Papua New Guinea LNG Project

Report of the Independent Environmental and Social Consultant

IESC - PNG LNG 18th Trip

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

AGI	Above-Ground Installation
ANUE	ANUedge–Australian National University Social development initiative
APEC	Asia-Pacific Economic Cooperation – meeting held in POM Nov 18
bbl	Barrel
BAA	Biodiversity Assessment Area (PMA-3)
BEC	Business Enterprise Centre
BIMP	Biodiversity Implementation and Monitoring Program
BMVG	Benchmark Vegetation Group
BOM	Board of Management
CBD	Convention on Biological Diversity
CDS	Community Development Support
CEPA	Conservation and Environment Protection Authority
CLIP	Community Livelihood Improvement Program
CHP	Community Health Program
CP	Cathodic Protection
CTA	Common Terms Agreement
CV	Check valves
DFAT	Australian Department of Foreign Affairs and Trade
DPE	Department of Petroleum and Energy
ECA	Export Credit Agency
EHS	Environmental Health & Safety
EMPNG	ExxonMobil PNG Limited (formerly EHL – Esso Highlands Limited)
EMP	Environmental Management Plan
EMS	Environmental Management System
EIS	Environmental Impact Statement
ESMP	Environment and Social Management Plan
ESMS	Environmental and Social Management System
FCL	Full Container Load
FF	Freight Forwarders
GIS	Geographic Information System
GWIM	Global Women in Management
HGCP	Hides Gas Conditioning Plant
HWMF	Hides Waste Management Facility
I&D	Inclusion & Diversity
IBR	Institute of Biological Research
IESC	Independent Environmental and Social Consultant
IFC	International Finance Corporation
iHDSS	Integrated Health Demographic Surveillance System
IMR	Papua New Guinea Institute of Medical Research
ISPM-15	International Standard for Phytosanitary Measures No. 15
IR	Industrial Relations
KP	Kilometer Point
KPI	Key Performance Indicator
L&CA	Land and Community Affairs
LCL	Less Container Load

LKRUMP	Lower Kikori Resource Use Management Plan
LNG	Liquefied Natural Gas
LTI	Lost Time Incident
MEG	Monoethylene Glycol
MLV	Main Line Valves
MOC	Management of Change
MOH	Medicine and Occupational Health
MOU	Memorandum of Understanding
MTA	Million tons per annum
MZ	MosquitoZone
NAQIA	National Agriculture Quarantine and Inspection Authority
NBSAP	National Biodiversity Strategy and Action Plan
NC	Non-Conformance or Non-Compliance
NGO	Non-Governmental Organization
NNL	No Net Loss
OIMS	Operations Integrity Management System
OSL	Oil Search Limited
Para.	Paragraph
P&GA	Public and Government Affairs
PMA	Program Monitoring Activity
PNG LNG	Papua New Guinea Liquefied Natural Gas Project
PPP	Public – Private Partnership
PS	Performance Standard
Q	Quarter
RAP	Resettlement Action Plan
RoW	Right-of-Way
SCI	Strategic Community Investment
SME	Small to Medium-Sized Enterprise
TOR	Terms of Reference
TRIR	Total Recordable Incident Rate
TWM	Total Waste Management
U-PNG	University of PNG
VMP	Vehicle Monitoring Plan
WASH	Water, Sanitation and Hygiene
WCS	Wildlife Conservation Society
WMA	Wildlife Management Area
WMZ	Weed Management Zone
WWTP	Wastewater Treatment Plant
YTD	Year to Date

EXECUTIVE SUMMARY

This report represents the eighteenth post-financial close field visit to Papua New Guinea (PNG) made by Rina Consulting S.p.A. (formerly D'Appolonia S.p.A.) of Genoa, Italy serving in the role of the Independent Environmental and Social Consultant (IESC) for the Papua New Guinea Liquefied Natural Gas (PNG LNG) Project with ExxonMobil PNG Limited (EMPNG) as the Operator on behalf of Export Credit Agencies (ECAs) and commercial banks providing Project financing (Lenders). The purpose of this visit has been to monitor conformance with Project environmental and social commitments made for the Production phase of this development. This visit was conducted from January 29 – February 4, 2019 in PNG. IESC visits during the Production phase of the PNG LNG Project are taken annually and the last visit was in September – October 2017.

The biggest event of 2018 was the occurrence of a Magnitude 7.5 earthquake with an epicenter close to the Hides Gas Conditioning Plant (HGCP) on February 26. PNG LNG needs to be recognized for its response to this large earthquake, both internally and externally. The designers and constructors of HGCP need recognition – the earthquake had to have exceeded the seismic design criteria. There was no loss of containment and the pipeline did not rupture. The plant operators showed remarkable discipline undertaking a manual shutdown. EMPNG's community response was exceptional. Production resumed April 7, 2018 with full production (better than before) on April 26, 2018. By the end of 2018 the annual plant production exceeded the design capacity of 6.9 MTA, even with the two-month shutdown due to the earthquake.

Environmental and Social Management System (ESMS)

The Environmental and Social Management System (ESMS) is a mature and active System. As such, it continues to evolve and be revised. Key framework documents to the ESMS are the Project Environmental Management Plans (EMPs), which have been upgraded to an advanced draft. These new EMPs have been updated to represent updated practices, new regulations, and incorporate mitigation measures that were included during construction, but are applicable to Production. IESC has reviewed these EMPs and provided our comments to EMPNG.

Pollution Prevention

EMPNG continues to work towards improving their pollution prevention systems, but the February earthquake damaged infrastructure and other situations developed that have slowed the process of improvement. Waste management is one area impacted. The February earthquake has caused the collaboration with OSL to be put on hold, as the OSL incinerator has not been operational. The Project also has no operating incinerators, either Upstream or at the LNG Plant. As a result, the amount of waste landfilled has increased. EMPNG has focused in 2018 to develop long-term waste management solutions in anticipation of the increased amount of waste that will be generated by the Expansion Projects. Third-party management of waste from the LNG Plant is still envisioned, but the development of the Roku Total Waste Management (TWM) facility has been slow. The short-term plans are to not allow significant quantities of waste to be stockpiled and to restore incineration capacity at the Hides Waste Management Facility.

A Level 1 NC was assigned to wastewater treatment in the last IESC report with the note: *Wastewater Treatment Plants (WWTPs) are operated at the LNG Plant, Angore, HGCP, and Moro. All of them have problems with their discharges, which have been the subject of numerous Environmental Compliance Incidents (ECIs) and EMP non-conformances (EMP NCs) internally assigned, but in any case, the problems have worsened over 2017*.The situation in 2018 is not fully resolved, but much improved over 2017.

Erosion and Sediment Control

The earthquake caused some serious problems with respect to slope failures in the Upstream area, including at the Komo airfield and along the pipeline route. At the HGCP the effects were relatively minor and under control by the time of the IESC visit. Remedial earthworks are still underway along the pipeline route and the next effort to be undertaken is the repair of the runway and the stormwater drainage structures. IESC recommends that the drainage systems at the Komo airport be given a high priority, as this is an area where minor erosion can turn serious in a short period of time.

Ecological Management and Biodiversity

Since our last visit, there has been much focus on Programmed Monitoring Activities (PMAs) related to assessing how well the Biodiversity Strategy is being implemented. Each of the field work teams have faced several challenges due to accessibility and/or security constraints. The remote sensing program continues to provide both interesting and valuable insights into the changes being observed in land use cover over time. Land cover loss of more than 1 Ha was observed in five areas: Angore, Kaiam River crossing, Kopi Scraper Station and Komo. Field inspections are due to verify the findings and confirm whether any attribution to the Project is appropriate. The PMA-3 biodiversity survey report is now finalized, again confirming the high biodiversity values for all surveyed taxa. The

surveys continue to find species of conservation significance, as well as species new to science and not recorded previously. The study authors conclude the biodiversity values of the Project areas remain intact, with no unequivocal evidence that edge effects from the RoW have negatively influenced the presence or behavior of species. The study did note however an increase in hunting pressure, feral dog predation and the potential spread of exotic species all potentially associated with the RoW and Project roads, may threaten biodiversity values. These surveys continue to provide huge ecological value, not only for determining residual impacts from the Project's presence, but also in building knowledge and capacity in PNG's biodiversity.

The Communicating Conservation meetings continue to provide benefits of knowledge sharing and networking for all attendees, and the IESC commends the work being led by EMPNG at these events. In addition, the first of the Biodiversity Conferences was held with over 150 participants. We encourage continuation of these meetings and conferences. Such opportunities are especially important in PNG where community conservation is one of the more feasible ways to achieve sustainable, positive conservation outcomes benefitting both wildlife and people.

The Feb 2018 earthquake seriously affected the lives and livelihoods of communities in the areas where the Project is seeking to engage on conservation. Therefore, there is little to report on the development of the upper elevation biodiversity offset program, but good progress has been achieved in the Lower Kikori Delta. Resource mapping has continued (to delineate fishing, timber and conservation areas) including GIS mapping of resource boundaries, undertaken through two separate engagement campaigns focusing on ten separate villages. In addition, EMPNG invited community leaders from across the Kikori Delta to discuss conservation and protected areas, the gathering over 300 people representing villages invited for participation in the offset program. The Project will continue to work with these communities to begin the process of establishing conservation deeds, to continue invasive species awareness, fisheries management planning and resource mapping.

Recommendations focus on: consideration of the PMA-1 technical specialists recommendation of a further two-year remote sensing monitoring frequency to allow enhanced assessment of the stability of areas impacted by the 2018 earthquake; to fully understand the biodiversity values of offset conservation areas, biodiversity surveys should include freshwater and marine fish; and to consider appropriate financial and oversight/governance mechanisms that will allow the biodiversity offset program to achieve the desired outcomes over the life of the Project's residual impacts.

Induced Access

EMPNG reports there have been no observed signs of logging adjacent to the RoW or infrastructure and report no bypassing or destruction of access control equipment, e.g. gates or padlocks on gates. Some burnt grasses were observed on the RoW near Angore. Community Affairs investigated the incident, liaising with the community, but security incidents in the area have prevented further site visits. During the chopper flyover of MLV-1 at Benaria, the IESC noted a wooden gate had been built blocking the road between the recently constructed government bridge and the government road to Benaria Station. This has resulted in vehicles continuing to use the EMPNG temporary construction bridge still in place, plus a short section of the RoW past MLV-1 in order to get to Benaria Station; vehicle tracks were discernable from the air. EMPNG will investigate, although security incidents in the area mean that visits to the site are difficult.

At the LNG Plant, vehicle incursions continue through the bare backshore area of the RoW at the LNG Plant, and tracks were apparent during our visit. We observed a small number of mangrove stumps and trees that had been cut. Community Affairs continue to liaise with the local community to reiterate access restrictions. The Project has also responded through the planned use of multi-lingual signage, highlighting the importance of mangrove protection.

EMPNG has advised they are in the process of revising and automating the way they collect and analyze vehicle records in their access monitoring datasets. This has resulted in the consolidation and amendment of historical quarterly vehicle data. Reasons for some of the changes in historical data could not be clarified in time for inclusion in this report. During the next site visit the IESC will seek a comprehensive update on the Project's updated approach, what implications this might have on previous analyses presented, and update the IESC vehicle graphs for the next report accordingly.

As detailed in our last report, there has been no further dialogue with government on the potential requisition of the Kantobo to Gobe EMPNG road portion of the Southern Highway, or the Kaiam Bridge. EMPNG has completed their environmental and social risk assessment.

With regard to the potential handover of the Kantobo to Gobe EMPNG road to government, we reiterate our high-level recommendation based on the summary of issues in our last report.

Reinstatement and Regeneration

Where naturally regenerating areas weren't affected by the earthquake, from our road-trip and flyover, the IESC was still able to observe continued regeneration of areas known to have been impacted during construction. Areas previously reinstated at Komo were heavily affected and considerable efforts will be necessarily to bring the full airstrip back into operation, then areas actively reinstated around this to aid with slope stability.

Regeneration monitoring results from Binatang's 2017 field campaign indicate RoW regeneration vegetation biomass and species composition, although not yet considered equivalent to early secondary benchmark vegetation, was progressing well along that path. However, ground and canopy cover generally did match that of young secondary vegetation benchmarks. A significant increase in the growth, abundance and diversity of trees was recorded since the 2015 surveys. As could be expected, slower progress in succession was observed at higher altitudes, and the canopy will take longer to compare favorably with young secondary vegetation benchmark plots. The 2019 campaign will be undertaken during the first half of the year.

Invasive Species and Quarantine Management

In previous reports, the IESC has flagged concerns that the information provided by EMPNG was insufficient to allow Lenders to determine whether invasive species risks raised in the EIS were being effectively mitigated. Insufficient analyses were provided as to whether observed priority weed species presence, persistence, abundance and distribution changes were of ecological significance. EMPNG has now revised their approach to weed monitoring. New Guinea Binatang Research Centre, already contracted to undertake the Project's regeneration monitoring, has now been engaged on weed monitoring. A revised methodology has been developed, with a focus on quantitative data collection and statistical analysis. Binatang's approach is more closely aligned with a classic characterization research methodology, rather than the previous risk-focused audit approach. The survey addresses the breadth of weeds found across the Upstream area and could benefit from additional analysis and interpretation of Priority-1 (P1) weed presence.

