore/tailings to determine if any mercury is present. However, the likelihood of mercury being present is negligible since the recovery methods used by the mining operations did not use amalgam sheets. The use of amalgam sheets would have resulted in residual mercury being present in the tailings. Instead, gravity separation methods were used, mainly sluice boxes comprising a variety of mats and riffling configuration. Mercury was not used to "spike" the ore to improve recovery. The presence of residual mercury from the previous processing should therefore be negligible.

The tailings will be loaded or staked onto the leach pad using CAT 950 Wheel Loader from the Run of Mine (ROM) stockpile. This stockpile will be positioned at the edge of the leach pad to reduce travel time for the loader. The ROM stockpile will be supplied by the Howo dump truck which will haul tailings from the various tailings spoil piles.

Figure 7: Lixiviant be added to a Stacked Leach Pad.

3.3: Leaching

The leaching process consists of stacking the tailings onto the leach pad in lifts and leaching each individual lift to extract the gold dissolved in the pregnant leach solution. The pregnant solution

will then be processed in the carbon in leach process to enable the gold to be adsorbed onto the activated carbon. Barren Leach Solution (BLS) referred to as the lixiviant containing diluted Jin Chan and pH balancing agent(lime) will be applied to the ore heap surface using a combination of drip emitters and sprinklers at an application rate of 6 L/hr/m^2. The leach cycle for each batch of ore being processed should be approximately 30 days.

The leaching solution or lixiviant will percolate through the tailings to the drainage system above the pad liner, where it will be collected in a network of perforated drainpipes. These drainpipes will be covered with pervious geotextile and embedded within a 0.6 m minimum thick granular cover drain fill-layer above the liner. The solution now termed the Pregnant Leach Solution (PLS) will gravity flow to the pregnant solution pond. PLS collected in the pregnant solution pond will then be pumped to the carbon columns for gold adsorption. After gold absorption the lixiviant now termed the Barren Leach Solution (BLS) is collected within the barren leach solution pond where the concentration of the leaching agent and pH balancing is adjusted before recycling the lixiviant/BLS to the leach pad.

3.4: The solution /lixiviant

Consideration must be given to the concept that Jin Chan has been developed as an alternative leaching agent to Sodium Cyanide. Jin Chan utilizes a leaching mechanism similar to cyanide, however the cyanide within the carbonized sodium cyanurate is not easily dissociated thus making Jin Chan much less toxic. Jin Chan is considered a more environmentally friendly lixiviant and has a simpler operating procedure than sodium cyanide.

Jin Chan will be administered at a concentration of 1.0 g/l of lixiviant with consumption being estimated to be approximately 1kg/ton of ore processed. To obtain maximum recovery parameters the pH of the lixiviant within the HLF will be maintained at a pH of 11. Lime (CaO) will be administered to the lixiviant, lime consumption is estimated to be approximately 2kg/ton of ore processed. The administration rate of lime will be between 1.5 to 2 g/L of lixiviant. The dosage rate will be adjusted as the leaching process continues to maintain the pH balance.

3.5: Pregnant leach solution

As the lixiviant percolates through the ore it dissolves gold particles, this pregnant leach solution (PLS) flows to the PLS pond under gravitational forces. The PLS is then pumped from the process pond to the adsorption feed head tank. From there, the PLS discharges to a single train of 10 carbon

adsorption columns. These columns stacked with activated carbon are used to adsorb the metals from the solution.

Figure 8:Processing Ponds in a Heap Leach Facility.

3.6: Adsorption

After the leaching stage, the PLS is pumped through the adsorption circuit, where it passes through a series of activated carbon columns or tanks. The PLS enters carbon column 1, flows through the Carbon-in-column (CIC) circuit, finally discharging from carbon column 10 over a carbon safety screen to the barren solution pond. The dosage rate of activated carbon is estimated at approximately 45 g/L. Carbon adsorbs the gold from the solution, forming a loaded carbon.

3.7: Smelting and Refining

The final step in the process is to recover the gold from the loaded carbon and to remove impurities and obtain high-purity gold. This is typically done through smelting. This process is where the gold is melted along with the addition of borax and silica to remove the impurities. Silica, borax, nitrate and soda ash will be combined to form a flux, which is used to remove impurities during smelting. The fluxes will be weighed out according to the desired mix and combined using a flux mixer. The flux will be combined with the loaded carbon and smelted in the gas-fired furnace.

