

**INTEGRATED SAFEGUARDS DATA SHEET
CONCEPT STAGE**

Report No.: ISDSC14402

Date ISDS Prepared/Updated: September 26, 2016

I. BASIC INFORMATION

A. Basic Project Data

Country: Nicaragua	Project ID: P155197	
	Additional Project ID (if any):	
Project Name: Geothermal Resource Risk Mitigation Project		
Task Team Leader: Migara Jayawardena		
Estimated Appraisal Date:	Estimated Board Date:	
Managing Unit: GEEDR	Lending Instrument:	
Sector: Energy and Extractives		
Theme:		
IDA Amount (US\$m.): 30.00 SREP Amount (US\$m.): 15.00 MDB/Private Financing Amount (US\$m.): 24.00 Project Developer (CCP): 46.50		
Environmental Category: Proposed environment category is A		
Simplified Processing	Simple <input type="checkbox"/>	Repeater <input type="checkbox"/>
Is this a transferred project	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>

B. Project Objectives [from section 2 of PCN]:

The development objective of the Geothermal Risk Mitigation Project is to help confirm resources and speed-up geothermal development in the field by mitigating risks and leveraging funds through a PPP arrangement.

C. Project Description [from section 3 of PCN]:

Project Scope: The proposed project is designed to confirm the resource base and to mitigate risks with the view to facilitate the development of the first operational power plant in the Casita-San Cristobal field. The resource confirmation and the demonstration of the first modular expansion of a small-scale demonstration power plant of 15-25 MW in capacity would mitigate the development risks and increase the prospects of additional investments to unlock the potential in the field. The proposed project will be developed in two project phases covering the multiple stages (1-4) of the geothermal development cycle, as detailed below:

Project Phase A: Exploration Drilling for Resource Confirmation [Estimated cost \$42.5 million (includes \$10 million already invested by Cerro Colorado Power, a public private partnership between Polaris Energy Corporation and *Empresa Nicaragüense de Electricidad* (ENEL))