Although it is not yet clear whether this new approach will fully address the requirements flagged previously, the IESC is encouraged that a new approach has been developed to tackle issues raised. The revised methodology is likely to provide interesting and valuable information in the next few years. We have closed the outstanding Observation with a view to reassessing the situation once a few monitoring campaigns have been completed, risks associated with ongoing P1 presence, persistence, abundance and distribution are better understood, and trends reanalyzed.

The first field campaign according to the new methodology was undertaken in 2018. Not all sites were able to be accessed due to security concerns – 20 sites were accessible, allowing 108 transects to be surveyed across all altitudes within the Project's footprint. Of significance to note is that none of the proposed sites within the Homa-Benaria Ridge Priority Ecosystem could be accessed. This area has been flagged previously due to the presence of P1 weed species in what was a largely weed-free ecosystem prior to construction. The survey provided a good characterization of the invasive species present. A widespread distribution of weeds was recorded, with the mid-altitudes (1000-1500m above sea level) having the highest diversity of weeds, although Priority-2 and Priority-3 are more abundant than P1. The community composition is changing rapidly, that more species are decreasing in abundance than increasing, and that the most abundant species are not P1 weeds. Of the four rapidly decreasing species, three were P1, and of the seven increasing species, one was a P1. The P1 weed *P. aduncum* was noted as one the five weeds most common in the weed community but was present in less than one third of transects.

Security issues have severely restricted the ability of MosquitoZone to access some areas for weed identification and control, including the Homa-Benaria Ridge Priority Ecosystem. Due to the risks to the environment associated with use of Glyphosate near water, flooding in some lowland areas has also meant targeted application has been challenging and/or not possible. However, weed control has continued wherever possible.

The Feb 2018 earthquake not only hampered active weed control efforts in the field but also provided increased expanses of disturbed/bare ground where invasive species can become established. Weed control will therefore require enhanced efforts across priority areas that are already on the Project's radar.

Cane toads are an increasingly challenging invasive pest in the Upstream Highlands areas; the Project has developed additional tools to help identify its presence and life-cycle stages.

The increasing need for quarantine-related re-fumigations once shipments arrive in country had prompted a number of investigations into both EMPNG Production and Wood Group freight forwarder practices. Corrective actions have been developed for EMPNG Production.

Recommendations focus on: prioritization of both weed monitoring and weed control in Priority Ecosystems such as Homa-Benaria, when it is safe to do so; consideration of increased weed control personnel and resources to minimize the opportunistic establishment and spread of weeds across disturbed grounds following the earthquake; increased analysis and interpretation of Priority-1 weeds; and reassessment of the weed control approaches taken at LNG Plant to ensure options other than Glyphosate application are also considered.

Resettlement

The major earthquake that occurred in February in the upstream Project areas damaged various Project facilities. Minimization of resettlement and household asset loss was a major criterion in determining sites for repair operations resulting to date in the need to resettle only one household located near the pipeline. The resettlement package provided is the same package provided to previously displaced households with the additional in-kind compensation offer of either a water tank or solar panels to directly contribute to improving the condition of the household. There remains, however, the potential for additional resettlement as post-earthquake maintenance scoping is still in process. The IESC requests that it be provided with updates on any additional resettlement necessitated by repair or other related works.

Community Impacts Management

The Project continues to appropriately apply the procedures and processes meant to avoid, minimize, and address any project related community environmental, health, safety and security concerns that arise during Production. Issues are monitored regularly by Community Affairs and Village Liaison Officers and the departments responsible for implementing management measures (such as Security, Safety, Environment, and Community Development Support). The Complaint and Grievance Mechanism also is analyzed to identify issues and assess trends.

Voluntary relocation from Potential landslip/soil movement risk: The earthquake resulted in large areas of risk for potential landslip and soil movements within and near the PNGLNG footprint. Further assessment identified three areas of potential risk of land slips that could cause impacts to community safety. EMPNG agreed with the PNG government to undertake relocation of affected households as part of a Government/Company community safety initiative. The 20 households (all near KP64) most at risk were offered optional relocation and a few other households (KP9.1-10.5) were paid compensation for structures and/or gardens. Given that these are voluntary relocations, formal monitoring and evaluation is not required, though the Project will continue to liaise with relocated households until they are re-established. The Project continues to engage with relocated households and the IESC recommends engagement be continued for a reasonable period. The IESC also notes that IFC PS5 does not apply in this case because the need for households to relocate is unrelated to the Project and because relocation of households is purely voluntary, and expropriation was not an option. The IESC recommends that all documentation on this optional relocation be kept separate from any resettlement reporting.

Upstream Risk from Conflicts: The frequency and risks associated with the tribal fighting in the upstream areas discussed in the last IESC report significantly decreased in 2018 and the Provincial government is actively involved in promoting clan peace treaties and local police and Government security forces are taking a more active community approach. Additionally, the Law and Justice component of the Project's Community Development Support (CDS) 2019 program is promoting improvements tied to reducing conflict, such as support to the Village Courts Secretariat, advocacy and awareness around domestic violence, provision of small infrastructure support for district and provincial courts and supporting PNG actors working on law and justice advocacy and leadership.

Community Development Support

CDS Projects that were previously initiated are on-going. Revisions to CDS planning and narrowing project focus are progressing, but finalizing a concrete plan needs attention, though the IESC recognizes that the Project's crucial and commendable humanitarian response to the earthquake necessarily required a great deal of time.

The IESC observes that CDS planning needs wider recognition that community development belongs to the Project as a whole and the CDS unit is meant to facilitate and coordinate the project-wide response. A community development program that is useful for both the community and a project involves intentional collective actions to improve social, economic, physical, and environmental well-being, while preserving valuable aspects of the culture of the particular geographic area. Many projects incorrectly implement community development as discrete social programs without an over-arching project goal and/or without the project-wide collectivity necessary to achieve the over-arching goal. This often result in CDS projects that are not directly tied to achieving the CDS goal, thereby wasting time and money, as well as in many cases raising expectations that the Project is taking over full responsibility for community development. This Project has a goal – to promote development of conditions conducive to enhancing economic self-reliance of individuals while also mitigating potential impacts, but this goal seems not to be sufficiently recognized as a Project-wide goal. In other words, all the development support provided by the Project itself or in partnership with others combine to represent the Project's CDS contribution. The IESC

observes that this is the ideal time to ensure that all core community development support activities, irrespective of the Project unit implementing them, are selected based on good potential to contribute to achieving the over-arching goal and are planned, integrated and reported on in a collective process. Going forward, the IESC provided the Project with some guidance on collaborative organization and suggests that the Project might develop a special committee (perhaps a community development support Stewardship Committee) to give final approval for projects the various units will implement.

Individual CDS activities are described in the relevant sections of the main report. In terms of strategic activities, a completed Livelihood Strategy Scoping Study, noted in the last IESC report, will be the basis for developing a Joint Stakeholder Livelihood Strategy and measurement indicators. The IESC observes that this is a step in the right direction, but it does not address the totality of the Project's and Company's contributions to community development. In terms of livelihood evaluation improvement, the ANUE CLIP project has established a monitoring and evaluation framework (Partnership Performance Assessment Tool) to monitor and assess the advanced community groups in order to qualify them to become extension trainers. The IESC notes that the tool is useful for improving evaluation, as recommended in the October/November 2017 IESC report.

In terms of psycho-social health promotion, the Project is responding to Gender Based violence (GBV) with involvement in several activities many of which involve males, as recommended in the last IESC report.

National Content

CDS is now responsible for reporting on National Content commitments, thus enabling the Project to find synergies and efficiencies, such as linking workforce development and community investment activities (such as Volunteer Program/ Wanwoks Program/ WEN etc.), providing a wider pool of staff to draw from in project execution and linking the Project's supplier development with other MSME (micro, small and medium enterprises) such as the Project supported IBBM Enterprise Centre, which may help with some of the work the Project is doing with households, farmers and local MSME initiatives.

The Project continues to make notable progress toward replacement of expatriate staff with PNG citizens through both targeted recruitment and training and development as shown in the table below.

Statistics on Workforce	Number
Total Workforce across Project	3,236
Foreign Nationals	465
PNG Workforce	2,771(86%)
EMPNG Workforce (direct hire employees or employees from recruiting agencies)	543
3rd Party Contractor Workforce	2,228
PNG Citizens Female workers	539
Origins of PNG Workforce	
Local origin	1,160 (42%)
Regional origin (P2)	902
From non-Project areas	709
Job Categories	
Management Responsible for supervising workers or for managing a SOW)	250
Office	284
Field – Both technical and non-technical roles	2,237

In terms of recruitment and training, Engineering recruited 11 interns for the 2018-2019 program and two PNG engineers started expatriate assignments. A recruitment database was developed, and a Chartered team identified options and recommended a sourcing strategy. The Project started recruiting Papua New Guinean engineers at

Australian universities in 2017 and expanded this practice in 2018 to include new PNG graduates from Chinese and Turkish universities. Additionally, the Project is working on promoting engineering training in PNG for future LNG operations. To that end, the Project is working with the University of Technology (Unitech (Lae) to become accredited and to improve its currently obsolete facilities, as well as supporting development of an international accredited engineering program in Port Moresby.

Operations and Maintenance (O&M) Technicians now represent 31% at Tech 1 level, 50% at Tech 2level, 8 % at Tech 3 level and 1% at Tech 4 level. Training Roadmaps are being implemented for all crafts and a career progression model is under development. The next training intake (the 5th) will include 29 candidates selected for EMPNG sponsorship and the Junior Tech 12-month program began in January 2019.

In terms of local Procurement and Supplier Development, more than PGK 567.3million was spent by EMPNG in-country with Papua New Guinean businesses. Of this, almost PGK184.3 million was spent on services from 16 Lancos and 250 non-Lanco Papua New Guinean businesses and PGK 153.2 to foreign businesses in PNG. The Enterprise Centre established in 2010 to help build local business capacity has assisted 19,728 local businesses / entrepreneurs, conducted Business Assessments of 572local businesses and provided 1,268 days of advisory and mentoring services to date.

Stakeholder Engagement and Consultation

The Project conducted 4885 engagements with 213 communities, including 188 communities in the upstream areas, 10 communities in the Plant site area 15 communities in the vicinity of EM Haus. The number of engagements declined from 2017 in the upstream as the result of mobility restrictions caused by the earthquake, tribal conflicts in Hides, civil unrest in the Komo and Angore areas, law and order issues in Tari township and in POM because of the Asia-Pacific Economic Cooperation (APEC) meeting. Engagement topics varied with area with many of upstream engagements addressing Project responses to earthquake impacts, Government benefits, law and order issues, pipeline safety awareness and right of way land access. Engagements with plant site communities included a variety of topics, mainly focused on monitoring of Government equity benefits, various health/safety issues, and CDS projects and programs. Engagements with communities in Port Moresby/EMHaus discussed the APEC meeting, law and order issues, security and land support for POM based upstream land owners.

Community Grievance Management

The Community Grievance Mechanism accepts and manages both issues and grievances. The Project continues to raise user proficiency in Isometrix IMS user proficiency to ensure effective data uploads for management of and external reports on grievances.

The number of grievances filed in 2018 was 59, about the same as in 2018. The main grievance topics are related to the Angore Tie-In Pipeline project (soil erosion, asset or land damages, etc.) ongoing land rentals/deprivation payments and pipeline RoW clan-caretaking activities; and various grievances related to a dog being hit by a project vehicle, a pedestrian struck by a falling branch dislodged by a passing vehicle, bad taste of project delivered school water, and claims about impacts on crops near LNGP.

Most grievances were closed within the new 100-day closure timeframe and grievance resolution overall maintained an annual rate above 75%. This is due to the good team collaboration through field VLOs and grievance strategies and processes that help maintain close working relationships. Resolution for a few complex grievances or those filed in areas affected by the earthquake or insecure law/order conditions required more than 100 days and one had to be carried over into 2019. The IESC has reviewed the causes and ultimate resolutions and finds them reasonable.

In 2018, 609 issues were submitted, slightly lower than the 899 issues 2017. In both 2017 and 2018 the capturing of issues was affected by tribal fighting and in 2018 by the earthquake in the Highlands and consequent reduction of possible community engagements. The law and order situation significantly improved by January of 2019, but is early in the year, thus capturing of issues is likely to increase.

Most issues relate to land (compensation, RoW management, land access and agreements, and clan disputes), requests for improvement of schools and other support, requests for employment and business development opportunities, requests for community development assistance, safety concerns, and delayed royalty benefits and other outstanding government issues.

Benefit Sharing

The PNG Government is responsible and accountable for determination and payment of landowner beneficiary royalty and equity dividends. EMPNG's goal is to influence and support the Government in its effort to pay landowner

State Cash benefits in accordance to the laws of PNG. Its main challenge in this objective is to help ensure safe, accurate, timely and effective delivery of cash benefits without having any actual control over the process.

The Project's strategy remains to mitigate near-term risk, support resolution of underlying issues, and capture lessons for potential future projects. To these ends, the Project continues to engage in positive engagements between the PNG Government and other stakeholders. The involvement of the Judiciary in the process of determining benefit recipients remains a challenge. The IESC notes that the Project's assiduous documentation of its support for the benefit sharing process is critical for risk management.

Royalty payments commenced in September 2017 to all four LNGP site villages and equity dividends paid to all four villages in July 2018. The lack of a schedule for regular payments, however, is a common complaint of entitled village leadership and people. Progress toward completion of the steps for Ministerial Determinations for the Upstream areas has been made but remains slow.

Labor and Working Conditions

The information received on compliance of policies, procedures, guidelines, and reporting formats covering labor and working conditions to the obligations of IFC PS2, international labor standards, and PNG labor law adequately demonstrates compliance of the Project and its main contractors.