3.8: Tailings detoxification

The tailings detoxification process will be achieved by using alkaline chlorination and sodium metabisulphite to reduce the weak acid dissociable cyanide (CNWAD) levels in the leach tailings prior to discharge to the TMA. The free cyanide or residual cyanide contained in the leach pad will

be oxidized using chlorine or hypochlorite under alkaline conditions. This will reduce the free cyanide in the processed ore/leach tailings to an environmentally safe level of 0.2 mg/l prior to disposal. The Cyanide detoxification process will be accomplished in a 7-day cycle after leaching. The process is proposed to require 2 days for draining, 2 days for alkaline chlorination treatment, 1 day for SMBS treatment to neutralize chlorination and 2 days for final draining. The operating parameters of this process will however be adjusted to meet the tailings detoxication requirements.

The chlorine detoxification solution is sprayed on the heaps, using the same sprinkler system used in the leaching cycle. After the solution percolates through the heap, it is collected in the chlorine pond and recycled after adjusting the chlorine content. This process is repeated with SMBS to neutralize any residual chlorine.

Sections of the leach pad will be sampled separately using 1.5-inch (37 mm) diameter pipes driven vertically through the heap to the pad, before the spent ore is emptied from the leach pad. The core samples will be analyzed for free cyanide and total cyanide.

Figure 9: Area Earmarked for Tailings Management Area, Aranka.

3.8: Tailings Management Area

TMA, for leach residue after washing and detoxification is discharged to the engineered TMA for further detoxification through natural aging process and thence mine reclamation. The TMA will be developed in a mined out covered with SMMS dredge tailings by constructing tailings dams and a haul road to be used for the disposal of tailings. This area is not within close proximity to

any natural water bodies. Since the tailings will be in a solid state and already detoxified, no pumping will be required.

Accumulated rainfall water, runoff and drainage from the TMA will continuously be monitored to ensure that they meet environmental discharge levels. After further detoxification by aging and providing that residual cyanide content is 100% removed, it is proposed that the tailings be used in reclamation. This proposal will however only be implemented after approval has been granted by the necessary Regulatory Bodies.

Figure 10: Fresh Water Pond, Aranka.

3.10: Storm water ponds

Built into the leaching facility will be two storm water ponds. These ponds will be contingency for the storage, treatment and discharge of excess pregnant and barren leach solutions due to excess water within the facility caused by excessive rainfall. Each storm water pond will be equipped with a detoxifying agent point and a monitored regulated discharge point as shown Figure 8.

4.0: Potential Environmental Impacts and Mitigation Measures

Due to the Project's environmental setting, the most significant potential environmental and social impacts are predicted and summarized below along with a description of the general strategies that will be employed to manage and mitigate such impacts during the life of the Aranka Gold Leach Project.

Project Component	Potential Impact	Management/Mitigation Strategies
Mine & leach pad/ process facility area	Impacts to Soils	Implementation of the Project *Erosion Prevention and Control Plan*; management of drainage and stormwater runoff on haul roads, maintenance of topsoil/organic matter stockpiles, and grading, scarifying, and re-vegetation of road rights-of-way (ROWs), exploratory roads, and other temporarily cleared areas • Implementation of appropriate progressive restoration and erosional stabilization procedures for disturbed areas per the Project *Erosion Prevention and Control Plan* and *Mine Reclamation and Closure Plan* • Implementation of the *Spill Prevention, Control, and Contingency Plan*
	Sediment loading of surface water	Installation of diversion structures to route un-impacted surface water around mining operations, and to route impacted surface water to the MWP, FWP, and TMA • Construction of sedimentation ponds and implementation of other best management practices (BMPs) in the *Erosion Protection and Control Plan* and *Water Management Plan* to manage stockpile sediment runoff and to detect and mitigate erosion in other disturbed areas • Implementation of progressive restoration and erosional stabilization procedures for areas historically disturbed by ASM, per the *Erosion Prevention and Control Plan* and *Mine Reclamation and Closure Plan*
	Loss of aquatic habitats	• Installation of diversion structures to route un-impacted surface water around mining operations, and to route all impacted water to the Mine Water Pond (MWP), Fresh Water Pond (FWP), and Tailings Management Area (TMA) • Implementation of BMPs in the *Erosion Protection and Control Plan* and *Water Management Plan* to manage topsoil/overburden stockpiles; and to detect and mitigate erosion in other disturbed areas • Implementation of appropriate progressive restoration and erosional stabilization procedures for mined-out areas of the open pits, as well as areas disturbed by ASM, per the *Erosion Prevention and Control Plan* and *Mine Reclamation and Closure Plan* • Implementation of a routine water quality monitoring program in the Cuyuni River and its tributaries as described in the *Water Management Plan* and *ESHS Monitoring Plan*
	Loss of terrestrial habitat and flora	• Minimization of clearance actions/project footprint per the *Erosion Protection and Control Plan, Exploration Management Plan, Early Works Construction Management Plan,* and *Construction Management Plan* • Implementation of a routine biodiversity monitoring program per the *Biodiversity Management Plan* and *ESHS Monitoring Plan* • Implementation of specific mitigation measures for the protection of any identified sensitive species and habitats, per the *Biodiversity Management Plan* • Implementation of BMPs in the *Erosion Protection and Control Plan* and *Water Management Plan* to manage sediment generation from waste rock/topsoil stockpiles; and to detect and mitigate erosional conditions in other disturbed areas. • Implementation of appropriate progressive restoration and erosional stabilization procedures for mined-out areas of the open pits, as well as ASM-

