

Environmental and Social
Action Plan
(ESAP)

Palagua Field

Colombia

Union Temporal – Palagua Field: Environmental and Social Action Plan

ACTION	DETAILS	RESPONSIBLE PARTY	STATUS
<p>EMERGENCY RESPONSE PLAN:</p> <p>To develop an Emergency and Contingency Plan for employees, visitors and other persons involved in the Palagua project through a document that states and applies knowledge to act efficiently and promptly in case of emergency, in compliance with API Standard 2610</p>	<p>Establish and generate skills, conditions and procedures that allow users (workers, visitors and other persons involved in the project) to prevent and to protect themselves in case of disaster or collective threats that may jeopardize the project, through quick, coordinated and reliable actions, and to have an organizational structure that provides adequate health care to all injured persons, if any.</p> <ul style="list-style-type: none"> • Plan evacuation drills. • Identify and implement a planning process of prevention, forecasting, mitigation, preparedness, response and recovery in case of disaster. • Have an adequate organizational structure in case of emergency. • Determine threats, conduct vulnerability analysis and define levels of risk. • Establish a standard evacuation procedure for all project users (operators, contractors, visitors). • Establish an operational system " IN SITU " for the attention of potential injuries during all types of emergencies • Promote among workers or employees an environment of trust, and to motivate their participation in the emergency prevention measures and activities. 	<p>The HSE supervisor under the supervision of the oilfield Superintendent.</p>	<p>Complete</p>

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<p>ENVIRONMENTAL MANAGEMENT PLAN:</p> <p>The Environmental Management Plan (EMP) develops the environmental management measures necessary to prevent, mitigate, control, protect and/or compensate for the possible impacts caused by the activities of the Drilling of Development Wells in the Palagua field.</p>	<ul style="list-style-type: none"> • Comply with the obligations as per the Rules and resolutions issued by the Environmental Authority of Colombia • Comply to IFC guidelines, APR Standard 2610 and Dutch Standards • Comply with guidelines on environmental management of production testing • Comply with Pipeline (flow line) management guidelines • Comply with guidelines of monitoring and tracking of disposition of industrial water and drilling solids • Comply with guidelines on waste management • Have adequate storage and transportation for the formation fluids produced during testing • Promote education and compliance at all levels of the organization • Organize annual training of staff • Submit annual report to Ecopetrol and the Government of Colombia 	<p style="text-align: center;">Environmental Coordinator of UT-IJP</p>	<p style="text-align: center;">Complete</p>
<p>WELL CONTROL POLICY:</p> <p>Use of pressure barriers to prevent uncontrolled flows of oil, gas or water to the surface. Conduct operations in such a manner that risks are controlled and reduced</p>	<ul style="list-style-type: none"> • Primary control is maintained with adequate drilling mud weight • Use of a Blowout Preventer for secondary Control • Use of tertiary controls as a last resource are to be considered only in an emergency situation 	<p>Drilling company and the contractors, under the supervision of the Environmental Coordinator of the UT-IJP</p>	<p style="text-align: center;">Complete</p>
<p>PIPELINE MANAGEMENT:</p> <p>Establish the appropriate measures for the environmental management of laying, welding and pipeline radiography activities to be used in the building of the flow line.</p>	<ul style="list-style-type: none"> • Before laying pipelines, it must be verified that the path is clear of obstacles. • All items such as butt welding, scrap metal, and pieces of cut pipe must be stored in properly marked containers along the road for later transportation to the Palagua Battery, where they will be collected and sent to scrap metal recyclers. • The welding processes should be supervised by the contractor's person in charge, and approved by the inspector designated by the UT-IJP to ensure optimal bonding of the pipe and prevent possible repairs later on. • During construction of the flow line, signs should be installed warning vehicles of the presence of WORKERS ON THE ROAD and use vehicle traffic signals. 	<p>The Well Supervisor, under the supervision of the Environmental Coordinator of the UT_IJP</p>	<p style="text-align: center;">Complete</p>