The labor grievance management process remains part of the Project's Procedures & Open Door Communication Policy. Nearly all grievances and issues are initially addressed by immediate supervisors and the majority are promptly resolved at the supervisor level. In the event that an employee is dissatisfied by a response from an immediate supervisor, the employee is entitled to further review by the applicable level of management. No time has been lost to disruption related to grievances or any other form of industrial dispute. Seasonal payroll queries remain the main subject of issues and the number of grievances continues to be very low. There have been no breaches of the Project's harassment policy. The Project continues to conduct sessions on EMPNG's values, policies and guidelines, provide conflict management training and develop the Inclusion & Diversity (I&D) framework.

Workforce Accommodation

Workforce field accommodation continues to be well-managed and consistently updated, particularly at the Plant site and HCGP camps. The Plant camp is considering expanding the mess to accommodate a larger number of people, some of whom will be associated with the Expansion. The IESC Social Expert notes that the menus at Moro and HGCP include many high calorie and high salt and sugary food items, but not enough healthy options and portion control is not practiced leading to consumption of very large portions of mostly carbohydrates and high fat meat products. The IESC recognizes that food intake is a difficult issue to address and that the Project continues to work with all camps to ensure that healthy options are available based on a PNG diet. The Project will also roll out a Culture of Health program that promotes a healthy lifestyle to all workers at site. MOH will present the Culture of Health initiatives at the next IESC review.

Community and Occupational Health

Community health continues to be a component of the Community Development Support program. One of the results of the February earthquake was to highlight inadequacies in Hela Province health infrastructure and the Project is investing K2.3 million to rebuild and equip three local health centers as part of its on-going support to invest in infrastructure improvements and support earthquake affected communities. The Mananda and Para sub health centers are managed by the Evangelical Church of PNG (ECPNG) while the Juni sub health center is staffed and operated by National Department of Health through the Hela Provincial Health Authority. EMPNGs strong short-term humanitarian response included provision of food, drinking water, medical items, and monetary aid. EMPNG's community partners in this effort included the UN International Organization for Migration, United Church PNG, Salvation Army PNG, Adventist Development Relief Agency (ADRA PNG), ANU Enterprise (ANUE) and Caritas PNG. Longer term efforts have been made to restore health facilities as described above, help communities regain agricultural stability by providing garden plantings and tools, and providing resources to help the Government restore roads and bridges.

EMPNG continues work closely with NGOs and other companies to implement public health initiatives for communities.

The occupational health program is world class and continues to perform well in all areas (clinical operations, public health and industrial hygiene). Clinical services, pathology and medical emergency response is maintained at the highest level across all camp clinics with continued efforts to keep up with the latest in medicine. The Robust Infectious Diseases Outbreak Management program was successfully implemented in November 2018 with successful containment of a norovirus outbreak at HGCP. The Malaria Control Program has been revised to reflect

a revised risk profile in Port Moresby allowing Port Moresby-based non-immunes to be excluded from the Malaria Chemoprophylaxis Compliance Program. Although the risk is not as great as previously assessed, it is still a risk and the malaria control program undertaken by MosquitoZone has been expanded into community training undertaken around the LNG Plant with the distribution of 2,400 treated mosquito nets.

Occupational Safety

EMPNG Production safety performance through Q4 2018 continues to be excellent. There were no Lost Time Incidents (LTIs) that took place in all of 2018 with close to 12 million man-hours worked. This is a remarkable testament to a robust safety program.

Cultural Heritage

Cultural heritage surveys have continued to be undertaken in association with the PNG LNG Project, most recently for the gas pipeline to the Niu Power Plant. Surveys along the pipeline route, the power plant site, and access road were undertaken in November 2016. In October 2018 additional surveys were undertaken along the transmission line route and an additional 15 sites were recorded. Sites were predominately isolated surface flake scatters or shell material, although pottery shards and stone artefacts were recorded. All sites were considered to be of low significance and are being managed as per EMPNG's Cultural Heritage Management Plan.

1 INTRODUCTION

Rina Consulting (Rina), formerly D'Appolonia S.p.A., located in Genoa, Italy, was appointed as the post-financial close Independent Environmental and Social Consultant (IESC) for the Papua New Guinea Liquefied Natural Gas Project (PNG LNG or the "Project") being developed by ExxonMobil PNG (EMPNG), the designated Operator and also representing a consortium of co-venturers including: Oil Search Limited; Kumul Petroleum Holdings Limited: Santos Limited; JX Nippon Oil and Gas Exploration Corporation; and Mineral Resources Development Company Limited, and their affiliates. Rina's role as the IESC is to support the Export Credit Agencies (ECAs) providing Project financing, including the Export-Import Bank of the United States (USEXIM); Japan Bank for International Cooperation (JBIC); Export Finance and Insurance Corporation (EFIC) of Australia; Servizi Assicurativi del Commercio Estero (SACE) from Italy; Export-Import Bank of China (CEXIM); and Nippon Export and Investment Insurance (NEXI), as well as a group of commercial banks, collectively referred to as the Lenders or Lender Group.

The overall role of Rina as the IESC within the PNG LNG Project is to evaluate compliance with commitments made by EMPNG within their Environmental and Social Management System (ESMS) including health and safety. The benchmark for the ESMS is now the Production Environmental and Social Management Plan (ESMP), the associated Environmental and Social Management Plan – Construction: Addendum associated with Angore Field pipeline construction, and also including associated commitments made within the ExxonMobil Operations Integrity Management System (OIMS) and the documents associated with biodiversity management.

The IESC Terms of Reference (TOR) requirements refer to an evaluation of Project "compliance", whereas the reporting requirements of the TOR state that the reporting will include a "list of non-conformance findings". Within this report the terms "compliance" and "conformance" are considered to be equivalent. In general, issues to be resolved are identified as non-conformances, but one of the requirements of the IESC is to identify any "material non-conformances" within the context of the CTA. The IESC believes that a "material non-conformance" within the context of the CTA would need to be a Lender decision, but for the purposes of this report a potential "material non-conformance" would be a Level III non-conformance or repeated Level II non-conformances as defined in the Section 2 Issues Table. It is emphasized that a Level III non-conformance is not necessarily equivalent to a "material non-conformance" and that extensive discussions among EMPNG, Lenders and the IESC would need to take place before any "material non-conformance" is identified.

IESC's review has included the environmental and social (E&S) and health and safety (H&S) management activities of EMPNG. Emphasis has been placed on evaluating conformance based on written information provided by EMPNG and observations made in the field including discussions with EMPNG personnel. Most of the findings identified in this report have been based on field observations and interactions with the individuals responsible for the field implementation of the ESMP, as well as meetings with stakeholders.

An activity that does not fall under the category of "monitoring" yet is within the scope of the CTA is a requirement for the IESC to certify certain non-Project operations (section 14.2(m)(iii) of CTA). Since the last field visit in October - November 2017 there has been one certification that relates to this requirement of the CTA:

- ✓ certifying that PNG Power Limited (PPL) Limited can construct, operate and eventually demolish a temporary 40MVA transmission line running from a newly constructed Port Moresby Power Station (located at plot 2740) to the existing PPL owned transmission line, that allows power export from the LNG Plant to the Port Moresby grid.

This action was evaluated to not have the potential to adversely impact the PNG LNG Project and was certified on October 31, 2018. This Project was visitedin the field during this IESC filed visit and no issues were identified from visual observation.

1.1 PRODUCTION OPERATIONS OVERVIEW

The biggest event of 2018 was the occurrence of a Magnitude 7.5 earthquake with an epicenter close to the Hides Gas Conditioning Plant (HGCP) on February 26. There was no loss of containment and the pipeline did not rupture. This is remarkable given that the ground motion had to have exceeded the design criteria of the HGCP. The plant operators showed remarkable discipline undertaking a manual shutdown. Production resumed April 7, 2018 with full production (better than before) on April 26, 2018. By the end of 2018 the annual plant production exceeded the design capacity of 6.9 MTA, even with the two-month shutdown due to the earthquake (see Figure 1.1). See further discussion of the earthquake in Section 3.4.

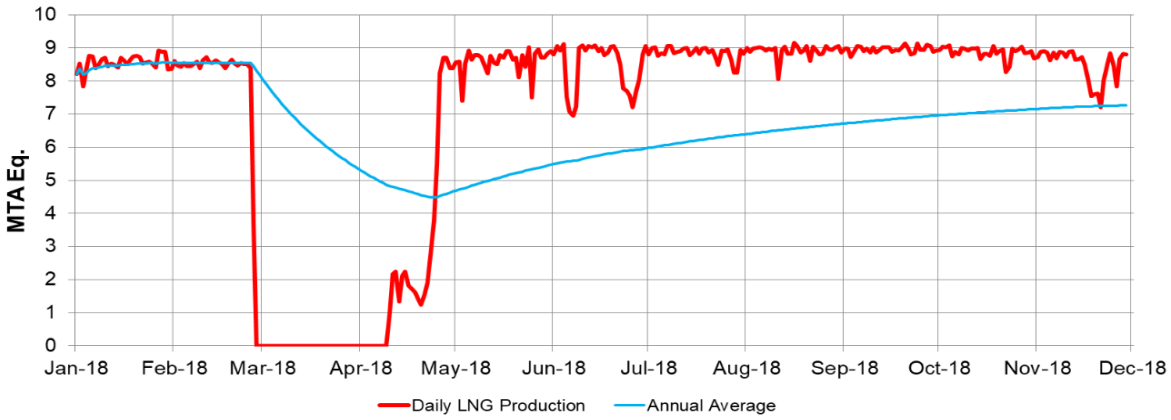

Figure 1.1: 2018 Production

Since June 2015 EMPNG has been supplying reliable power to the PNG Government from generators at the LNG Plant that produce about 25 MW of power. This operation has continued through 2018, but the PNG Government owned 50MW Gas-fired power generation plant near the LNG Plant is nearly complete. The gas line connection to the plant has been installed and the reinstatement efforts along the pipeline look good.

Angore field activities were suspended in November 2018 after execution progress was affected by the earthquake in February, site incursion and vandalism in June 2018 and a near-miss security incident in October 2018. Prior to recommencing construction activities, the Landowner Beneficiaries Identification Process (LOBID) needs to be brought to completion, including the subsequent establishment of a recognized gas resource company for PDL 8. Angore gas is projected to meet gas sales requirements in 2023/2024.

As a result of the earthquake, the Komo Airfield runway is approximately 50% serviceable (see Figure 1.2), sufficient for routine equipment and commuter flights, but not sufficient for the heavy aircraft for which the airfield was designed. The areas where the airfield was constructed by means of a cut remained effectively undamaged. The portions constructed with fill exhibit settlement and lateral slope failures. The target completion for the repairs is scheduled for the end of 2020.

Figure 1.2: Example of Earthquake Damage to fill Portion of Komo Airfield

The total workforce as of the end of September 2018 was 3,295 (3,057 at end of June 2017), a 7% increase in workforce since 2H2017. The total PNG workforce is 2,797 which corresponds to 85 percent being Papua New Guinean. Women make up about 20% of the PNG workforce.

1.2 SOURCES OF INFORMATION

The main sources of information used to prepare this eighteenth IESC trip report are primarily those provided by EMPNG, but Rina also obtained information by means of interviews with local stakeholders during the field visit in PNG as well as EMPNG employees. The information provided by EMPNG has included presentations made to the IESC and additional documents consistent with the trip schedule provided in Appendix A.

1.3 REPORT ORGANIZATION

Subsequent sections of this report are organized as follows:

- ✓ Section 2.0 – Issues Table;
- ✓ Section 3.0 – Environmental and Social Management;
- ✓ Section 4.0 – Pollution Prevention;
- ✓ Section 5.0 – Biodiversity and Ecological Management;
- ✓ Section 6.0 – Social;
- ✓ Section 7.0 – Labor and Human Resources;
- ✓ Section 8.0 – Health and Safety; and
- ✓ Section 9.0 – Cultural Heritage.

The basic findings of the review are presented in the form of observations, comments and recommendations that are generally described according to topics within each section. Significant findings are summarized in the Issues Table provided in Section 2.0.

2 ISSUES TABLE

This Chapter tabulates a summary of the non-conformances raised in this report, consistent with our TOR as discussed in Section 1.0. The Table has been structured to provide a color-coding for strict non-conformances raised during each site visit, as well as IESC observations for situations that if left unattended could result in a non-conformance. Non-conformance is referenced with respect to Project commitments as included in applicable Project documents and with respect to on-going compliance with Applicable Lender Environmental and Social Standards. As noted in Section 1.0 of this report, "Applicable Lender Environmental and Social Standards" means the environmental and social standards applied by the Loan Facility Lenders to the Project in the form attached to Schedule H-1 (Environmental and Social – Applicable Lender Environmental and Social Standards) of the CTA. The nomenclature of the color-coded categorizations is assigned based on non-conformance levels similar to the non-conformance levels defined in the ESMP, somewhat revised to reflect the point of view of the IESC and to address that certain non-conformances need to be framed in the context of the Applicable Lender Environmental and Social Standards. The following descriptions are provided:

- ✓ **High**: Level III critical non-conformance, typically including observed damage to or a reasonable expectation of impending damage or irreversible impact to an identified resource or community and/or a major breach to a commitment as defined in Project documents or the Applicable Lender Environmental and Social Standards. A Level III non-conformance can also be based on repeated Level II non-conformances or intentional disregard of specific prohibitions or Project standards. In some cases, Level III non-conformances or repeated Level III non-conformances may, but not necessarily, represent a material non-compliance with the CTA. This would be decided on a case-by-case basis;
- ✓ **Medium**: Level II non-conformance representing a situation that has not yet resulted in clearly identified damage or irreversible impact to a sensitive or important resource or community but requires expeditious corrective action and site-specific attention to prevent such effects. A Level II non-conformance can also represent a significant breach of a commitment, or a risk of a significant breach if not expeditiously addressed, requiring corrective action as defined in Project documents or Applicable Lender Environmental and Social Standards. A Level II non-conformance can also be based on repeated Level I non-conformances;
- ✓ **Low**: Level I non-conformance not consistent with stated commitments as defined in Project documents, but not believed to represent an immediate threat or impact to an identified important resource or community. A Level I non-conformance can also represent a minor breach of a commitment requiring corrective action as defined in Applicable Lender Environmental and Social Standards;
- ✓ **IESC Observation**: A potential non-conformance situation that could eventually become inconsistent with stated commitments as defined in Project documents or the Applicable Lender Environmental and Social Standards.