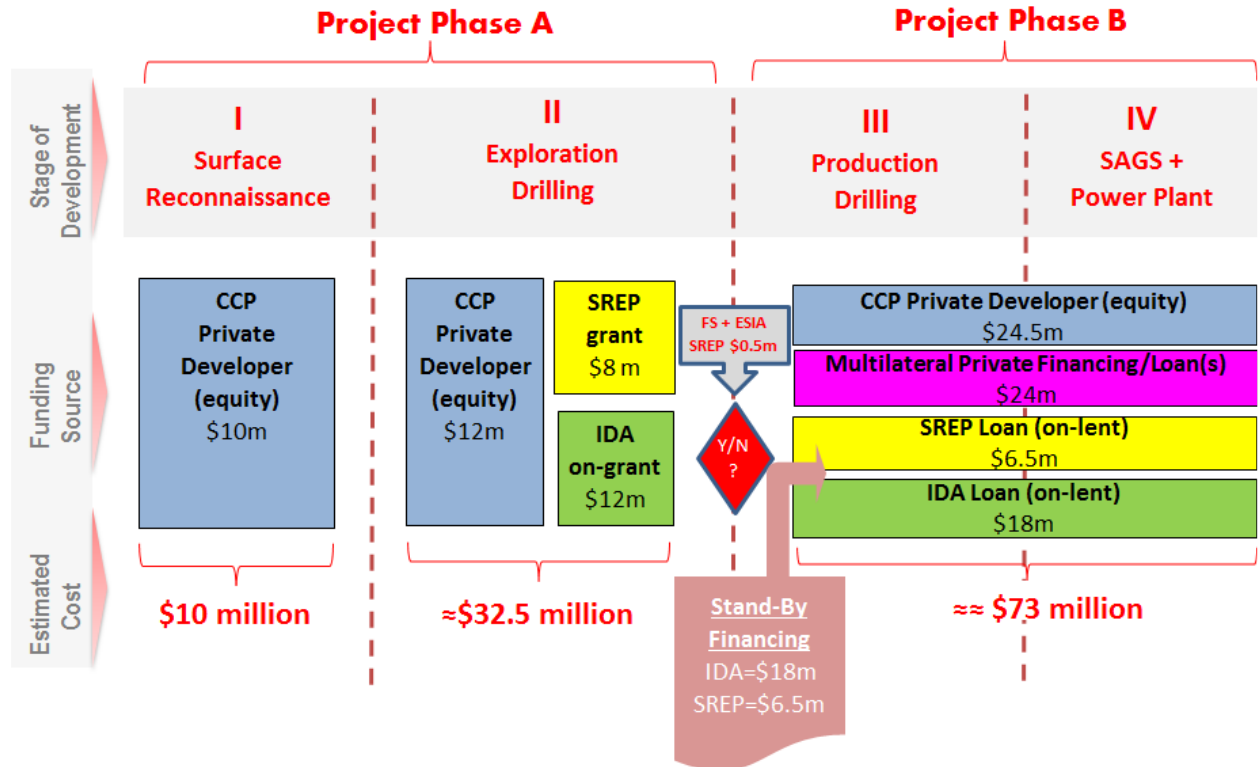
- **Stage I: Surface Studies and Reconnaissance** – This includes the first set of activities undertaken in a geothermal development. They consists of surface reconnaissance, geological, geophysical and geochemical studies, and in the case of the Casita- San Cristobal Field, the drilling of a slim/core hole that has confirmed the availability of a steam resource. CCP, utilizing its own funds, has already completed this activity, providing a sounds basis for moving forward with stage II development.
- **Stage II: Exploration Drilling Program** – An exploration drilling program of 3-5 wells is being considered in order to ascertain the steam capacity (i.e. resource base) for producing electricity and to estimate the cost of extracting the resource. The exploration program will significantly improve the understanding of the geothermal resource and provide better estimates as to the cost of the project, whereby, risks would be considerably reduced.
- **Technical Assistance for Resource Confirmation** – Following the exploratory drilling, an industry standard (bankable) feasibility study and an Environmental and Social Impact Assessment (ESIA) that meets international standards and complies with World Bank Group requirements will be prepared. These important studies will evaluate and confirm the commercial viability of the project and its prospects for sustainability. It will form the basis for making an informed investment decision as to how to proceed with Project Phase B activities.

Project Phase B: Steam Field and Power Plant Development [Illustrative cost ≈\$73.0 million]

- **Stage III: Production Drilling and Steam Field Development** – On the basis of the resource estimate and the initially proposed expansion, the well field would be further developed with additional drilling of production and injection wells; and the Steam Above-Ground System (SAGS) that will transport the steam from the wells to the power plant will be constructed.
- **Stage IV: Construction of Power Plant** – Also based on the feasibility and ESIA studies, an initial small geothermal power plant expected to be in the range of 15MW-25MW will be constructed in line with industry standards. It will demonstrate the viability of sustainably generating power from the geothermal steam resource in the Casita-San Cristobal reservoir; and open up prospects for further modular expansion at the field in the future.

Project Financing through PPP Arrangement: Activities described in the proposed scope will be funded through additional equity from the private developer, SREP grants and credit up to \$15 million, IDA credit up to \$30 million, and potential private financing from other multilateral sources. The initially proposed funding arrangements, is depicted in the following figure:

Illustration of Proposed Project Funding Structure across Multiple Geothermal Development Stages



D. Project location and salient physical characteristics relevant to the analysis of environmental and social risks and impacts (if known):

The exploitation concession covers an area of 20 square kilometers and is located on the southeast slope of the Casitas volcano, (part of the *Cordillera de los Maribios* and *Reserva Natural Complejo Volcánico San Cristobal-Casita*) in the municipality of Chinandega located in the Chinandega Department. The Project is situated approximately 130 km northwest of the city of Managua and 20 km West of the city of Chinandega. The concession is located in private lands overlapping the *Reserva Natural Complejo Volcánico San Cristobal-Casita*; Hacienda Algeria (99%) and Cooperativa El Higueral (1%). No human settlements or communities are located within the geothermal concession area (20 km²).