		disturbed areas, per the *Erosion Prevention and Control Plan* and *Mine Reclamation and Closure Plan*
Mine and leach pad/process facility area	Discharges of Jin Chan/cyanide and other hazardous chemicals to surface water	• Purchase of Jin Chan reagent exclusively in solid powder form, transported to the Project site in dedicated sealed containers • Jin Chan reagent will be transported by truck; delivered in dry powder form in dedicated sealed containers. No alternative delivery forms or methods will be permitted. • Implementation of the secondary containment, engineered spill prevention and control measures, and other BMPs defined by the Project *Jin Chan/Cyanide Management Plan,* the *Aranka Site Spill Prevention, Control and Contingency Plan,* and the *Emergency Preparedness and Response Plan* • For non-cyanide reagents and fuel, implementation of the secondary containment and engineered spill prevention and control measures, remote fueling control procedures, and other BMPs defined by the *Hazardous Material Management Plan*, *Aranka Spill Contingency Plan,* the *Aranka Site Spill Prevention, Control and Contingency Plan,* and the *Emergency Preparedness and Response Plan* • *Adherence to the Cyanide Code*
	Slope failures of barren waste tailings and saprolite stockpiles, disrupting surface flows	• Operator training programs/ compliance with *Overburden Management Plan* • Periodic monitoring of the physical integrity of the barren waste tailings and Saprolite stockpiles, in accordance with the *Overburden Management Plan* and the *ESHS Monitoring Plan,* and re-grading and/or strengthening of earthworks or other action as indicated by observed conditions
	Modification of hydraulic flow patterns within streams/creeks due to FWP, MWP, TMA and surface mining operations	• Installation of diversionary structures/diversion of un-impacted surface water around mining and processing operations in order to maintain biological base flows in local tributaries of the Cuyuni River • Control of discharges from the FWP, MWP, and TMA into local tributaries of the Cuyuni River in accordance with the *Water Management Plan* and *Tailings Area Management Plan,* in compliance with effluent discharge guidelines and/water quality standards defined by Guyana EPA, (IFC, 2007), and the ICMC
Mine and leach pad/process facility area	Breaches and overtopping of the FWP, MWP and/or TMA	• Provision of sufficient freeboard in the design of the MWP, FWP, and TMA based on the Probable Maximum Precipitation (PMP) event • Inclusion of sufficient contingency in the design of the MWP, FWP, and TMA embankments to withstand PMP events plus an appropriate safety factor • Inclusion of a series of redundant water management features (e.g., spillways, diversion ponds) in the TMA design • Rigorous independent Construction Quality Assurance (CQA) oversight of MWP, FWP, and TMA embankment construction • Development and implementation of probabilistic water balance/monitoring program and other BMPs for the MWP, FWP, and TMA, in accordance with the *Tailings Management Plan, Water Management Plan*, and *Jin Chan/Cyanide Management Plan* • Adherence to the Cyanide Code
	Potential runoff of impacted stormwater into surface water	• Diversion of un-impacted surface water around mining and processing operations