Item ID	Site Visit	Closing Date	Description	Non-Conformance	Reference	Status	Comments/Report Reference
Environmental Issues – Environmental Management							
M17.1[1]	Nov '17		Wastewater Treatment Plants (WWTPs) are operated at the LNG Plant, Angore, HGCP, and Moro. All of them have problems with their discharges, which have been the subject of numerous Environmental Compliance Incidents (ECIs) and EMP non-conformances (EMP NCs) internally assigned, but in many cases the problems have worsened over 2017.	IESC Observation	EMP Section 9	Open	The problems experienced in 2017 have largely been resolved, but non-conformances with Project standards still occur.
M17.2	Nov '17	Feb '19	EMPNG has made the decision to restrict ambient air monitoring to situations whereby major equipment modifications or major addition to facilities could cause an increase in air emissions.	IESC Observation	EMP Section 9	Closed	The MOC request submitted in June 2018 is sufficient for allowing this change to take place.
Environmental Issues – Biodiversity and Ecological Management							
M17.3	Nov '17	Feb '19	Audit reports have previously indicated the RoW and road to be one of the pathways for the spread of certain P1 weeds from lowlands to highlands – as the construction of the RoW moved through different ecological areas leaving large areas of bare soil, this was a risk predicted in the EIA. Mitigation measures and monitoring were to ensure risks were minimized. However, different types of monitoring data errors or inconsistencies have been reported to us during our last three annual visits. Latterly, EMPNG's review has indicated inconsistencies in historical weed species abundance data, making comparisons in abundance data between audits (and therefore assessment of some trends) difficult, and any conclusions that can be drawn from distribution data unclear. Lenders need to be able to understand invasive P1 species distribution changes, especially along the linear construction RoW/road footprint, and P1 weed persistence in new areas where negative ecological implications might arise. To understand whether weed distribution and persistence is of ecological significance, more localized data (within/between WMZ) should be analyzed and presented so as to identify any challenge areas that warrant prioritized action. This is in addition to the monitoring of Permanent sites. Without this understanding, we are not able to draw a conclusion that EMPNG's considerable efforts to mitigate impacts are sufficient.	IESC Observation	IFC Performance Standard 6, Biodiversity Strategy and EMP Section 15	Closed	We had previously flagged a number of gaps in relation to weed reporting errors, historical data inconsistencies, and the adequacy of analyses presented to allow Lenders to determine whether risks raised in the EIS were being effectively mitigated. This included the requirement to be able to understand whether weed presence, persistence, abundance and/or distribution changes observed were of actual ecological significance and how adaptive management was addressing any impacts not fully mitigated. We required that the Project source appropriate expertise for guidance. EMPNG has now revised their approach to weed monitoring. New Guinea Binatang Research Centre, already contracted to undertake the Project's Regeneration monitoring, have now been engaged. A revised methodology has been developed, with a focus on quantitative data collection and statistical analysis and the first field campaign undertaken. Although it is not yet clear whether this new approach will fully address the requirements flagged previously, the IESC is encouraged that a new approach has been developed to tackle issues raised. The revised methodology is likely to provide interesting and valuable information in the next few years. We close this Observation with a view to reassessing the situation once a number of monitoring campaigns have been completed, risks associated with ongoing P1 presence, persistence, abundance and distribution are better understood, and trends reanalyzed. (Report ref: Section 5.5.2.1)

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[1] In order to better track project progress and accomplishments, the issues identified during each site visit are identified by a letter (M) and number (e.g. M1) that identifies the site visit (e.g.: M1 for the first visit, M2 for the second visit, etc.) followed by a digit that identifies the specific issue found (e.g. M15.1 refers to issue 1 found in visit 15).

3 ENVIRONMENTAL AND SOCIAL MANAGEMENT

3.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

The Environmental and Social Management System (ESMS) is a mature and active System. As such, it continues to evolve and be revised. Key framework documents to the ESMS are the Project Environmental Management Plans (EMPs), which have been upgraded to an advanced draft with the following objectives:

- ✓ ensure EMPs reflect as-built conditions and reflect current practices;
- ✓ provide clarifications to queries that have been raised since Production commenced;
- ✓ include Regulatory changes that have occurred since Production commenced; and
- ✓ incorporate mitigation measures that were included during construction that are still applicable to Production Projects.

IESC has reviewed these EMPs and our minor comments have been submitted to EMPNG.

3.2 MANAGEMENT OF CHANGE

At the time of the last IESC visit in October – November 2017 an MOC requiring IESC review was pending for a proposed waste management synergy between EMPNG and OSL in the Upstream area. This synergy has stalled as a result of the earthquake, although the IESC is prepared to approve this MOC should the cooperative effort between EMPNG and OSL resume.

One proposed change initiated in June 2018 is with respect to the monitoring of ambient air quality. An initial monitoring campaign was undertaken once steady state operations was achieved - within the first two years of production. Further ambient air quality monitoring will be conducted at such time after major modifications to existing plant that will increase emissions affecting ambient air quality. This MOC has not been submitted to the IESC for review, but the draft MOC we have reviewed appears reasonable.

A pending MOC, now reported in several IESC reports, is the anticipated turnover of Project infrastructure to the PNG Government. As described in the last several IESC field reports, no activity has taken place. The PNG Government has not occupied any of the infrastructure and the status quo is being maintained.

3.3 INCIDENTS

As anticipated in Section 1.1, security concerns in the Angore area have continued. Angore field activities were suspended in November 2018 after execution progress was affected by the earthquake in February, but site incursion and vandalism took place in June 2018 and a near-miss security incident occurred in in October 2018, which also affected the decision to put the development on hold. Pending activities for resuming the field work are landowner identification and gas resource company formation, principles agreed for a Memorandum of Understanding, and community re-integration.

In terms of environmental incidents, in 2018 there was one Corporate reportable spill (>1 bbl) when 3,060 liters of condensate export pump seal wash water was inadvertently decanted into Hides Waste Management Facility (HWMF) oil/water separator. Roughly 1,000 liters exited the separator and was discharged into leachate management system (reed bed). This material contained glycol and trace levels of other chemicals which reached ground as the reed bed is permeable. Sampling of the downgradient retention ponds did not identify any exceedances of Project standards. Most spills were minor with 56 recorded in 2018, most less than five liters (see historical spill performance in Figure 3.1).

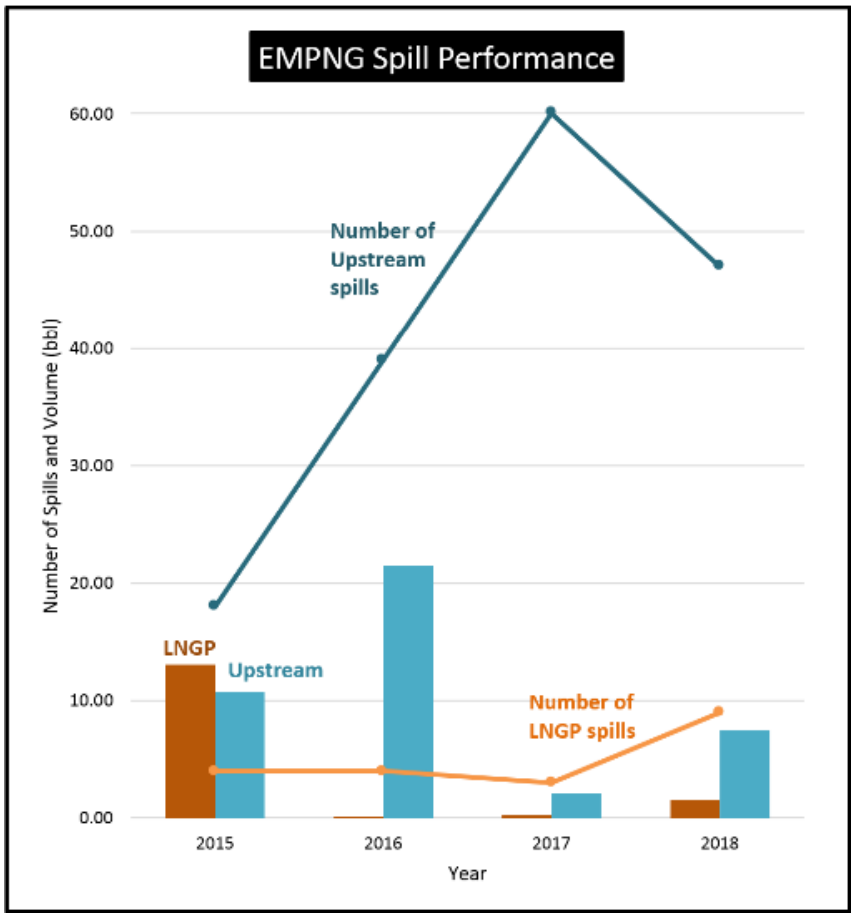

Figure 3.1: Historical Spill Performance

Most of the Environmental Compliance Incidents (ECIs) and EMP non-conformances (EMP NCs) in 2018 assigned by EMPNG related to water discharges and also a case of improper tree felling. Non-conformances regarding air emissions, noise and reinstatement and regeneration procedures were also internally identified by EMPNG.

3.4 EMERGENCY RESPONSE

The emergency response (ER) system was fully tested as a result of the February 26, 2018 M=7.5 earthquake. Performance was exemplary. An indication of the strength of the earthquake is evidenced by damage to two helicopters that were bounced into the air and crashed to the ground because of the earthquake ground motion. This observation implies that the vertical ground acceleration exceeded gravity (1 g), certainly more than the plant design. Figure 3.3 shows the relationship of the PNG LNG facilities to the location of the main shock, as well as the aftershocks, which reached M=6.9 at Moro.

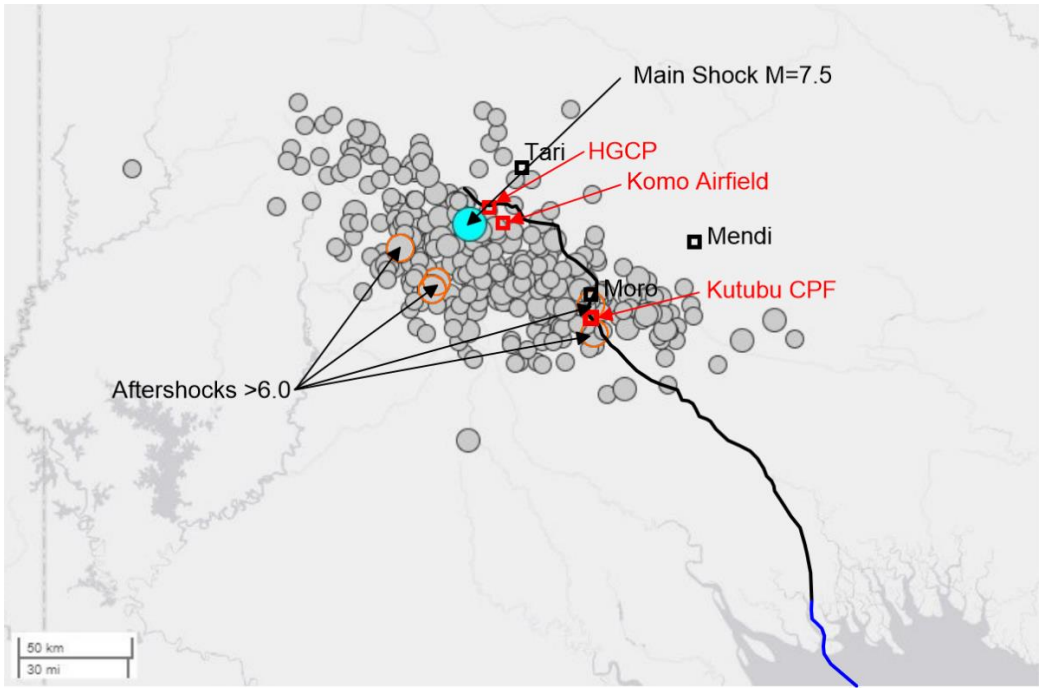

Figure 3.2: Main Earthquake and Aftershocks 26 Feb 18

The Emergency Response Plan (ERP) was activated immediately on the day of the earthquake and operators at the HGCP undertook a safe shutdown of the plant. After confirming that all employees and staff could be accounted for, evacuation of approximately 300 non-essential personnel from the HGCP began the day after the earthquake and evacuation was complete by March 1, even though the Komo Airport had to be closed to fixed-wing flights. On March 1 EMPNG led a team of emergency assessment and relief personnel in a visit to the earthquake affected area. EMPNG then began a humanitarian response effort to aid local communities.