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<p>MONITORING AND TRACKING OF DISPOSITION OF INDUSTRIAL WATER AND DRILLING SOLIDS:</p> <p>Monitor physical, chemical, and bacteriological characteristics of wastewater generated during drilling before and after being treated. Determine the chemical properties of solid waste from the drilling.</p>	<ul style="list-style-type: none"> • MONITORING OF WATERS: Carry out monitoring of the effluent of the industrial wastewater treatment system of the well before being sent to the Palagua Battery, through composite sampling, analyzing the physicochemical parameters mentioned below. • MONITORING OF DRILLING CUTTINGS: The drilling cuttings in the land farming area will be evaluated by taking two samples from the site. One sample will be taken after the drilling operations begin and the other at the end. The samples taken in a composite way and at different heights in the heaps will be taken to the laboratory for type TCLP analysis (leaching potential) to assess the heavy metals of health interest, nitrites and nitrates in the leachate. The results from potential leaching are not the same as the results from metal content through chemical breakdown with acids but are simulations of the leaching process of the material to determine its potential. • Use the recommendations for Results Analysis, Parameters to Assess, and Sampling and Analysis in the Guidelines 	<p>Well Chief and the contractor under the supervision of the Environmental Coordinator from the UT_IJP</p>	<p>Complete</p>
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<p>WASTE MANAGEMENT:</p> <p>Provide information on the measures to carry out an effective control of pollution that may be generated by the well location improvements.</p>	<ul style="list-style-type: none"> • Conduct periodic inspections of smoke emissions from machinery. The emissions that are too high need to be immediately corrected. Also, the operation of machinery with hydraulic oil or fuel leaks will not be allowed since they affect the soil. • Conduct periodic checkups of the machinery in the work area, for leakages of fuel and / or lubricants. • Select an area for fuel and oil storage away from water streams. This fuel storage area should have a geo-membrane flooring or a cement floor and have a grease trap. This area should have a ceiling, posted No Smoking signs, and be lined with security tape. • Machinery leaking polluting fluids will not be allowed to function and will not be allowed to operate until the leakage is repaired. • Do not wash work machinery and equipment in water bodies located in the vicinity of the work area. • Change of lubricants or fuel must be carried out in remote areas with placement of 55 gallon metallic barrels to receive the lubricant that is been changed or to contain accidental spilling. Also, the soil must be protected with polyethylene to prevent pollution. • Provide training to workers about the importance of pollution control in the work area, including issues such as causes of pollution, consequences and control methods. • Inform workers in regarding the rules established in the work area to avoid the impacts caused by pollution at the worksite. • The disposal of surplus construction materials or organic residues in places like water bodies, areas surrounding the work place, springs, or places other than authorized areas will not be allowed. • The containers to store solid waste produced by workers will be strategically placed in the work area. The facilities needed for the management of domestic waste water will be provided. 	<p>Well Chief and the contractor under the supervision of the Environmental Coordinator from the UT_IJP</p>	<p>Complete</p>
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<p>HANDLING AND STORAGE OF CHEMICAL PRODUCTS:</p> <p>Stipulate the actions for handling, storage and disposal of chemical residues generated during the Drilling of Wells of the Palagua – Caipal Field.</p>	<ul style="list-style-type: none"> • Construction of proper warehouses for storing chemicals and empty packaging and containers. • Post appropriate signs. • Classify the chemicals to be stored according to flammability and/or reaction to other products, to determine the adequate storage areas within the warehouse. • Adequate labeling of the containers of the chemical products to minimize risks. • Forbid the reuse of the packaging of special products in all activities. It is recommended that the packaging be returned to / reused directly by the supplier and / or manufacturer. • Implement the "Material Safety Data Sheet – MSDS" (commonly known as Safety Sheet) for each product and have them available for information of the worker. 	<p>The Drilling Company and the contractors, under the supervision of the Environmental Coordinator of the UT-IJP</p>	<p>complete</p>
<p>HEALTH AND SAFETY OF THE COMMUNITY:</p> <ul style="list-style-type: none"> • Develop the different actions required for the adequate execution of the Social Management Plan in the area of influence of the Project. 	<ul style="list-style-type: none"> • Conduct annual meetings with the community to address concerns • Guideline of control and monitoring to the social management program • Guideline of dump areas, land removal and land-fills management at the locations • Guideline of drainage management of access roads and locations • Erect signs near local schools alerting traffic to slowdown • Install safety rails around each well pump 	<p>Environmental Coordinator of UT-IJP</p>	<p>complete</p>