		• Installation of skimmers/oily water separators on mine stormwater discharges, with discharge reporting to MWP for settling/dilution and testing prior to any discharge • Collection (and as necessary treatment) of leachates from onsite solid waste disposal facility prior to any potential controlled discharge • Collection of runoffs from mining and process facility processing areas, stockpiles, and roadways, and retention in settling ponds and the MWP (or dedicated settling ponds at individual waste rock stockpiles) for settling and dilution prior to any potential controlled discharge • Regular monitoring of MWP water quality in accordance with the *Water Management Plan* and *ESMS Monitoring Plan* to ensure that controlled discharges meet quality standards defined by the Guyana EPA and (IFC, 2007) • Implementation of the Project *Erosion Prevention and Control Plan*; management of drainage and stormwater runoff on haul roads to minimize sedimentation; maintenance of topsoil/organic matter stockpiles; and grading, scarifying, and re-vegetation of road ROWs, exploration roads, and other temporarily cleared areas
Mine and leach pad/process facility area	Potential runoff or seepage of contaminated water from TMA into surface water	• Installation of barge and pump back systems to return TMA reclaim water back to the process facility for industrial use • Installation of embankment seepage interception, collection, and return systems on TMA • Construction of TMA in a low-permeability saprolite soil basin, supported by geological evaluation of the basin and local compaction, grouting, or other basin preparation actions during construction as necessary to ensure consistent low-permeability conditions • Inclusion of a series of redundant water management features (e.g., spillways, diversion ponds) in the TMA design. • Implementation of probabilistic water balance/water monitoring program for the TMA in the operational phase, in accordance with the *Tailings Management Plan, Water Management Plan*, and *Jin Chan/Cyanide Management Plan* • Regular monitoring of TMA water quality in accordance with the *Tailings Facility Management Plan, Jin Chan/Cyanide Management Plan,* and *ESMS Monitoring Plan* to ensure that controlled discharges will be within Guyana EPA and (IFC, 2007) limits, as well as the free cyanide limits recommended by the ICMC for protection of aquatic life
	Diesel oil spills into the Cuyuni River and its tributaries	• Implementation of the secondary containment and engineered spill prevention and control measures, remote fueling control procedures, oily water separators/treatment systems, and other BMPs per the *Hazardous Material Management Plan* and *Spill Prevention, Control and Contingency Plan* • Implementation of the Project's preventive maintenance (PM) and field inspection programs for the operation of the fuel farm, emergency generator area, and fueling station • Installation of skimmers/ oily water separators on mine wastewater discharges, reporting to the MWP for settling and dilution prior to any controlled discharge • Regular monitoring of MWP water quality in accordance with the *Water Management Plan* and *ESMS Monitoring Plan* to ensure that controlled

		discharges will be within the effluent discharge guidelines and/water quality standards defined by the Guyana EPA and (IFC, 2007)
Mine and leach pad/process facility area	Jin Chan/Cyanide spill into the Cuyuni River and its tributaries	• Purchase of Jin Chan reagent exclusively in solid powder form, transported to the Project site in dedicated sealed containers • Implementation of the secondary containment, engineered spill prevention and control measures, and other BMPs defined by the Project *Jin Chan/Cyanide Management Plan,* and *Emergency Preparedness and Response Plan* • Implementation of operational practices in the process facility that minimize the potential for process upsets, as noted in the Project *Jin Chan/Cyanide Management Plan* • Implementation of the Project's PM and field inspection program for the operation of the process facility • Adherence to the Cyanide Code
	Potential runoff or seepage of leachate from the solid waste landfill	• Collection and periodic testing of leachate from landfill; if testing results indicate effluent quality issues with respect to Guyana EPA or (ICMC, 2007) guidelines, route to MWP for dilution and storage or install local water treatment system
	Infiltration of potential spills or discharges of Jin Chan/cyanide and other chemicals into groundwater	• Purchase of Jin Chan exclusively in solid powder form, transported in dedicated sealed containers. • Implementation of the secondary containment, engineered spill prevention and control measures, and other BMPs defined by the Project *Jin Chan/Cyanide Management Plan* and *Emergency Preparedness and Response Plan* • Implementation of operational practices in the process facility that minimize the potential for process upsets, as noted in the Project *Jin Chan/Cyanide Management Plan* • For other (non-cyanide) reagents and fuel, implementation of the secondary containment and engineered spill prevention and control measures, remote fueling control procedures, oily water separators/treatment systems, and other BMPs defined by the *Hazardous Material Management Plan*, *Aranka Spill Contingency Plan,* the *Aranka Site Spill Prevention, Control and Contingency Plan,* and the *Emergency Preparedness and Response Plan*
Mine and leach pad/process facility area	Potential failure of the TMA and MWP dams after completion of mining activities	• Stabilization, breaching/removal of embankments, closure, and selective re-vegetation of tailings surfaces and embankments per the final *Detailed Mine Reclamation and Closure Plan* • Post-closure monitoring of the stability of the reclaimed MWP, FWP, and TMA areas and periodic monitoring of down-gradient surface and groundwater conditions per the final *Mine Reclamation and Closure Plan* and *ESHS Monitoring Plan*
Arangoy Landing to HLF Mine Site	Impacts on soils	• Implementation of the *Spill Prevention, Control and Contingency Plan* and A*ranka Spill Contingency Plan,* placement of spill kits in heavy equipment /passenger vehicles
Arangoy Landing to HLF Mine Site	Impacts from improper culvert installation at stream crossings	• Design culverts to properly handle natural surface water flows, per the Project *Erosion Prevention and Control Plan;* correct grading, lined with grass and/or riprap, where necessary, to control flow rates/velocities and minimize erosion
	Loss/degradation of aquatic habitats	• Implementation of BMPs in the *Erosion Protection and Control Plan* and *Water Management Plan* to detect and mitigate areas of soil erosion, manage