4 POLLUTION PREVENTION

4.1 WASTE AND WASTEWATER MANAGEMENT

4.1.1 Project Strategy

EMPNG's objectives are to apply the waste management hierarchy (wastes will be preferentially and sequentially avoided, reduced, reused, recycled or recovered) and to dispose all wastes at EMPNG facilities and approved third party facilities only. EMPNG's objectives are also to avoid significant impacts associated with the release of pollutants to surface water and groundwater and meet applicable discharge criteria. These applicable discharge requirements are those tabulated in Chapter 9 of the Upstream and LNG Plant EMPs.

4.1.2 Observations

4.1.2.1 Waste Management

EMPNG continues to work towards improving their pollution prevention systems, but the February earthquake damaged infrastructure and other situations developed that have slowed the process of improvement. Waste management is one area impacted. The February earthquake has caused the collaboration with OSL (Synergy Program) to be put on hold, as the OSL incinerator has not been operational. The Project also has no operating incinerators, either Upstream or at the LNG Plant. As a result, the amount of waste landfilled has modestly increased both Upstream (not counting the waste generated from the demolition of the Komo Camp) and at the LNG Plant (Figure 4.1).

EMPNG has focused in 2018 to develop long-term waste management. Third-party management of waste from the LNG Plant is still envisioned, but the development of the Roku Total Waste Management (TWM) Integrated Waste Management Facility (IWMF) facility has been slow. Landfill capacity at the LNG plant is good for a year or two and the old construction cell still appears serviceable, but plans will need to be made for the addition of landfill cells once the Expansion Projects start. The HWMF landfill is under review. Due to these situations long-term strategies include:

- ✓ define EMPNG's WM objectives for a sustainable waste management operation for the life of the project (~30 yrs);
- ✓ identify potential Waste Business Model(s) for EMPNG that meet these strategic objectives (self-sufficient, 3rd party, or combined); and
- ✓ characterize current state of WM operations/facilities and limitations/risks (e.g. gaps) and propose solutions to achieve proposed WM business models.

Immediate plans include:

- ✓ do not stockpile waste in the long term;
- ✓ restore incineration capacity at HWMF – i8 and Mediburn incinerators are on order;
- ✓ fully transition LNG Plant waste management to TWM's Roku facility - L2 amended permit issued 27 July 2018 for the construction and operation of IWMF plant and infrastructure).

The IWMF project still appears to the IESC to be an initiative worthy of EMPNG support. It offers synergies with other waste generators in the area of Port Moresby such that there would be an overall benefit to the region. The EMPNG requirements for using a third-party providing services as comprehensive as proposed will need to include a clear definition of standards and a close oversight based on frequent audits. IESC continues to think the project is a good idea and we hope that TWM takes advantage of the support given to them by EMPNG.

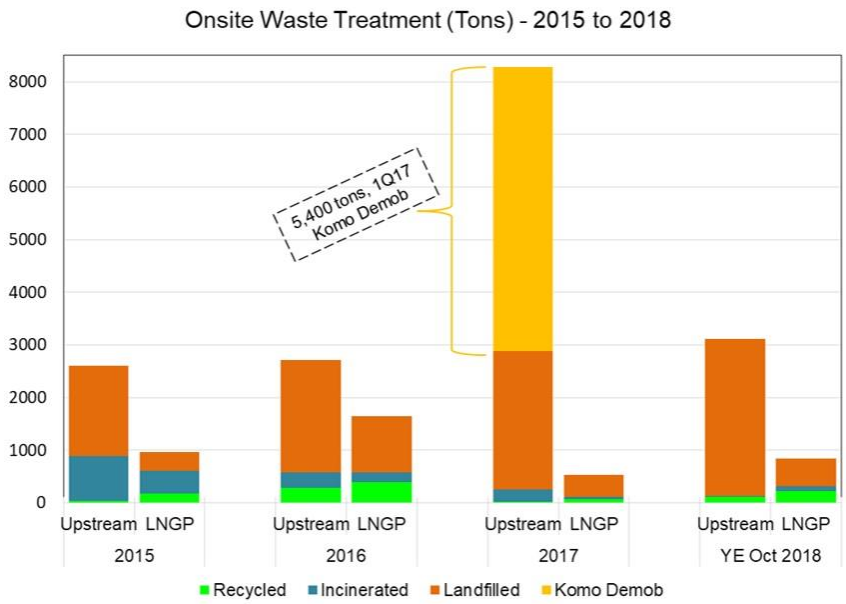

Figure 4.1: Project Waste Profile over the Past Four Years

4.1.2.2 Wastewater Management

A Level 1 NC was assigned to wastewater treatment in the last IESC report with the note: Wastewater Treatment Plants (WWTPs) are operated at the LNG Plant, Angore, HGCP, and Moro. *All of them have problems with their discharges, which have been the subject of numerous Environmental Compliance Incidents (ECIs) and EMP non-conformances (EMP NCs) internally assigned, but in any case, the problems have worsened over 2017*. The situation in 2018 is not fully resolved, but much improved over 2017 (Figure 4.2).

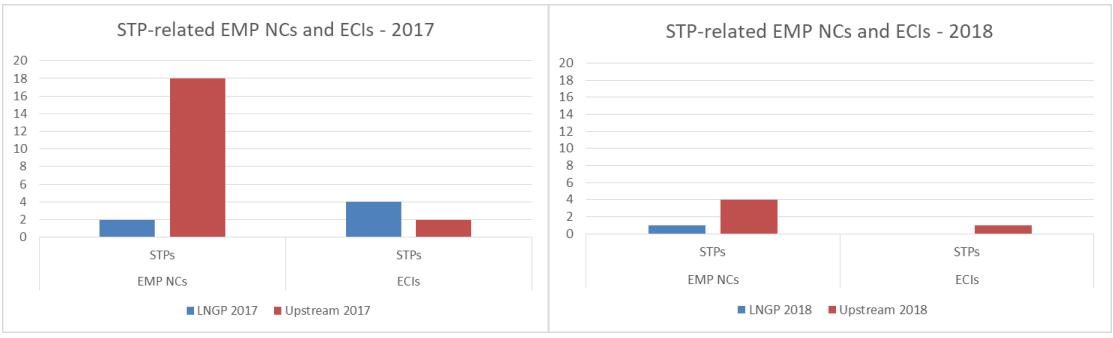

Figure 4.2: Improvements to WWTP Management

Wastewater Treatment Plants (WWTPs) are operated at the LNG Plant, HGCP, and Moro. The Angore unit has been demobilized and reassembled at HGCP where its commissioning is still progressing.

Wastewater discharges into the environment at the LNG Plant including the discharges to Caution Bay have all been compliant with standards, but there have been some non-conformances with end-of-pipe WWTP, Retention Pond and Oily Water System discharges. The management of fecal coliforms remains a challenge and a microbiology study has been initiated to understand the source of the problem. The potential for algae interference causing the local laboratories to overstate results has already been identified as a potential issue. EMPNG is also looking to evaluate the significance of fecal contamination, noting that the World Health Organization (WHO) recommends evaluating fecal coliform in the context of a risk matrix.

In the Upstream area there has been improvement in WWTP performance. An additional Moro WWTP dewatering unit is planned to be installed in early 2019. Exceedances have almost uniformly related to fecal coliforms and fecal coliform monitoring sites are being investigated to identify sources. A sampling verification plan has been created with full implementation planned for early 2019.

The issue of the presence of amines in the process water from the LNG Plant is discussed in detail in the IESC report from November 2016. Amines are present in water that is coming off the Regenerator Gas Knockout Drum and enters the retention pond. The problem is not fully resolved, but amines have not been detected at compliance locations, the retention pond mixing pit and tidal flats. Trials started in Q4 2018 to divert water containing amine back into the dehydration system.

4.2 HAZARDOUS MATERIALS MANAGEMENT AND SPILL PREVENTION

4.2.1 Project Strategy

EMPNG's objectives are to prevent spills of hydrocarbons and chemicals and to respond effectively to spills should they occur. EMPNG also has standards for materials management where objectives are to avoid significant impacts associated with the procurement and use of raw materials and to use materials that are less hazardous or otherwise preferable from an environmental perspective, where practical.

4.2.2 Observations

Spill prevention continues to be effective. As discussed in greater detail in Section 3.3, there was only one Corporate reportable spill (>1 bbl) in October 2018, but the spill did not have environmental consequences. Overall, from what was observed in the field, hazardous materials continue to be well managed throughout the Project. Spill kits and fire extinguishers were found to be available and properly located throughout the sites and hazardous material drums and containers were observed to be appropriately labeled.

4.3 AIR QUALITY AND NOISE

4.3.1 Project Strategy

EMPNG's objectives are to avoid significant impacts associated with the release of pollutants to air and meet applicable emissions and air quality criteria. Requirements for noise control are those identified in the IFC General EHS Guidelines.

4.3.2 Observations

Stack testing was completed in August 2018 at the LNG Plant and all stacks were tested. Compliance was achieved for 19 stacks out of 22. Three Train 2 compressors were non-conformant with follow-up actions in progress with re-testing to be conducted in 2019.

Stack testing at HGCP took place in November 2018. All stacks in use were tested and tested and compliant. No testing was conducted at the HWMF incinerator, which was not operational as discussed in Section 4.1.2. Testing of a new incinerator at the HWMF will take place after installation in 2019.

Flaring has generally trended downwards at Upstream and LNG Plant locations over the past four years. improvements in 2018 are interpreted to be due to stable operations and enhancements to the HGCP flare header and metering. Nevertheless, the earthquake caused a significant upset in March-April 2018 accounting for ~104 mscf at HGCP and ~1587 mscf at LNGP, respectively (Figure 4.3).

As noted in the last IESC report, an initial ambient air monitoring campaign was undertaken once steady state operations were achieved - within the first two years of production. Further ambient air quality monitoring was proposed to be conducted at such time after major modifications to existing plant that will increase emissions affecting ambient air quality. IESC recommended that this change be documented in an MOC and, as discussed in Section 3.2, this process was initiated in June 2018 and IESC concurs with the proposed approach.

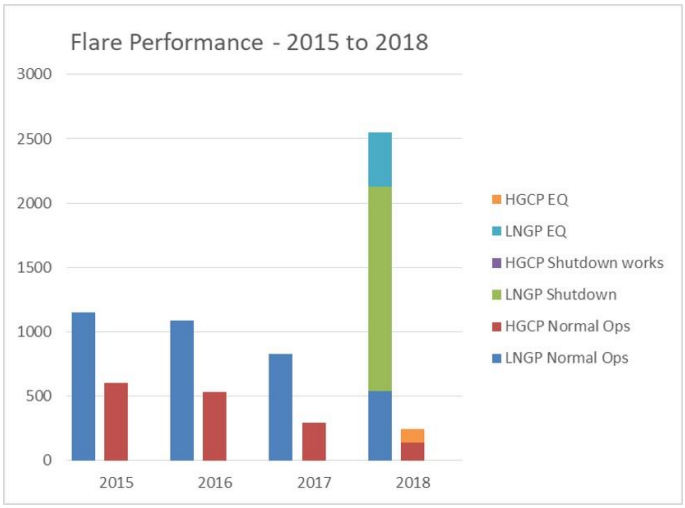

Figure 4.3: Four-Year Flare Performance

Noise monitoring surrounding Project facilities has shown that noise is not an issue at the LNGP and Port Moresby Office monitoring sites for both for day and nighttime limits. The most significant noise issue over the past several years has been the incinerator at the HWMF, but it was not operational in 2018. At-the-fence nighttime noise exceedances were measured in association with the WWTP pumps/blowers at the HGCP. The current noise barrier is being replaced with a higher-quality barrier, which will be tested after installation.

Figure 4.4: Noise Barriers being Replaced at HGCP

4.4 EROSION AND SEDIMENT CONTROL

4.4.1 Project Strategy

EMPNG's objectives are to control significant erosion and prevent sedimentation of surface waters.

4.4.2 Observations

The earthquake caused some serious problems with respect to slope failures in the Upstream area, including at the Komo airfield and along the pipeline route. In particular, there was major damage to the drainage infrastructure at the Komo Airfield. Figure 4.5 shows an example of damage to the Komo Airfield drainage infrastructure.

Figure 4.5: Drainage Infrastructure at Komo Airfield Destroyed by the Earthquake

Figure 4.6: Komo Airfield Apron in Area Constructed over Fill

At the HGCP the effects were relatively minor and under control by the time of the IESC visit.

At the time of the IESC field visit, the focus of activity was pipeline ROW stabilization, erosion and sediment control management.. Although there was no pipeline rupture, repairs have been required at MLV access roads, the fiber optic cable and areas of numerous sinkholes, drainage and landslips. The remaining level of effort to complete the remedial earthworks along the RoW was estimated to be between $140 and 200 million at the time of the IESC field visit.

The activities along the RoW are to continue surveillance and execute maintenance and repairs. The exposed pipeline observed at KP 43 exemplifies the difficulty of undertaking maintenance in areas where the erosion and sediment controls essentially must be constructed from scratch after the earthquake damage.

Figure 4.7: Exposed Pipe at KP 43

4.4.3 Recommendation

IESC recommends that the drainage systems at the Komo airport be given a high priority, as this is an area where minor erosion can turn serious in a short period of time and uncontrolled erosion has already started.