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<p>MANAGEMENT OF DUMP AREAS, LAND REMOVAL AND FILLINGS AT WELL LOCATIONS:</p> <p>Establish applicable environmental management measures to execute the land removal in the preparation of the well location.</p>	<ul style="list-style-type: none"> • Ascertain that the locations are in acceptable condition to install drilling infrastructure. Additional to this, materials such as rubble and certain building materials waste, which require change or renewal, will be used in the geo-morphological recovery of an external area affected by natural erosion and not induced by the existing operation. • According to preliminary calculations of the movement of earth and the requirements of the project, no surplus material will be generated, therefore the will be no need to use dump areas. • Adapt protection works, such as bag-concrete or wood barriers, that are resistant and with high bearing capacity, to protect the slope located behind the wells. • Protect the soils with polyethylene or a similar material when making mortar or concrete. • Construct the drainage works that are needed for the disposal of rainwater in the access roads. 	<p>Environmental Coordinator of UT-IJP</p>	<p>Complete</p>
<p>DRAINAGE MANAGEMENT:</p> <p>Design and implement a program for the proper management of drainage in access roads and locations to the wells, through the building of drainage works.</p>	<ul style="list-style-type: none"> • Removal of structures and facilities set up during the building and assembly process. • Treatment of all sanitary facilities that were built. • Adequate disposition of the waste generated during the drilling and production tests, as well as the waste generated in the dismantling of the facilities and the demolition of structures. • Monitor levels of TSP, particulate matter, SOx, NOx, CO2 and O3. • Keep records of the state and maintenance of vehicles and equipment used during the development of the project. • Verify the compliance with regulations of the vehicles used regarding air quality. 	<p>Environmental Coordinator of UT-IJP</p>	<p>complete</p>
<p>LIQUID WASTE MANAGEMENT: (Abandonment stage)</p> <p>Develop guidelines for leaving a location environmentally and technically ready for recovery, removal of components installed for management of waste generated during Project operations and removal of structures built in order to prevent alterations to the terrain</p>	<p>AIR EMISSIONS:</p> <p>Identify and minimize pollution from emissions, comply with air quality regulations and perform monitoring activities.</p>	<p>The Field Superintendent and the contractors, under the supervision of the Environmental Coordinator of UT-IJP</p>	<p>complete</p>
		<p>Well Chief and contractor company under the supervision of the Environmental Coordinator of UT-IJP</p>	<p>complete</p>