		stormwater runoff, and control sedimentation on access road ROWs and other adjacent disturbed areas • Implementation of progressive restoration and erosional stabilization procedures for any excessively wide ROW areas, as well as any ASM disturbed areas, per the *Mine Reclamation and Closure Plan* • Implementation of routine water quality monitoring program at stream crossings per the *ESHS Monitoring Plan*
	Loss/alteration of terrestrial habitats	• Minimization of clearance actions/project footprint per BMPs in the *Exploration Management Plan, Early Works Construction Management Plan,* and *Construction Management Plan* • Implementation of a routine biodiversity monitoring program within the Aranka Mining Area per the *Biodiversity Management Plan* and *ESHS Monitoring Plan* • Implementation of progressive restoration and stabilization procedures for ROWs and ASM-disturbed areas, per the *Exploration Management Plan, Early Works Construction Management Plan, Construction Management Plan,* and *Mine Reclamation and Closure Plan* • Implementation of specific mitigation measures for the protection of sensitive species and habitats, as directed by the *Biodiversity Management Plan* • Implementation of BMPs in the *Erosion Protection and Control Plan* and *Water Management* Plan to manage stockpiles, and to detect and mitigate erosional issues in other disturbed areas
Arangoy Landing to HLF Mine Site	Impacts on soils	• Implementation of the Project *Erosion Prevention and Control Plan*, including maintenance of stockpiles, and -re-vegetation of ROWs and other cleared areas adjacent to the road • Implementation of the *Spill Prevention, Control and Contingency Plan* and *Aranka Spill Contingency Plan;* placement of spill kits on all heavy equipment and passenger vehicles, and installation of emergency response stations at select locations along the access road • Inclusion of appropriate contractual requirements for spill prevention and control and maintenance of spill kits for all delivery contracts
	Spills of fuel and other chemicals during transport between the Arangoy Landing and HLF Mine Site	• Establishment of contractual requirements for the trucking companies transporting other hazardous chemicals to have spill contingency plans and spill kits • Establish emergency response stations at selected locations on access road
Overall macro-scale impacts of the project	National socio-economic impacts due to closure	• Implement the Project *Community Relations Plan*, *Influx Management Plan*, and final *Detailed Mine Reclamation and Closure Plan;* key actions will include: - diversification of skills/training, and building capacities of former workers and service providers to find economic opportunities with other industries in Guyana; and - Amerindian communities for income generation projects • Implement selected public/community development projects
	Potential influx into the site, leading to health, security and conflict related risks	• Hiring advertised and controlled through Georgetown office • Control of employee travel to and from site using ORAVA vehicles

		• Prohibition of economic or social contacts by workforce or contractors with transients or local communities • Prohibition of public (transient) access to the mine, process facility, mechanical shops, fuel storage areas, TMA/MWP/FWP areas, main-camp, solid waste landfill, water supply system, airstrip, explosives silos and magazine, and other sensitive locations • Promote and implement health awareness and disease prevention campaigns among workers and contractors, as well as local communities upstream and downstream of project site
	Potential ASM and SMM issues	• Continued consultation and engagement with illegal and artisanal/local miners' in accordance with the *Influx Management Plan* and *Community Relations Management Plan.*
	Potential human influx to the mine site and related risks	• Train the security personnel on site to monitor potential influx, and to handle influx without creating conflict or security issues, in accordance with the *Influx Management Plan* and applicable sections of the *Community Relations Management Plan* • Prohibition of onsite hiring. Work opportunities advertised and controlled through ORAVA Georgetown office • Control of employee travel to and from site using ORAVA vehicles • Prohibit public access to the Solid Waste Landfills • Promote and implement health awareness and disease prevention campaigns, especially for malaria suppression and human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) and sexually transmitted diseases (STDs) among workers and contractors.