The *Reserva Natural Complejo Volcánico San Cristobal-Casita*, is a protected area of 179.64 km² under the category of Natural Reserve belonging to the National System of Protected Areas (*Servicio Nacional de Areas Protegidas SINAP*) of the Republic of Nicaragua . It was established by Decree-Law 1320 of 1983. It is located in the department of Chinandega, 130 km north of the Pacific region of Nicaragua km of the capital Managua. The protected area consists of a chain of five volcanic cones, including the San Cristobal one, the country's highest volcano. The reserve is divided into six management zones: Core Area, Conservation Recovery Area, High Fragility Area, and Sustainable Production Zone in addition to the buffer zone. The geothermal development activities of the Project are proposed to take place within the Sustainable Production Zone and the Core Zone, while the already built access road and the future transmission line also affect a narrow strip within the Buffer Zone of the protected area. Most of the impacts will however be generated within the Sustainable Production Zone, where at

least two well pads and the power plant are planned to be sited. The already constructed well pad and an additional proposed well pad are located within the Core Zone.

Nicaraguan legislation approved in 2006-2008 (through amendments to the Geothermal Law, article 7; to the General Environmental and Natural Resources Law, article 116; and to the Protected Areas Bylaw, article 22) allows geothermal exploration and development in protected areas, provided appropriate environmental assessment and mitigation measures are applied and included in the Management Plan of the Protected Area

Geothermal development is a multi-stage process, and the Casita-San Cristobal field development began in 2009. Surface studies (geological, geophysical, and geochemical) have already been completed, a well pad constructed including its associated access road, and a slim hole drilled that has led to the confirmation of the availability of a steam resource. Based on this favorable result, it is proposed to proceed with the remaining stages of development towards the demonstration of a small operational power plant (phase B of the Project).

Compliance with Nicaragua's permitting requirements:

Following Nicaraguan legislation, CCP prepared Environmental Impact Studies (EIS), Category II ¹ at the request of the Environmental and Natural Resources Ministry (*Ministerio del Ambiente y los Recursos Naturales* or MARENA). In 2009, MARENA granted CCP with an environmental permit for the project to conduct exploration activities from three drilling sites (two of them within the core zone of the Natural Reserve (*Resolución Administrativa* No. 017-2009 - Nov 23, 2009) in the exploration concession area of 100 km². Based on the environmental permit, CCP carried out in 2009-2011 an initial geothermal exploration program in the area, which comprised surface investigations, construction of an access road and drilling of a single slim hole within the core zone of the Natural Reserve. For the follow-on exploitation phase, CCP prepared an EIA category II covering an area of 20 km², for which an environmental permit was granted by MARENA on July 13, 2015. The proposed activities covered by this permit are: construction and installation of four (4) platforms for production and reinjection wells, civil works and ancillary installations necessary for the drilling program and the construction of the power plant. The permit was granted with a series of conditional requirements that need to be fulfilled prior to starting any exploitation activities including the drilling of additional wells. These requirements include: a presentation of the updated and specific environmental management program including a contingency plan, control and follow-up plan; environmental quality plan; waste management plan; noise management plan; and training and environmental education plans. Additional permit conditions have to do with the biodiversity component of the project, for which MARENA is requesting flora and fauna inventories, based on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, to identify presence of migratory, endemic or resident species in the area of the concession.

¹ CATEGORY II - All works, projects, industries and activities considered in this Environmental Category II can cause a potential high impact on the environment and are subject to an Environmental Impact Study.