5 BIODIVERSITY AND ECOLOGICAL MANAGEMENT

5.1 INTRODUCTION

This section provides an updated record of IESC Observations and Recommendations associated with EMPNG's ecological management (both terrestrial and aquatic) including: implementation of the Biodiversity Strategy and related monitoring of areas potentially impacted by the project; the ongoing development and implementation of the biodiversity offset program (to address residual impacts); the reinstatement and regeneration of areas previously and newly cleared by the Project (including pipeline Right-of-Way (RoW), construction camps, quarries, etc.); the management of issues related to invasive species, pests and plant pathogens (including quarantine management of imports); and the avoidance of project-related induced access resulting from the construction/upgrade/retention of roads, tracks and the pipeline RoW corridor.

The whole Upstream Project area is deemed to be Critical Habitat in accordance with the 2006 version of IFC Performance Standard 6, and therefore no net loss (NNL) of biodiversity is a key deliverable. EMPNG's approach to biodiversity and ecological management is described in the Biodiversity Strategy, the Biodiversity Implementation and Monitoring Plan and Production-phase EMPs, along with other associated documents.

Records from the EIS baseline studies and the Pre-Construction Surveys (see previous IESC reports for background) serve to establish the ecological conditions prior to ground disturbance/clearance or infrastructure development. These records include information on the presence and distribution of invasive species, and the locations of focal habitats and ecological sensitivities such as (but not restricted to): pinnacles that contain bat colonies; potential Bulmer's fruit bat (*Aproteles bulmerae*) colonies; bird-of-paradise and bowerbird display grounds and trees; large individual trees (>1m diameter breast height); areas of Pandanus swamp forest; swamps in sinkholes less than 50 m deep on Hides Ridge; and *Nothofagus* (beech) forest that will require special hygiene measures (due to risk of dieback as caused by pathogens such as *Phytophthora cinnamomi*). These detailed records have been compiled into a Register of Focal Habitats and Significant Ecological Features. This Register is being supplemented by information related to post-construction and current ecological conditions through ongoing monitoring studies and surveys.

5.2 BIODIVERSITY STRATEGY &IMPLEMENTATION

5.2.1 Project Strategy

EMPNG's commitment is to safeguard biodiversity in areas where the company operates and in particular, the biodiversity values in the Upstream area. The Biodiversity Strategy was developed to guide the long-term management of terrestrial and freshwater biodiversity within the Upstream area. The Strategy provides an overview of EMPNG's overall approach to mitigating impacts on biodiversity in alignment with the avoid, reduce, remedy, and offset mitigation hierarchy. The goal of the Strategy is to retain the biodiversity values of the Upstream Project Area on a regional scale for the long term. To achieve the overall goal, EMPNG's objectives are to:

i. maintain the intactness of the Upstream Area as a whole;
ii. conserve priority ecosystems;
iii. protect focal habitats; and
iv. identify, measure and offset significant residual impacts.

In order to achieve these objectives, avoidance, mitigation and monitoring of biodiversity values takes place at three levels:

- ✓ the large scale, which is the entire Upstream Project Area – biodiversity values at this scale include extensive intact forest, high levels of flora and fauna diversity and endemic species, unique assemblages of species, species of conservation concern, and biodiversity of importance to local communities;
- ✓ the medium scale, which is represented by particularly valuable areas referred to as 'priority ecosystems', including forests in the Hides Ridge and high-altitude Homa areas, the Lake Kutubu area and forests in the Juha area; and
- ✓ the small local-scale, which are sensitive habitats referred to as 'focal habitats' and significant ecological features; these include caves and pinnacles, sinkhole swamps, upland streams, stream refuges in unstable landscapes, lowland rivers in stable landscapes, off-river waterbodies, flora/fauna/habitats of cultural significance and lekking trees/grounds.

To ensure that implementation of the Biodiversity Strategy is effective, the Biodiversity Implementation and Monitoring Program (BIMP) assesses on the ground performance against the following five Key Performance Indicators (KPIs):

i. intactness of forest;
ii. trends in species diversity and abundance;
iii. conditions of focal habitats;
iv. occurrence of invasive species/pathogens; and
v. offset gains.

Four Programmed Monitoring Activities (PMAs) are used to collect information for analysis against these KPIs:

- ✓ PMA-1: remote sensing of broad-scale land cover, designed to monitor forest loss, land use change and degradation in the Upstream Area as caused by project-related direct and indirect impacts. Landsat data was acquired for 2009, 2011, 2013 and 2015 periods for the entire Upstream Area (UA), and higher resolution RapidEye data was acquired for 2011, 2013 2015 and 2017 periods for a linear infrastructure (LI) corridor containing the PNG LNG RoW, facilities and all other infrastructure within the Upstream area;
- ✓ PMA-2: 'condition' surveys of focal habitats and significant ecological features adjacent to and in the vicinity of the pipeline RoW, facilities and other infrastructure;
- ✓ PMA-3: specialized biodiversity surveys, designed to collect and analyze flora, fauna and ecosystem data both in/around areas affected by the project and in protected areas enhanced and/or established through the offset program; and
- ✓ PMA-4: to assess the efficacy of the various components of the biodiversity offset program, and to establish, over time, EMPNG's progress with respect to achieving NNL of biodiversity.

In addition, three Environmental Management Plan (EMP) Protocols are used to inform the KPIs. IESC observations on their implementation are provided in subsequent sections of this report:

- ✓ Access Control: the protocol formalizes the monitoring of vehicle access to and along PNG LNG project roads and infrastructure to prevent potentially damaging third party activities resulting from access;
- ✓ Regeneration Monitoring: the protocol formalizes the collection and analysis of information relating to the regeneration of temporary work areas disturbed during construction and evaluated against established benchmarks; and
- ✓ Invasive Species and Plant Pathogens: the protocol formalizes monitoring of the occurrence and distribution of invasive species, pests and plant pathogens, and provides guidance on remedial actions.

EMPNG will evaluate monitoring results gathered via the various PMAs and EMP protocols, and depending on the significance of the findings, implement adaptive actions through management response.

To address residual impacts on critical habitat, and in accordance with the Biodiversity Strategy, EMPNG is implementing a Biodiversity Offset Program to ensure no net loss (NNL) in biodiversity.

5.2.2 Observations

EMPNG's updated Biodiversity Strategy (BS) and Biodiversity Implementation and Monitoring Program (BIMP) documents are publicly available for download at https://pnglng.com/Environment/Biodiversity-management.

This 2019 site visit was of a shorter duration than previous visits, but from observations made we can confirm the BS and BIMP continue to be implemented across EMPNG's work plans and infrastructure. This section provides updates in relation to implementation of the strategy since our previous visit

5.2.2.1 Biodiversity Strategy, Implementation and Monitoring Program

The IESC was updated on EMPNG's ongoing use of their Field Observation system to track non-significant instances of ecological management notifications, for example, removal of cultivated plants, inadvertent clearance of areas outside construction zone, and observations of positive actions by bush-felling crews.

Monitoring Program

Monitoring campaigns have continued on a one/two-yearly cycle as previously scheduled, and summaries provided to the IESC.A number of adjustments are proposed across the PMAs (including recommendations by PNG LNG's external technical specialists) which the IESC consider appropriate at this stage.

- ✓ PMA-1 Remote sensing update:
  - 2017 data has now been analyzed against previous years. The technical specialist has concluded that there continues to be no evidence of broadscale forest loss or degradation attributable to PNG LNG. However, land cover changes of >1Ha were observed in five areas: Angore, Kaiam River crossing, Kopi Scaper Station and Komo and deemed 'priority inspection zones' – these will be investigated through field verification, to determine potential cause of change and whether any attribution to the Project is appropriate. Greening of newly restored areas associated with post-construction regeneration along the RoW were noted, as were areas of increased logging especially in lowland areas (outside of the Project linear infrastructure zone),
  - as part of the 2019 remote sensing program, RapidEye will be replaced by use of Sentinel-2 satellite imagery (with infill of higher spatial resolution in targeted areas as required), classification adjustments made, and data capture/analysis frequency will be extended to every 5yrs. The monitoring footprint will be reduced to target areas closer to project sites and linear infrastructure (including the pipeline and a 5km buffer zone) and will now include wider coverage around all priority ecosystems, and existing/new conservation target areas (Lake Kutubu WMA and Lower Kikori), plus some temporary coverage to capture recent earthquake impact areas. An additional KPI will be added to contribute towards monitoring of Objective 4 (see 5.2.1 above), that of 'trends in significant residual impact',
  - field verification of this and previous monitoring findings will be key. The Project has faced a number of fieldwork challenges to date due to accessibility and/or security constraints. The IESC appreciates the move to Sentinel-2, but with the associated slight reduction in resolution, this puts even more emphasis on in-field follow-up. Due to the 'exceptional event' of the 2018 earthquake, the technical specialist also recommends a further 2-yr monitoring frequency (in 2021) prior to shifting to 5-yr frequency, to help assess the stability of areas impacted by the 2018 earthquake;
- ✓ PMA-2 Condition' surveys of focal habitats and significant ecological features update:
  - field missions to 29 sites were undertaken in May 2018. Conclusions from survey work are that the condition of accessible focal habitats and sensitive ecological features remain generally intact with substantial vegetation growth. The field team noted that streams and cave monitoring sites in close proximity continue to be used by local communities, as was the case prior to construction of the RoW. It is presumed that monitoring sites no longer accessible due to the extent of natural revegetation are now deemed unaffected/no longer affected, and that ecological condition is in the process of restoration or already restored. Attempts to access some of these sites may actually affect natural restoration processes, so the IESC concurs that inaccessible sites should no longer be monitored regularly through fieldwork;
- ✓ PMA-3 Biodiversity survey updates:
  - details and initial findings from the May 2017 fieldwork at Biodiversity Assessment Areas (BAAs) were noted in the last IESC report. The report is now finalized and will be posted on PNG LNG's public website in the coming months. Key observations include:
    - both BAAs retain high biodiversity values for all surveyed taxa, with surveys continuing to find species of conservation significance as well as species new to science and not previously recoded; hence the study authors conclude overall the biodiversity values of the Project area remain intact, with no unequivocal evidence that edge effects negatively influence the presence or behavior of any species,
    - although there was a trend for more butterflies to be detected at the forest edge, they were not encountered in sufficiently high numbers to assess the potential impacts of linear infrastructure, and therefore for them to justify inclusion in future surveys,
    - nearly half of frog species encountered (n=16) remain undescribed. For frogs, elevation appears to have a more significant effect on species diversity than distance from forest/RoW edge,
    - the use of improved genetic identification techniques was of great value in improving species identification,
    - bat surveys indicated diversity was significantly greater at the RoW/open areas versus in the forest interior, therefore a positive 'edge' effect was concluded; greater species diversity was noted in 2017 versus in 2015, with higher diversity observed at lower elevations, and 2 bat species possibly new to science were found,

  - camera trapping proved extremely useful and effective in detecting rare and threatened taxa in the BAAs and captured 13 species not previously recorded in the BAAs, some not even recorded previously in the Kikori Basin. The camera traps did demonstrate some conflicting results between the two primary BAAs in relation to whether increased activity was observed closer to, or further away from, the forest edge/clearings,
  - the increase in hunting pressure and feral dog predation, plus the potential spread of exotic rodent species (including increased predation and competition), both potentially associated with the RoW/roads, were the main factors that study authors concluded may threaten biodiversity values in the BAAs surveyed. They noted also a number of trees had been removed by locals, on or adjacent to 2017 survey transect lines. These impacts will continue to be monitored,
  - the authors make a number of recommendations for adjustments/additions to future surveys;
- the next field campaign is due third quarter 2019. An environmental genomics pilot study will be included.

  The PMA-3 team also surveyed at Lake Kutubu WMA and Lower Kikori sites during 2017.

  These PMA-3 surveys are intended to also assess the biodiversity values of the Lake Kutubu WMA and Wau/Viera conservation areas.

  It is the IESC's opinion that freshwater and marine fish surveys would also be beneficial so that baseline data is available on all biodiversity values likely to be of value to community stakeholders. When undertaking protected area planning and communities resource mapping as the Project has, it is the IESC's opinion that such surveys would contribute to a better understanding of the biodiversity values of an area, for example at Kutubu, previously conserved primarily for its endemic fish species;

✓ PMA-4 Biodiversity offset efficacy updates:

- the Project has revised its approach to assessing progress in offset implementation, and the PMA-4 scorecards reported on previously to measure performance in various offset component activities will not be used. The Project proposes the KPI be adjusted from solely a generic 'offset gains' to include 'trends in size and quality of conservation areas' associated with the Project offset program,
- the biodiversity surveys noted above have started to establish the 'quality'/condition of both the Lake Kutubu WMA and the Lower Kikori at Wau Creek and Veiru Creek.The Project has continued to refine the offset accounting methodology – see next section.

Land Access Post-Earthquake

EMPNG provided a summary of the Earthquake Land Access Process (developed from the existing Operations Land Access Process) following the Feb 2018 earthquake for the purposes of accessing areas of the pipeline ROW for necessary repairs. From a PS6 perspective, this includes checks and balances related to whether access is required to areas within previously disturbed ground, whether a pre-construction survey is required, etc. and the linkages from Operations to the Environment and Biodiversity teams is apparent. Access to the RoW for repairs will be necessary in areas where previous construction tracks and access had been able to naturally regenerate. Therefore, the IESC notes that previous regeneration success will be affected but that this is necessary to ensure pipeline integrity. On request, the Project supplied the IESC with additional information on access points and length of restored RoW likely to be affected by this renewed access.