Table 2: Potential Impacts and Mitigation Measures to be Employed.

5.0: Project Capital Cost

Project Capital is summarized in Table 3 below. Initial Capital Costs are estimated to be $466,800,000. Based on experience gained from the Aranka Gold Leach Project, expenses attached to the Processing and acquisition of License have been included here.

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ITEM	COST (GUY$)
Plant/Machinery/Equipment	184,500,000
Machinery Re-capitalization	55,000,000
Mine development mobilization expenses	38,000,000
Building and civil works	4,500,000
Furniture and Fixtures	2,000,000
Reclamation & Closure	8,000,000
Processing/License/	42,000,000
TOTAL	**334,000,000**
NET INITIAL WORKING CAPITAL	**132,000,000**
PROJECT COST	**466,800,000**

Table 3: Project Capital Cost, Aranka.

5.1: Cash Flow Analysis

The cash flow analysis for the LOM is shown in Table 4 below

	Year 1	Year 2
SALES	**2,054,440,000**	**2,054,440,000**
Ounces Recovered	**2,400**	**2,400**
Operating cost	1,078,980,000	1,078,980,000
Admin, Rehab expenses	403,000,000	63,800,000
GROSS PROFIT	572,460,000	911,660,000
Royalty 8 %	164,355,200	164,355,200
NIS 8.4%	4,800,000	4,800,000
NET PROFIT BEFORE TAX	403,304,800	742,504,800
Company Tax 40%	161,321,920	297,001,920
Profit/Loss	**241,982,880**	**445,502,880**

Table 4: Project Cash Flow Analysis, Aranka.

5.2: Employment Criteria

ORAVA will directly employ a total of fifteen (15) persons as shown in Table below. However, transportation/delivery services for fuel, rations and supplies will be outsourced to local contractors.

NO	STAFF	NO OF EMPLOYEES
1	Site Manager	1
2	Mechanic/technician	1
	Supervisors and others	
3	Loader Operator	1
4	Excavator Operator	2
5	Heavy duty drivers	2
6	Chemical Engineer	1
7	Laborers	4
	Auxiliary Staff	
8	Cooks	1
9	Security	1
10	Medic	1
Total		**15**

Table 5: Employment Criteria for AGLP.

5.3: Implementation Schedule

The AGLP estimated to utilize two years for processing and recovery of gold with an additional half year for mobilization and closure. The implementation schedule is shown below.

Task	Annual Quarters										
	1	2	3	4	5	6	7	8	9	10	11
Mobilization and Infrastructure Development											
Development of Process Infrastructure											
Processing and Gold Recovery											
Rehabilitation and Reclamation											

Monitoring and Reporting/Operational Phase											
Rehabilitation and Closure											
Monitoring and Reporting/Closure Phase											

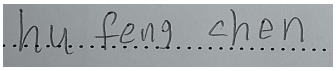
Table 6:Implementation Schedule for AGLP.

7.0: Summary

The AGLP proposes to utilize Jin Chan as a leaching agent to recover gold from hammer mill tailings in the Aranka Area. The gold contained within these tailings would have otherwise been lost since these tailings have already been rejected by the small and medium scale miners. As such there will be a financial or economic benefit from resources that would have otherwise been lost.

Jin Chan has been developed as an alternative leaching agent to sodium cyanide. It has advantages such as low toxicity, easy handling, cheap and boasts high recovery rate. The use of this leaching agent therefore provides an opportunity to develop gold recovery techniques that do not require the use of mercury.

This project is being developed by ORAVA, who has competent and experienced personnel who have been working at heap leach site within Guyana. As such the experiences and knowledge gained from that project will be transferred and utilized at this Site. ORAVA also commits to operating in close collaboration with all Regulatory Agencies to develop an efficient, safe and environmentally friendly mining operation.