E. Borrower's Institutional Capacity for Effective ESMS:

Currently, CCP doesn't have an ESMS in place consistent with the WB Performance Standards. However, Polaris, the primary shareholder of CCP, is an experienced geothermal developer that constructed and is currently operating the San Jacinto-Tizate geothermal project in Nicaragua, which is being financed by IFC and other multi-lateral development partners. Therefore, it has prior experience with the implementation of the IFC performance standards and has an ESMS in place for the San Jacinto-Tizate operation. Polaris is proposing the approach of transferring technical and operational capacity by adopting the applicable ESMS procedures/protocols from the San Jacinto drilling operation (which is currently ongoing) to the CCP and applying them to the Casita-San Cristobal exploration drilling program. Additional work will be undertaken by CCP to develop the ESMS further to adapt it to meet the specific requirements of the Casita-San Cristobal project. This approach will help them take advantage of the valuable experience developed by Polaris throughout the development of the San Jacinto field and utilize staff with expertise that will help transfer good operational practices for implementing the ESMS during the implementation of the Casita- San Cristobal Project.

F. Environmental and Social Safeguards Specialists on the Team:

Noreen Beg/ Ximena Herbas Ramirez
Peter LaFere/Carlos Perez Brito

Senior Environment Specialists
Senior Social Specialist

II. PERFORMANCE STANDARDS THAT MIGHT APPLY

Performance Standards <i>(please explain why)</i>	Yes	No	TBD
PS 1: Assessment and Management of Environmental and Social Risks and Impacts	X		
Given that the activities of the proposed Project will be implemented within a protected area, the San Cristobal Casita Natural Reserve, including inside the core area of the Reserve, the World Bank has classified the proposed project as Category A (for all phases), requiring full Environmental and Social Impact Assessment (ESIA). Since the project will finance both phases, the Borrower will be required to comply with World Bank Performance Standards throughout the entire Project.			
Following Nicaraguan legislation, CCP prepared Environmental Impact Studies (EIS), Category II ² at the request of the Environmental and Natural Resources Ministry (<i>Ministerio del Ambiente y los Recursos Naturales</i> MARENA). In 2009, MARENA granted CCP with an environmental permit for the project to conduct exploration activities from three drilling sites (two of them within the core zone of the Natural Reserve (<i>Resolución Administrativa</i> No. 017-2009 - Nov 23, 2009) in the exploration concession area of 100 km ² . Based on the environmental permit, CCP carried out in 2009-2011 an initial geothermal exploration program in the area, which comprised			

² CATEGORY II - All works, projects, industries and activities considered in this Environmental Category II can cause a potential high impact on the environment and are subject to an Environmental Impact Study.

Performance Standards <i>(please explain why)</i>	Yes	No	TBD
<p>surface investigations, construction of an access road and drilling of a single slim hole within the core zone of the Natural Reserve. This has resulted in favorable findings indicating the existence of high temperature steam, which if extracted, could be suitable for power generation.</p> <p>For the follow-on exploitation phase, CCP prepared an EIA category II covering an area of 20 km², for which an environmental permit was granted by MARENA on July 13, 2015. The proposed activities covered by this permit are: construction and installation of four (4) platforms for production and reinjection wells, civil works and ancillary installations necessary for the drilling program and the construction of the power plant. The permit was granted with a series of conditional requirements that need to be fulfilled. Some of these requirements include a presentation of the updated and specific environmental management program including a contingency plan, control and follow-up plan, environmental quality plan, waste management plan, noise management plan, training and environmental education plans among others. Other conditions have to do with the biodiversity component of the project, for which MARENA is requesting flora and fauna inventories using the International Union for Conservation of Nature (IUCN) list and defining if there are migratory, endemic or resident species in the area of the concession.</p> <p>As the EIA for the follow-on exploitation phase was undertaken to meet local requirements and hence does not consider the WB performance standards, it will need to be revised taking into consideration the requirements for complying with WB Performance Standards. This review will be carried out independently and it may need several additional studies and Environmental and Social Action Plans to be developed to bring the ESIA and the management aspects of the project in line with the World Bank performance standards.</p> <p>Also, it would be useful for CCP to strengthen the project's socioeconomic baseline, through the development of a Social Assessment that will be included in the ESIA and that will contribute to the development of more effective Environmental and Social Action Plans. This Social Assessment is expected to include: (a) a more complete picture of land tenure, ownership, and use within the project site and concession area, (b) current economic/livelihood activities within the project's influence area (c) more detailed information of sources of potable water, water usage by the local community within the project site and concession area, water-quality data, and periodic monitoring of water supplies (ground and surface) within the project site and concession area, (d) issues related to land/resource access and any impacts thereof as a result of CCP's activities, (e) more precise demographic data for the project site and the concession area, (f) presence of indigenous peoples as identified under PS 7, (g) archeological, paleontological, historical, cultural, artistic, or religious value of the project area.</p> <p>The Social Assessment will also provide a basis for the development of a stakeholder engagement and consultation strategy to ensure that the World Bank consultation requirements for a Category A project are met.</p> <p>Upon completion of Phase A and once the geothermal resources have been confirmed, additional assessments will be carried out incorporating the updated information. This is a critical mid-project decision point regarding the manner in which Phase B will be implemented. Along with the technical studies, an ESIA for the phase B will be prepared with the additionally available</p>			