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<p>SOLID & LIQUID WASTE MANAGEMENT:</p> <p>Prevent and/or mitigate potential impact caused by improper management, storage and final disposal of solid waste that will affect soil, superficial water bodies and aquifers.</p>	<ul style="list-style-type: none"> • Domestic Solid Waste – Separate organic and recyclable waste to facilitate its handling and disposal. • Drill Cuttings - The most important industrial waste by quantity and quality, that is generated in a drilling well is composed of two fractions: the cuttings separated from the mud in the solid waste control equipment (product from the excavation of soil by action of the drilling bit); and the solids resulting from dewatering or dehydration of mud (removed from the line due to aging, loss of rheological properties or changes in the mud program). The drill cuttings will be stored in a tank at the location, which will be transferred to a land-farming area for final disposal. • Other Industrial Waste – to be handled according to the guidelines 	<p>The Drilling Company and the contractors, under the supervision of the Environmental Coordinator of the UT-IJP</p>	<p>complete</p>
<p>LIQUID WASTE MANAGEMENT:</p> <p>Develop liquid waste management measures to prevent the alteration of the drainage of the area of influence of the project. Treat and dispose liquid waste in a safe manner and according to current environmental legislation</p>	<ul style="list-style-type: none"> • Treat all liquid waste to comply with IFC guidelines • Water used for re-injection into aquifers should meet WHO guidelines for drinking water or be treated to baseline quality • Drainage should be through ditches, sewers, culverts, dock and/or surmps • Train workers to use proper disposal methods 	<p>Environmental Coordinator of UT-IJP and the Well Supervisor as representative of the drilling company</p>	<p>complete</p>
<p>NOISE GENERATION:</p> <p>Develop guidelines to comply with all regulations for noise generation, identify and minimize noise pollution sources and implement measures to mitigate noise levels produced by machinery at the wells.</p>	<ul style="list-style-type: none"> • Keep records of the state and maintenance of vehicles and equipment during the development of the project. • Verify compliance of vehicles with the regulations regarding noise emissions. 	<p>Well Chief and contractor company under the supervision of the Environmental Coordinator of UT-IJP</p>	<p>June 30 2011</p>
<p>REVEGETATION:</p> <p>Determine actions to be taken to mitigate landscape impact during location preparations, restore vegetation, improve the landscape and prevent erosion.</p>	<ul style="list-style-type: none"> • Species Selection – should be of rapid growth with easily dispersed seeds. The graminea to be used should be adapted to the region. • Planting locations – The species should be planted around the well locations and the sides of the access roads. 	<p>Field Superintendent and the contractor of the works under supervision of the Environmental Coordinator of UT-IJP</p>	<p>complete</p>

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<p>WATER QUALITY: Monitoring and improvement of injection water quality, and continuation of waste water injection program</p>	<ul style="list-style-type: none"> • Monitor the quality of the waste water at the entrance and exit of the treatment plan, analyzing the physical-chemical parameters: O/W, Suspended Solids, Turbidity, and Dissolved Oxygen • Re-inject all treated sewage • Ensure that no waste water is disposed of in bodies of water, or in areas of the Palagua field 	<p>Environmental Coordinator of the UT-IJP and the Well Supervisor as representative of the drilling company</p>	<p>complete</p>
<p>FIRE PREVENTION AND CONTROL PLAN: Develop a systematic procedure for the prevention of fires. In the event there is a fire outbreak, develop procedures for an immediate and safe response to fire outbreak to minimize injuries and damage.</p>	<ul style="list-style-type: none"> • Develop and administer a fire prevention and control plan in compliance with NFPA Code 30 and API Standard 2610 • Designate and train an emergency response brigade. • Ensure the proper maintenance of fire control equipment and systems • Control fuel source hazards • Conduct fire risk surveys and make recommendations • Ascertain required training of all employees • Identify potential hazards • Identify alternate methods of fire control • Plan review and recordkeeping 		<p>complete</p>
<p>SPILL PREVENTION CONTROL AND COUNTERMEASURES: Develop measures for well production testing at the location to minimize the environmental risks that may be generated, and provide safety guidelines for the transportation of produced fluids.</p>	<ul style="list-style-type: none"> • Adopt adequate storage and transportation measures for fluids produced during the testing • Follow the management procedures for polluted water generated during production testing 	<p>Production supervisor, under supervision of the Environmental Coordinator of UT-IJP</p>	<p>complete</p>
<p>SOCIAL MANAGEMENT: Design, develop and disclose an information system to make the project known to the populace in the Palagua area and the mass media, inviting active participation. Establish means of communications among the communities, their leaders, the Project social leader and the company.</p>	<ul style="list-style-type: none"> • Inform the population residing in the area of influence of the Project about the characteristics of the Project, through informative meetings. • Agree with the participants the date and place of the necessary meetings and workshops. • Record the minutes of meetings and workshops with the constancy of the participants and topics. • Prepare adequate materials and aids for the presentations to be understood by the participants. 	<p>Field Superintendent</p>	<p>Complete</p>