Hufeng Chen
Director

Paul Callender
Project Engineer

APPENDICES

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MATERIAL SAFETY DATA SHEETS
(MSDS)
GOLD DRESSING AGENTS
"JINCHAN"

Shenzhen Toby Technology Co., Ltd.
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SAFETY DATA SHEETS

Section 1-SAMPLE INFORMATION

1. Sample Description: JINCHAN Ore-dressing Agent
2. Sample Model: ---
3. Product Code: 3824909990
4. Manufacturer: GUANGXI SENHE HIGH TECHNOLOGY CO., LTD.
5. Manufacturer Address: NO. B-3-1, MINGYANG FORTH ROAD, MINGYANG INDUSTRIAL PARK, NANNING
6. Function: Gold ore-dressing

CLIENT INFORMATION

1. Applicant: GUANGXI SENHE HIGH TECHNOLOGY CO., LTD.
2. Applicant Address: NO. B-3-1, MINGYANG FORTH ROAD, MINGYANG INDUSTRIAL PARK, NANNING
3. Applicant Post Code: ---

TEST INFORMATION:

1. Applicant No: 150510442
2. Test Items and Request: MATERIAL SAFETY DATA SHEETS
3. Date of Receipt: May 11, 2015
4. Date of Test: May 12-18, 2015

SUMMARY:

As per request, the contents and formats of the SDS are prepared in accordance with European Commission Directives 67/548/EEC, 1999/45/EC, Regulation (EC) No 1907/2006, Regulation (EC) No 1272/2008 and Regulation (EU) No 453/2010, and is provided per attached.

REMARKS:

1. The SDS is prepared based on the information provided by client.
2. This sample is likely to be classified as article with substances not intended to be released and is out of scope of a SDS as set out in Regulation (EC) No 1907/2006. This SDS is generated for client's reference only.

Signed for Shenzhen TOBY

Justin Zhang
Manager

SHENZHEN TOBY TECHNOLOGY CO., LTD.

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on of the substance /preparation and of the company/undertaking

Identification of the preparation	:	JINCHAN Ore-dressing Agent
Company Identification	:	GUANGXI SENHE MINING TECHNOLOGY CO., LTD.
Company Address	:	NO.B-3-1, MINGYANG FORTH ROAD, MINGYANG INDUSTRIAL PARK, NANNING
Tel	:	0771-5645626
Emergency Contact No	:	0771-5645626
Fax	:	0771-5645626
e-mail	:	melody@nnshhg.com

Section 2 - Hazards Identification

Preparation hazards and classification:
Not dangerous with normal use.

Health hazards: To the eyes, and respiratory system and skin damage, Can cause eyelid blepharoptosis, eyeball outstanding or tremors, cavity ulcer, skin redness, ruffled, relaxation, and rash

Environment hazards: Production of ore and waste water after the alkaline is on the high side, can join a small amount of chlorine acid calcium (bleach), ferrous sulfate and alkalinity; But in order to avoid water and soil loss must DAMS, dredge waterways.

Section 3 - Composition/ Information on Ingredients

Component/Substance	Percentage by weight %	CAS No.
Carbon (C)	22.04%	12069-90-8
Sodium (Na)	38.3%	100894-64-2
Ammonia (N)	15.42%	14914-35-3
Oxygen (O)	22.92%	17778-80-2
Ferrum (Fe)	0.96%	14092-79-6
Chlorin (Cl)	0.36%	24934-91-6

Section 4 - First Aid Measures

Skin contact: Flush affected area with large amounts of water using deluge emergency shower, Remove contaminated clothing. If symptoms persist, seek

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medical attention.

Eye contact: Flush eyes with large amounts of at least 15 minutes. Seek immediate medical attention if eyes have been exposed directly to acid.

Inhalation: Should immediately from the scene, moved to the air fresh place, If symptoms persist, seek medical attention.

Ingestion: If swallowed, give large amounts of water, Do not induce vomiting or aspiration into the lungs may occur and can cause permanent injury or death.

Section 5 - Fire-Fighting Measures

Flammability Properties: Itself won't burn, but with acid chemical reaction, will have to explosion.

Suitable extinguishing Media: Water, yellow sand ranks, dry powder

Unsuitable extinguishing Media: Acid chemicals

Protective Equipment and precautions for firefighters:

Disable acid , fire fighters into before the fire, should wear a good anti-virus mask.