Performance Standards <i>(please explain why)</i>	Yes	No	TBD
<p>information. This phase B ESIA and ESMS would need to comply with World Bank Performance Standards, and will be one key consideration that will determine how to proceed with Phase B activities. In addition, the ESMS will also be updated to include the activities of Phase B as appropriate. The new ESIA and revised ESMS will be key criteria for deciding whether to move forward with the implementation of Phase B and disbursement of funds. CCP will meet the requirements of the updated ESMS and the Phase B ESIA in compliance with the World Bank Performance Standards.</p> <p>The key environmental and social impacts and risks associated with the project's construction phase (<u>during drilling</u>) are (a) potential contamination of surface and ground water, as well as soils, from drilling fluids, geothermal fluids, muds, and cuttings associated to any wells drilled to date or additional wells, and construction waste (b) increased water demand from drilling, well testing, and construction activities (c) potential air emissions, noise, and solid and hazardous waste generated from construction activities and/or accidental spills, (d) transportation of heavy equipment and machinery and increased hazards thereof (e) potential health and occupation risks to construction workers from working with extremely hot components and handling and operating heavy equipment and machinery; and (<u>during SAGS and power plant construction</u>), (f) incremental impacts associated with the easement and expansion of existing access roads, the construction of a demonstration 15-25 MW small power plant along with a substation and a 35.8 kV transmission line extending 5.8 km to the substation.</p> <p>Once the project is completed and the small demonstration power plant is in operation, the key environmental and social impacts and risks are: (g) potential soil and water contamination from re-injected process water and drilling wastes (muds, cuttings) (h) increased emissions of potentially hazardous (and malodorous) air pollutants such as hydrogen sulfide (H₂S) and mercury (i) community and worker exposure to explosions, well blowouts, pipeline failures, induced seismicity and/or ground subsidence (j) water consumption for supplementary activities associated with power plant operations (primarily from water use in sanitary facilities and associated construction camps and within the generation facility). and (k) hazardous working conditions for plant personnel (e.g. increased exposure risks to toxic gases, working in confined spaces or heights, exposure to heat, high pressure gases, and noise). These impacts and risks can be managed with existing pollution prevention and control technologies and with standard industry and environmental management practices, such as those described in IFC's EHS Guidelines: http://www.ifc.org/ehsguidelines and the EHS guidelines for Geothermal Power Generation http://goo.gl/W3hvY6</p> <p>During appraisal, the different elements of the environmental, health and safety and social management system, its plans and procedures will be evaluated if additional measures and actions are identified an Environmental and Social Action Plan will be developed.</p>			
PS 2: Labor and Working Conditions	X		
<p>For the construction of civil works for the exploitation phase, CCP expects about 50 people to be employed by contractor and no workers camp is expected. These will include civil engineers, surveyors, machine operators and experienced drivers for earthworks; as well as bricklayers,</p>			