Freshwater Ecology

We noted in the previous IESC report that freshwater monitoring was unable to be performed during 2017 due to security reasons, and that it would instead be undertaken in 2018. Due to the Feb 2018 earthquake, freshwater ecology monitoring surveys downstream of Komo were not undertaken. Regardless, any potentially remaining, discernable Project impact would be completely masked by the extraordinary levels of earthquake-related sediments affecting large areas of the catchment.

5.2.2.2 Biodiversity Offsets

Offset Framework & Technical Rationale

The Project's biodiversity offset accounting methodology was the subject of an independent review during 2018 by The Biodiversity Consultancy (TBC), culminating in a workshop in which the IESC participated. The IESC commends the Project on undertaking this review, not only to verify the existing offset 'debt' but also to ensure that the NoNet Loss (NNL) accounting methodology was fit for purpose. The independent review endorsed the approach that had been developed by the project since 2015, as well as recommended refinements to the methodology, building on the previous Habitat Hectare approach; no doubt the process will continue to mature as data is generated and additional clarifications are deemed necessary.

However, the IESC can finally conclude and report to Lenders that in our opinion PNG LNG has developed an appropriate biodiversity offset loss/gain accounting methodology, that when implemented should allow it to demonstrate No Net Loss of biodiversity (as per IFC PS6 2006 requirements). The revised biodiversity gain required to offset Project-related losses aligns with the Habitat Hectare figures discussed previously, and will be spread over the 3 altitudinal bands and over a notional period of 30 years as previously noted. Various related documents will be updated accordingly to reflect the revised approach.

Key to verification of losses and gains, and compliance with PS6 requirements for Natural and Critical Habitat, will be the ongoing implementation of the Project's monitoring program, not least the use of remote sensing and expert-led biodiversity field surveys.

We also recommend PNG LNG consider the financial and oversight/governance mechanisms that will allow the offset program to achieve the desired outcomes over the life of the residual impact period.

Offset Program Design and Early Implementation

To achieve NNL, EMPNG's offset program combines both direct and indirect (enabling) components. The company has provided the IESC with updates on each component:

- ✓ Offset Component 1: Protected area planning. This component provides support to CEPA[2] in meeting its international Convention on Biological Diversity (CBD) commitments via production of a 'Protected Area System Plan' for a Kikori-wide river basin (on World Heritage 'Tentative' list):
  - update: EMPNG informed the IESC that they now consider this component complete due to the repeated yet unsuccessful efforts to engage with CEPA EMPNG therefore proposes that further work in relation to conservation areas in the Kikori River Basin be undertaken via other offset program components,
  - the IESC note that previous intentions had been to have further consultations on conservation prioritization work (in conjunction with WCS who had developed the EMPNG-commissioned report, 'Protected Area Planning for the Kikori River Basin') and ultimately to help develop a Protected Area System Plan that could feed into CEPA's process to attain World Heritage status for the Kikori River Basin. CEPA's involvement and engagement is necessary to now move forward at the Kikori Basin scale - without sufficient engagement from CEPA, it is currently difficult to see how else this component could be effectively progressed;
- ✓ Offset Component 2: Support to CEPA to achieve 'actions for improvement' of the National Biodiversity Strategy and Action Plan (NBSAP). EMPNG is supporting the re-establishment of the bi-annual Conservation Forum, the development of quarterly newsletters (Biodiversity Digest) and provide for biology conferences:
  - update: two further Communicating Conservation meetings were held, with 75 and 150 attendees respectively, with representatives from all over PNG ranging from local communities, conservation community, national government, industry and development agencies. Conversations focused on community based marine conservation initiatives, gender roles and breaking cultural barriers in conservation decision making, capacity building, challenges of community-level conservation (including funding), and implementation of PNG's Protected Areas Policy. In addition, PNG LNG hosted the 2018 Biodiversity Conference (in conjunction with CEPA and the Japan International Cooperation Initiative) with help from Mama Graun Conservation Trust Fund, with over 150 participants attending the 2 day event in Port Moresby. Presentations addressed biodiversity research in PNG, protected area management, and conservation challenges in a PNG context. The intention is to hold another 2 meetings and another conference during 2019,
  - the IESC commends the work being led by EMPNG to provide these valuable networking opportunities, where those involved in community conservation can guide and learn from others involved in conservation in their own communities. This is especially important in PNG where community conservation is one of the most feasible ways to achieve more sustainable, positive conservation outcomes benefitting both wildlife and people;
- ✓ Offset Component 3: Enhancing Conservation Capacity Program (ECCP). EMPNG's support is focused on developing and institutionalizing Post-Graduate Diploma and Master's degree courses at University-PNG (U-PNG), providing scholarships, and establishing a framework for placements and mentorships with field-based conservation NGOs:
  - update: four sponsored Master's scholars are now enrolled in Conservation Science at University of PNG. Ten sponsored BSc Hons and Post-Grad Diploma students have commenced Year 1 studies.

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[2] Conservation and Environment Protection Agency, PNG Government.

In addition, 24 community conservation practitioners graduated with Community Conservation Certificates at the end of 2017. EMPNG's support to this program is currently envisaged to continue until 2020, with support beyond that date focusing on Master's student sponsorships;

✓ Offset Component 4: Support for existing protected areas. Enhancement of the Lake Kutubu WMA (Wildlife Management Area) is the primary focus for achieving this component. EMPNG supports an on-site Coordinator role to work with the WMA Committee; initial priorities are to build capacity with the aim to develop and implement a protected area management plan, and ultimately ensure conservation gain within EMPNG's medium elevation zone:

- update: the Feb 2018 earthquake caused extensive damage in the Lake Kutubu WMA area, including to houses and gardens, plus the WMA boat recently provided by the Project was damaged (now fixed). Therefore, WMA committee members have had priorities other than wildlife conservation. Nevertheless, the Committee continued their quarterly meetings and arranged a number of community conservation events related to World Environment Day and the Kundu and Digaso Festival events. Conservation training and Ramsar training, supported by the Project and delivered by IBR (Institute of Biological Research) has been delayed until 2019 – this will include the establishment of conservation objectives for the WMA. Following their successful application to the UNDP Small Grants Programme, the Committee has now developed their Implementation Plan, which has in turn triggered the next tranche of funding from the programme. EMPNG advise they are seeing direct benefits in committee capacity following on from the committee organizational and strategic training undertaken previously;

✓ Offset Component 5: Establishing new protected areas.

1. at the Lower Elevation Zone (0-600m), EMPNG's intention is to establish a Lower Kikori Resource Use Management Plan (LKRUMP), so as to offset residual impacts on biodiversity values affected in this zone. The creation of a new community based, regionally-gazetted protected area (Community Conservation Area) will be in the vicinity of the existing Aird Hills WMA.. To achieve this, EMPNG plans to work with the former Barging Route Waterways Committee members and the Aird Hills WMA Committee:
    - update: EMPNG reports they have made good progress during 2018 in their community engagement amongst the villages of the Lower Kikori, with 2 separate engagement campaigns in the Delta area and 10 villages engaged. Resource mapping continued across 9 villages with over 1000 people involved, and the results from the 2015 PMA-3 biodiversity surveys in the Lower Kikori were welcomed when presented back to communities. Following discussions, initial verbal community agreement has been received from 5 villages for areas to be committed for conservation. In addition, community leaders gathered from villages across the Kikori Delta in Aug 2018, representing villages targeted for participation in the offset program, to discuss conservation – over 300 people attended. CEPA's process of establishing protected areas was explained and discussed, along with a vision for how conservation could best work across the region. The Project advises they are cognizant of managing community expectations sensitively and are under no illusions of the challenges facing conservation in a remote area with such isolated communities, along with the existing threat of invasive fish species being present (tilapia, climbing perch). Nevertheless, it is the IESC's opinion that the approach being presented is a solid basis on which the Project can help build a more sustainable multi-faceted conservation program with Delta communities. The Project will continue to work with the communities to begin the process of establishing conservation deeds, to continue invasive species awareness, fisheries management planning and resource mapping;
2. Representative offset locations in the Upper Elevation Zone (montane >1200m) are to be determined – biodiversity at this higher altitude represents the largest residual impact requiring offset compensation. EMPNG's recent focus has been to engage with Hela Government to identify and discuss potential candidate offset locations in the province:
    - update: establishing an offset to contribute towards biodiversity gain in the higher elevation zone has not progressed, and no formal engagement occurred during 2018 - the Feb 2018 earthquake seriously affected the lives and livelihoods of communities in the area where the Project is seeking to engage on conservation. Nevertheless, the Project were invited to the launch of a local youth group seeking to focus on eco-cultural activities. Further opportunities will be sought during 2019 to engage with Hides communities with a view to developing a suitable biodiversity offset program.

5.2.3 Recommendations

1. Due to the 'exceptional event' of the 2018 earthquake, we suggest the Project consider the PMA-1 technical specialist recommendation, that a further 2-yr monitoring frequency (in 2021) prior to shifting to 5-yr frequency, to help assess the stability of areas impacted by the 2018 earthquake.

2. As an understanding of the biodiversity values of the Lake Kutubu WMA and Wau/Viera conservation areas are necessary for the purposes of understanding their conservation significance, we recommend that freshwater and marine fish surveys would be beneficial. When undertaking protected area planning and resource mapping, such surveys would contribute to a better understanding of the biodiversity values of an area.We recommend PNG LNG consider the financial and oversight/governance mechanisms that will allow the offset program to achieve the desired outcomes over the life of the residual impact period.

5.3 INDUCED ACCESS

5.3.1 Project Strategy

EMPNG's objective is to control vehicle access to Project roads and infrastructure, to prevent potentially damaging third party activities through enhanced access.

EMPNG has retained a number of RoW construction access tracks/roads for permanent use during the Production-phase, so as to allow emergency access, maintenance and delivery of fuel to above ground installations (AGIs), such as main line valves (MLV), check valves (CV) and cathodic protection stations (CP). Background on the justification for access and methods of access control is provided in the EMP (an updated Table 17-1 will be included in a future EMP revision) and in previous IESC reports, along with IESC's opinion on the status and effectiveness of each vehicle access control.

EMPNG's strategy is that access will generally be allowed only to EMPNG vehicles. Access by third party vehicles serving operational needs may be sanctioned subject to prior approval from EMPNG. Access by landowner vehicles may be sanctioned subject to approval from EMPNG. In both cases, access will be authorized only by designated EMPNG personnel. Vehicles will be inspected as deemed appropriate. A Vehicle Monitoring Plan (VMP) describes the process to be followed for vehicles seeking authorization to use EMPNG roads, and data is being gathered on type of vehicles passing through points where Access Monitors are located.

CEPA's Environmental Permit states that EMPNG is "required to establish and maintain systems to ensure project infrastructure and road systems are not used in any way to provide support of logging activity or any other uncontrolled access. Prevention of access should continue until such time as natural vegetation regrowth prevents their use."

5.3.2 Observations

Access Control

With regard to ongoing control and monitoring of vehicular access on EMPNG roads to prevent potentially damaging third party activities, there are a small number of differences between the controls stated in the published Upstream EMP and the control mechanisms actually in place. These are listed in Table 5.1 and observations noted below. As the EMP documents are currently being revised, the Access Control table within the revised EMPs will more accurately describe the actual current status of controls.

EMPNG advises there are no changes in status of access controls since our last visit.

Table 5.1: Status of Access Controls / Monitors

Access location	Access reason	Current Vehicle Access Control/Monitor Status
Hides Ridge	Producing wells	As per EMP. Manned station at vehicle wash at base of well pad access road. All vehicle access is logged, and all vehicles washed on entry to the road.
CV-1	AGI (Above ground installation)	**Different from EMP.** Unmanned boom-gate between Angore WP-B and the RoW is installed but currently unlocked due to ongoing works for the Angore pipeline and surface facility work.
Angore well pad access road	Producing wells (future)	**Different from EMP.**

Access location	Access reason	Current Vehicle Access Control/Monitor Status
		Boom-gate installed but open, & not permanently manned. In an attempt to control access onto the well pad access roads, EMPNG has been working with community on how the gate will be managed. **Update**: Still not manned - currently EMPNG has significant presence in the area due to Angore pipeline and surface facility work. See record of vehicle tracks below.
MLV-1 Benaria	AGI	**Different from EMP**. No boom-gate is currently installed. Vehicle Access Monitor at Benaria village, not at project bridge/infrastructure. EMPNG previously advise that a locked boom-gate would be installed once the government has completed the installation of a permanent bridge to link Benaria Station to the public road. **Update**: the government has completed the installation of the public bridge. We were advised in 2016 that the lockable boom gate would be in place and the temporary construction bridge would be removed before the end of the year - this has still not occurred. EMPNG advises this is due to security concerns. Therefore, Benaria Village clans continue to use the temporary construction bridge and section of RoW access track running past MLV-1.
MLV-2 &Homa-Benaria Ridge access track	AGI / Road	**Different from EMP**. The EMP states that the valve is served by helicopter and there is no vehicle access. This is not the case. The Homa Ridge construction access track is still retained for use. Boom gates (two) are installed and locked, one at MLV-2 end of the Ridge track, and one at the intersection of the tax-credit public road and MLV-2 Homa Ridge access track.
MLV-3	AGI	As per EMP. Boom-gate installed and locked.
MLV-4	AGI	As per EMP. Boom-gate installed and locked.
CV-2, Moro	AGI	As per EMP. No EMPNG control. Rely on OSL road controls at Moro.
Agogo tie-in (KP101.8)	AGI	As per EMP. Boom-gate installed and locked.
Kutubu MLV (gas pipeline)	AGI	As per EMP. Boom gate installed and locked.
Moro to Kantobo OSL road, access to CP-1 (KP153). **Kantobo to Gobe** EMPNG road (incl. Heartbreak Hill &Mubi Bridge)	AGI / Road / Bridge / Road	**'Southern Highway' -** The EMPNG constructed road from Kantobo to Gobe links Moro to Kaiam (see updates below on Southern Highway). *Access from the north (Moro to Kantobo):* **Different from EMP**: The EMP states access is controlled via a locked unmanned boom-gate at KP164 near Kantobo. EMPNG maintains that due to community requests for access, this gate is not currently in place. Instead EMPNG rely on OSL road controls at Moro (KP95) and Manu (KP115). *Access from the south (Kantobo to Gobe):* As per the EMP. Access Monitors record vehicles using the road at the re-instated Chevron/OSL boom gate at Gobe.
Gobe MLV	AGI	Boom gate installed and locked.