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<p>HIRING OF LOCAL WORK FORCE:</p> <p>Publicize the need for unskilled labor, job requirements, wages, hiring process, and selection process.</p>	<ul style="list-style-type: none"> Establish the number of personnel needed and the job requirements Hire from the entire Project area equitably and fairly Offer one employment workshop in the Palagua rural district, addressing any concerns Record minutes of any meetings and workshops As the work on any new well begins, a meeting will be held by the HSE Committee. Daily five minute environmental training indicating the following: <ol style="list-style-type: none"> “Social and Cultural Conditions of the Area” oriented towards presenting the characteristics of the area and towards observing respect for the residents of the area. “Use and Management of the Natural Resources”, oriented towards the existing Environmental Regulations and Environmental Conditions of the Area, and oriented towards the care that must be taken in the area of the Project. Conduct regular safety meetings Submit pertinent safety information at quarterly joint meetings with the UT and Ecopetrol 	<p>Field Superintendent</p>	<p>complete</p>
<p>EDUCATION & TRAINING OF WORK STAFF:</p> <p>Educate all staff with regard to environmental and workplace safety as part of normal operating procedure. Raise awareness of the social and cultural aspects of the Palagua area, as well as the community's participation.</p>	<ul style="list-style-type: none"> Relay pertinent archeological and historical heritage information and safeguards to management, administration and operators in the work area. Hold informative workshops on the importance of restoration and conservation of archaeological material and sites, including current legislation and necessary measures to implement in case of an archaeological find. This report is in compliance with OPIC Finance Agreement Section 6.11 and 6.12 and is due June 30 for activities of the previous year. 	<p>Environmental Coordinator of UT-IJP</p>	<p>complete</p>
<p>ARCHEOLOGICAL INFORMATION GUIDE:</p> <p>Comply with current legislation on protection of Colombia's heritage, preventing destruction and alteration through safeguards.</p>	<p>Environmental Coordinator of UT-IJP</p>	<p>complete</p>	<p>complete</p>
<p>ANNUAL REPORT TO OPIC</p> <p>This report includes all monitoring results and methodologies and social and safety activities and incidents</p>	<p>Engineer, JTI</p>	<p>current</p>	<p>current</p>

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<p>SAFETY REQUIREMENTS Activities held by the UT to educate workers, prevent accidents, and teach proper disaster response.</p>	<ul style="list-style-type: none"> • Blowout/Kick/Well Inflow drills – Personnel go to Well Control School every two years to certify. • Fire Drills on different stations • Weekly testing of Fire systems • Speed control devised on all vehicles • Alcohol testing – random, as needed • Various training classes provided by the insurance company, 4-5 times per year 	<p>HSE Engineer</p>	<p>ongoing</p>
<p>MONITORING ACTIVITIES UT is responsible for monitoring drilling cuttings and possible pipe leaks. All other monitoring is the responsibility of Ecopetrol, the results of which are published in our annual report to OPIC.</p>	<ul style="list-style-type: none"> • Drilling cuttings/Land farming – new wells • Drilling cuttings from new wells are deposited in the land farming area and are monitored at 8 days, 3 months and 6 months • Inspection for pipe leaks is done daily by visual inspection • Monitoring of air quality 	<p>Instituto Colombiano del Petróleo has been appointed by Ecopetrol to monitor the water and soil quality. Drilling cuttings are monitored by Baroid Survey Solutions. Pipes are inspected by UT engineers. Air quality is monitored by HSEQ.</p>	<p>ongoing</p>
<p>PALAGUA FIELD DEVELOPMENT PLAN:</p>	<ul style="list-style-type: none"> • Comprehensive development plan outlining proposed drilling, workovers and improvements to the field • Submitted annually to Ecopetrol and the Government of Colombia 	<p>UT Executive Committee</p>	<p>complete</p>