Performance Standards <i>(please explain why)</i>	Yes	No	TBD
<p>welders, helpers and guards. Unskilled workers and guards may be hired from the communities near the project.</p> <p>For building platforms and drilling of wells, CCP expects to hire about 60 employees. An estimated 50% of qualified personnel will be recruited nationally, while most of the unskilled workers, helpers and security personnel will be hired locally.</p> <p>The WBG team will review the specific HR processes and practices for the Casita-San Cristobal project in line with the requirements of the PS including some requirements in the contracts for third party employers as well as the process for a grievance mechanism and occupational health and safety practices.</p>			
PS 3: Resource Efficiency and Pollution Prevention	X		
<p>Air Emissions/Air Quality: Air emissions will consist primarily of carbon dioxide (CO₂) and hydrogen sulfide (H₂S) in the waste steam and from around well heads. These two parameters will be measured continuously during drilling operations and ambient levels will be measured on a semi-annual basis around well platforms, power plant, rock muffler and silencers.</p> <p>Greenhouse Gas (GHG): This project is expected to positively reduce the climate footprint of power generation in the country displacing the utilization of less environmentally friendly bunker fuel for producing electricity. The client will be asked to report gross and net emissions</p> <p>Solid waste: The main solid waste, apart from construction waste, will be dried drilling mud and cuttings containing potentially hazardous heavy metals, drilling fluids residues, or other contaminants. Other solid waste generated during generation phase would include cooling tower sludge, lubricants and plastic bags.</p> <p>Water consumption and extraction: Well drilling typically is a water intensive process. Water wells will be drilled in order to obtain the necessary water primarily for the drilling operations. The company needs to undertake a hydrogeological evaluation to gather information about aquifers, yields, permeability, users, gradients, abstraction, quality, etc. in order to understand impacts to the resource, and so as to elaborate on mitigation measures, etc.</p> <p>Regarding resource conservation and energy efficiency to be implemented in the project, the WBG team will evaluate the process CCP will implement to ensure that resource and energy efficiency is examined throughout the different phases of the project (exploitation, construction and operation), and the monitoring measures and indicators to benchmark the performance of the project on these aspects following best practices for the industry.</p>			
PS 4: Community Health, Safety, and Security	X		
<p>The World Bank team will assess if the company's management system includes a Health Management Plan to address matters regarding the health and wellbeing of construction workers, project staff and nearby landowners, a Transport/Road Safety and Logistics Management Plans with measures to ensure safety of road users during construction, that appropriate Emergency Response Plans have been developed include procedures to respond to accidental leaks, spills, emissions, fires, and other unforeseen impacts (including natural disaster events such as landslides, unstable terrain, volcanic eruptions and floods). Issues pertaining to management of security personnel will also be appropriately specified in line with this Performance Standard. Also the WBG team will review if the system includes training of</p>			

Performance Standards (<i>please explain why</i>)	Yes	No	TBD
security personnel on Voluntary Principles on Security and Human rights.			
PS 5: Land Acquisition and Involuntary Resettlement	X		
<p>The land requirement for this project will affect five landowners in the area with whom easement rights for development affecting 36 ha were negotiated and concluded in the period May 2009 – May 2010. The Government of Nicaragua imposed easement rights for the benefit of CCP on one of the five owners. The easement rights would not affect communities’ access to natural resources such as water, and no physical displacement or economic displacement have occurred or are expected to occur as a result of this project.</p> <p>CCP will commission a Completion Audit to determine whether the five easements were compensated in accordance with PS 5 and, if necessary, develop a Social and Environmental Action Plan, as required by performance standard, prior to appraisal to identify additional corrective actions that would be required to comply with the policy. If any further easements are identified, a Livelihood Restoration Plan will be developed and included with the Environmental and Social Action Plan.</p> <p>As the project is likely to be conducted in several phases and as there are likely further easements required of which the exact nature and location is not yet fully known, a Livelihood Restoration Framework will also be developed in accordance with PS 5 to describe the principles for the conclusion of any further easements, land acquisition, or restrictions to the use of natural resources.</p> <p>The</p>			
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	X		
<p>The <i>Reserva Natural Complejo Volcánico San Cristobal-Casita</i>, is a protected area of 179.64 km² under the category of Natural Reserve belonging to the National System of Protected Areas (<i>Servicio Nacional de Areas Protegidas SINAP</i>) of the Republic of Nicaragua . It was established by Decree-Law 1320 of 1983. It is located in the department of Chinandega, north of the Pacific region of Nicaragua, 130 km. of the capital Managua. The protected area consists of a chain of five volcanic cones, including the San Cristobal one, the country's highest volcano. The reserve is divided into six management zones: Core Area, Conservation Recovery Area, High Fragility Area, Sustainable Production Zone in addition to the buffer zone. The geothermal development activities of the Project are proposed to take place within the Sustainable Production Zone and the Core Zone, while the already built access road and the future transmission line also affect a narrow strip within the Buffer Zone of the protected area. Most of the impacts will however be generated within the Sustainable Production Zone, where at least two well pads and the power plant are planned to be sited. The already constructed well pad and an additional well pad are located within the Core Zone.</p> <p>CCP must undertake a biodiversity assessment of related risks in all phases of the project in strict conformance with Performance Standard 6 that will evaluate whether the Project is located within Critical Habitats for phase A and B. The results of the biodiversity assessment will be</p>			