Section 6 - Accidental Release Measures

Personal Precautions: The product has the hygroscopicity, should be placed in a cool dry place airtight package save, pay attention to moistureproof, prevent wet; Pay attention to human and livestock direct oral inhaled. With no acid chemicals, food chemicals mixed packing

Environmental Precautions: Production of ore and waste water after the alkaline is on the high side, can join a small amount of chlorine acid calcium (bleach), ferrous sulfate and alkalinity; But in order to avoid water and soil loss must DAMS, dredge waterways.

Section 7 - Handling and Storage

Handling Procedures and Storage Requirements :

1. Strictly abide by the execution set by the state for the hazardous chemicals transport custody system
2. This product no explosion danger, not of flammable solid, no risk, not of 6.1 antioxidant a poison product, not of radioactive, not of corrosive, no other transport risk
3. The product has the hygroscopicity, should be placed in a cool dry place airtight package save, pay attention to moistureproof, prevent wet; Pay attention to human and livestock direct oral inhaled.
4. With no acid chemicals, food chemicals mixed packing.

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Section 8 - Exposure Controls/ Personal Protection

Engineering Control：Airtight package, Charge in areas with adequate ventilation.

Respiratory Protection: Not required for normal conditions of use. See also special firefighting procedures.

Eye Protection: Wear protective glasses with side shields or goggles.

Skin and body Protection: Wear chemical resistant glove as a standard procedure to prevent skin contact.

Section 9 - Physical and Chemical Properties

Appearance	Solid
Odor	No Odor
Boiling Point, initial boiling point and Boiling range	1496℃)
PH	<10
Density/relative density	1.05
Vapor Density: (Air = 1)	Not applicable
Solubility in Water	100%
Auto-ignition temperature	Not applicable
n-octanol/water partition coefficient	Not applicable
Evaporation rate	Not applicable
Decomposition temperature (℃)	Not applicable
Vapor Pressure	Not applicable
Flash Point	Not applicable
Viscosity	Not applicable
Specific gravity	Not applicable

Section 10 - Stability and Reactivity

Stability : The product is stable under normal conditions.

Conditions to Avoid: With no acid chemicals, food chemicals mixed packing

Section 11 - Toxicological Information

Inhalation: A runny nose, breathing slowly, and the difficulties

Ingestion: Air expansion or contraction, diarrhea

Skin: The skin aglow, ruffled, relaxation, and rash

Eyes: Eyelid blepharoptosis, eyeball outstanding or tremor

:

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Section 12 - Ecological Information

General note	Production of ore and waste water after the alkaline is on the high side, can join a small amount of chlorine acid calcium (bleach), ferrous sulfate and alkalinity; But in order to avoid water and soil loss must DAMS, dredge waterways.
Mobility in soil	Not Available
Persistence and Degradability	Not Available
Bioaccumulation potential	Not Available
Other Adverse Effects	Not Available

Section 13 - Disposal Considerations

Product disposal recommendation:

1. Strictly abide by the execution set by the state for the hazardous chemicals transport custody system
2. JinChan not light with addition of meaning with medicine, unless there is a technical guidance
3. product has hygroscopic, should be placed in a cool dry place airtight package save, pay attention to moistureproof, prevent wet

Section 14 - Transport Information

Hazards identification: none.

Road regulations:

The substance is not subject to GB12268-2005.

Packaging Requirements: the goods are package according to the packaging requirement of ordinary goods.

Air transport ICAO-TI and IATA-DGR:

The substance is not subject to IATA DGR

Packaging Requirements: the goods are package according to the packaging requirement of ordinary goods.

Sea transport IMDG:

The substance is not subject to IMDG Code.

Packaging Requirements: the goods are package according to the packaging requirement of ordinary goods.

Rail regulations:

The substance is not subject to list of dangerous goods by rail.

Packaging Requirements: the goods are package according to the packaging

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requirement of ordinary goods.

Section 15 - Regulatory Information

《Hazardous chemicals transport custody system》

Section 16 - Other Information

Date: May 18, 2015

Department: Quality department.

Data Audit Units: Shenzhen Toby Technology Co., Ltd.

Disclaimer: The information in this Safety Data Sheet (SDS) was obtained from sources which we believe are reliable; however, the information is provided without any representation of warranty, expressed or implied, regarding the accuracy or correctness.

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All information, recommendations, and suggestions appearing herein concerning this product are taken from sources or based upon data believed to be reliable.

****** (END OF REPORT) ******