Performance Standards <i>(please explain why)</i>	Yes	No	TBD
included in the ESIA. The assessment exercise should include a comprehensive evaluation and understanding of the landscape in which the project is located, including the extent of anthropogenic modification and or the presence of natural habitat or critical habitat; the biodiversity values of the project area, the direct and indirect impacts of the project on the biodiversity values, and recommendations of appropriate mitigation measures following the mitigation hierarchy: avoidance, minimization, remedy/restoration and compensation/offset of any residual (unavoidable) impact. Also, the alternatives analysis of the project will need to be assessed to demonstrate that the project prioritized ‘avoidance’ of impacts on sensitive biodiversity areas before considering mitigation and that there were no other viable alternatives within the region for development of the project.			
PS 7: Indigenous Peoples			X
The EIA did not identify any groups that meet the definition in PS7 in the project area. However, given the presence of IP in Chinandega or the possibility that certain groups have a collective attachment to distinct habitats or natural resources within the project area, the Social Assessment that will be prepared to complement the existing EIA will include specific further information on whether any IP will be impacted by the project. If presence of IP is confirmed and there are impacts generated by the Project, further requirements will be prepared based on PS 7.			
PS 8: Cultural Heritage	X		
There is no cultural heritage management plan detailed in the existing EMP and EIA. The Social Assessment that will be prepared to complement the existing EIA will include an assessment of whether the site as a whole, or a specific part thereof, has archeological, paleontological, historical, cultural, artistic, or religious value. Chance finds procedures will be incorporated into the EIA and Environmental and Social Action Plans.			

III. SAFEGUARD PREPARATION PLAN

- A. Target date for the Quality Enhancement Review (QER), at which time the ESRS would be disclosed and the PAD-stage ISDS would be prepared: March, 2017
- B. For Category C or Category FI projects that do not require an ESRS, the target date for preparing the PAD-stage ISDS: N/A
- C. Time frame for launching and completing the safeguard-related studies that may be needed. The specific studies and their timing³ should be specified in the PAD-stage ISDS:

³ Reminder: The Bank's Access to Information Policy requires that safeguard-related documents be disclosed before appraisal (i) at the InfoShop and (ii) in-country, at publicly accessible locations and in a form and language that are accessible to potentially affected persons.

Resettlement Policy Framework/ Resettlement Action Plan (RAP):
 EIA/EMP for drilling/power plant construction: Completed in July 2014. To be updated as
 needed and as requested by MARENA.

IV. APPROVALS

<i>Signed and submitted by:</i>		
Task Team Leader:	Migara Jayawardena	Date
<i>Approved by:</i>		
Regional Safeguards Coordinator:	Agi Kiss	Date
Comments:		
Practice Manager:	Antonio Barbalho	Date
Comments:		