Access location	Access reason	Current Vehicle Access Control/Monitor Status
CP-2	AGI	Boom gate installed and locked.
Kopi shore base to Kopi scraper station*	Road/bridge	**Different from EMP.** The EMP states locked boom gates at each end of the EMPNG road linking two old logging tracks. **Note*: This** road was handed over to the government in 2016 following their request in 2015.
KP232	AGI	As per EMP. Boom gate installed and locked.
Kikori River Bridge	Road/ bridge	Boom gate installed and manned with Access Monitor (records vehicles using road).

EMPNG reports there have been no observed signs of logging adjacent to the RoW or infrastructure and report no bypassing or destruction of access control equipment e.g. gates or padlocks on gates. Some burnt grasses were observed on the RoW nearby Angore during regular aerial patrols in the second half of 2018. Community Affairs investigated the incident and liaised with the community to reiterate the conditions of the RoW Clan Caretaking Agreement; however, security incidents in the area have prevented further site visits.

During chopper flyover of MLV-1 at Benaria, the IESC noted a wooden gate had been built blocking the road between the recently constructed government bridge and the government road to Benaria Station. This has resulted in vehicles continuing to use the EMPNG temporary construction bridge still in place, plus a short section of the RoW past MLV-1 in order to get to Benaria Station; vehicle tracks were discernable from the air. EMPNG will investigate, although security incidents in the area mean that visits to the site are difficult.

At the LNG Plant, vehicle incursions continue through the bare backshore area of the RoW at the LNG Plant, and tracks were apparent during our visit. We observed a small number of mangrove stumps and trees that had been cut and were told that landowners access the RoW area with vehicles to find firewood and to catch crabs. Community Affairs continue to liaise with the local community to reiterate access restrictions. The Project has also responded through the planned use of multi-lingual signage, describing the importance of mangrove protection.

Figure 5.1: Evidence of Damage to Trees at the Pipeline Landfall RoW at the LNG Plant

Monitoring Vehicle Traffic along Project Roads

EMPNG has advised they are in the process of revising and automating the way they collect and analyze vehicle records in access monitoring datasets. This has resulted in the consolidation and amendment of historical quarterly vehicle data. EMPNG advise that some further small adjustments to data may be necessary.

Reasons for some of the changes in historical data could not be clarified in time for inclusion in this report. There is the possibility that some changes to quarterly historical data might potentially affect analyses presented in previous IESC reports. Therefore, during the next site visit the IESC will seek a comprehensive update on the Projects updated approach, what implications this might have on previous analyses presented, and update the IESC vehicle graphs for the next report accordingly.

The Project advise that increased traffic between Kopi, Gobe and the OSL Ridge camp (towards Moro) was noted, likely to be as a result of earthquake response/pipeline repair traffic.

Ownership of Roads / Infrastructure and Responsibility for Mitigation

EMPNG advise there have been no further developments in the requisition of project roads and/or infrastructure by the government from that which we reported last year. EMPNG has completed an internal risk assessment developed in the eventuality of a request for handover of the Gobe-Kantobo section of the 'Southern Highway'. EMPNG intend to develop an MOU with the government to detail commitments for environmental and social protection. See our 2016 report Section 5.4.2 for a summary of IESC issues related to such a handover – we retain here the recommendation noted previously.

5.3.3 Recommendations

1. EMPNG should ensure as part of any negotiations with the PNG government regarding transfer of ownership of roads/infrastructure that every effort is made to prevent any ecological damage through third party access to areas, and therefore allow the company to uphold their commitments made to Lenders with regard to invasive species, induced access and ecological management. Potential risks need to be fully understood and effective mitigation options discussed.

5.4 REINSTATEMENT AND REGENERATION

5.4.1 Project Strategy

EMPNG's objectives are to establish stable landform conditions at temporary work areas disturbed during construction and create ground conditions conducive to natural regeneration so as to achieve vegetation succession according to established benchmarks.

The Regeneration Monitoring Program, currently undertaken every two years, uses fixed and random sampling and a benchmarking scoring system to evaluate the progression of plant community succession within the Upstream area. Project-affected areas undergoing natural restoration are visited, and progress compared against benchmark sites determined previously. The methodology is detailed in Appendix 3 of the Upstream EMP available at ww.pnglng.com, and supplements EMPNG's regular aerial assessments of regenerating areas to check for evidence of encroachment or slope failure.

5.4.2 Observations

The Feb 2018 earthquake has created a large number of new zones of disturbance along the RoW and in the vicinity of Project facilities.

5.4.2.1 Reinstatement

Where naturally regenerating areas weren't affected by the earthquake, from our road-trip and flyover, the IESC was still able to observe continued regeneration of areas known to have been impacted during construction.

We were able to observe Hides Ridge both by chopper and by car up to well pad G. Several years have passed since the completion of construction, and landforms appear sufficiently stable for natural revegetation – for example aerial observations of limestone blackening of side-cast rubble slopes near the well pad F access road. Increased floral diversity was noted. The establishment of photo-points along the Hides Ridge road has helped in demonstrating the change in general soil/rubble coverage for simple status comparisons through time.

Areas previously reinstated at Komo were heavily affected (as described in Section 4.4.2 above); considerable efforts will be necessarily to bring the full airstrip back into operation, then areas actively reinstated around this to aid with slope stability.

Static photo-points at the LNG Plant pipeline landfall RoW are providing progress records of mangrove restoration over time. As flagged in our last report, the Sandalwood tree located between the jetty and the pipeline landfall RoW, as noted for preservation within the Pre-Construction Survey, finally succumbed to community pressures on the tree (cut-damage and bush-fires lit in the backshore area) and has died.

5.4.2.2 Regeneration Monitoring

The second regeneration monitoring campaign was completed in 2017 by EMPNG's technical consultants New Guinea Binatang Research Centre, using survey transects at various locations along the RoW, across 12 different benchmark vegetation groups (BMVGs), from Omati up onto Hides Ridge. Regeneration monitoring results from these69 survey plots were then compared with results from 2015, benchmark plots of both younger and older secondary growth forest, plus primary forest benchmark plots.

The Figure below from Binatang's report demonstrates the relative importance of individual success stages for a number of life forms typically found in vegetation around the RoW. Binatang's statistical analysis shows that succession stages can be easily distinguished using the life forms found during regeneration surveys.

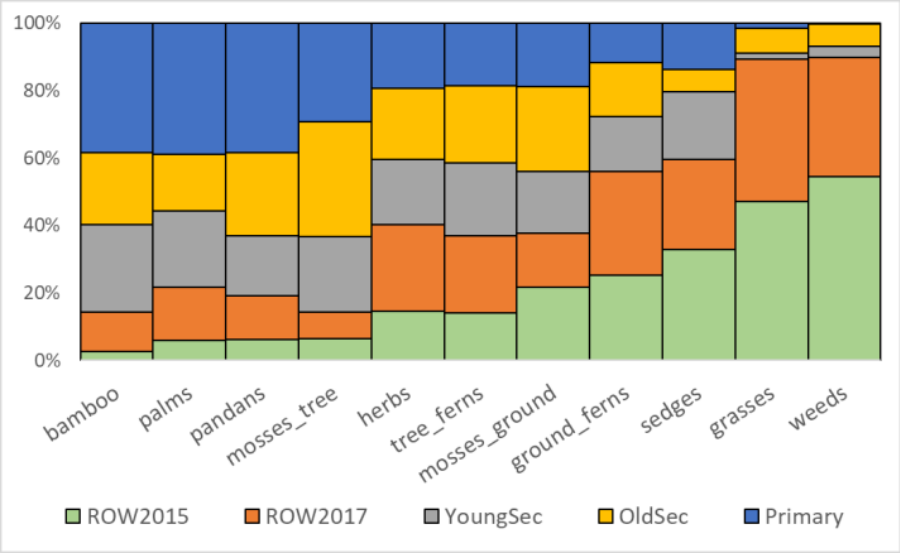

Figure 5.2: Variation of Vegetation Types expected in different Succession Stages

Monitoring results from 2017 indicate RoW regeneration vegetation biomass and species composition, although not yet considered equivalent to early secondary benchmark vegetation, was progressing well along that path. However, ground and canopy cover generally did match that of young secondary vegetation benchmarks. A significant increase in the growth, abundance and diversity of trees was recorded since the 2015 surveys.

Slower progress in succession was observed at RoW plots at higher altitudes; although ground cover, seedlings and sapling growth were on a par with lower altitudinal regeneration, the regeneration of trees above altitudes of 1500m (above sea level) remains low. The expected, associated increase in canopy cover at higher elevations should therefore be expected in future surveys. Although the technical specialists consider this to be not unexpected and recommend that no active measures are deemed necessary at this stage, they do recommend additional monitoring will help better understand higher altitude regeneration dynamics.

The 2019 campaign will be undertaken during the first half of the year.

5.4.3 Recommendation

There are no recommendations on this topic at this time.

5.5 INVASIVE SPECIES, PESTS AND PLANT PATHOGENS

5.5.1 Project Strategy

EMPNG's objectives are to prevent priority invasive species, pests and plant pathogens from entering or becoming established at (or in the vicinity of) their facilities and infrastructure, and ensure containment of existing priority invasive species, pests and plant pathogens already present. A Weed Identification Manual has been developed, the Weed Monitoring Protocol recently revised (as per the revised audit approach 2018), and a Register of Invasive Species, Pests and Pathogens. This Register is used to track any changes in invasive species type, abundance and distribution, and is updated through external specialist audits, internal monitoring and general reporting from staff and communities.

The project footprint is split into separate Weed Management Zones (WMZs), each delineating broad ecological units based on patterns of distribution and abundance of weed populations, and zones for phased mitigation approach as pipeline construction progressed through the Project area. Priority-1 (P1) weeds are defined as species that rapidly colonize disturbed areas and displace and/or invade native vegetation; the Project aims to control and monitor all P1 weeds and exclude them from all work areas through active control. Priority-2 (P2) weeds are defined as species that may rapidly colonize disturbed areas and displace native vegetation, but rarely invade natural habitats; P2 species are monitored, but only controlled where a species shows signs of increasing invasiveness or is growing alongside P1 weeds; P3 weeds are deemed low risk, require minimal attention and may provide value in soil stabilization during regeneration.

EMPNG seeks to manage the threat of spread of *Phytophthora cinnamomi* by preventing the spread or introduction of Type A2 into unaffected areas, in particular ecologically sensitive areas susceptible to senescence.

With regard to quarantine implications of imports into PNG, EMPNG has developed and adopted quarantine requirements which aim to prevent the importation and spread of foreign invasive species, pests, pathogens or disease; quarantine requirements are contained within a Quarantine Procedure.

5.5.2 Observations

5.5.2.1 Invasive Species

Weed Audit Scope and Analyses

As reported in detail in previous reports (in particular, IESC 2017 report), the IESC has consistently flagged a number of gaps in relation to weed reporting errors, historical data inconsistencies, and the adequacy of analyses presented to allow Lenders to determine whether risks raised in the EIS were being effectively mitigated. This included the requirement to be able to understand whether weed presence, persistence, abundance and/or distribution changes observed were of actual ecological significance and how adaptive management was addressing any impacts not fully mitigated. A series of Observations have been issued (see Issues Table) over several years.

During 2017/2018, EMPNG has revised their approach to weed monitoring. The Project have engaged New Guinea Binatang Research Centre (also undertaking the Regeneration monitoring program); they have revised the company's weed monitoring methodology and established an updated field monitoring approach. In comparison, Binatang's approach is more closely aligned with a classic characterization research methodology, rather than a risk-focused audit approach as undertaken previously. The new methodology allows for a quantitative dataset to be gathered and built over time, utilizing multiple 100m x 5m transects along the length of the RoW and at Project facilities. A detailed protocol has been developed (Appendix 1 of the 2018 weed audit report) but was not included in the version provided to the IESC.

Results from their first weed audit are summarized below. Although it is still not clear to the IESC whether this new approach will address the requirements flagged above, we do note the fact that the Project is prepared to reassess its whole approach to weed monitoring is encouraging. Therefore, a number of repeated surveys using this new approach might be required to build up a sufficient picture to allow Lenders to understand whether the Project has the right information to ensure risks have been and are being adequately managed. In the interim, we close the Observation in light of changes made to the Project's approach, with a view to reassessing the situation once a number of monitoring campaigns have been undertaken (and trends assessed in conjunction with older weed abundance data).

2018 Weed Audit

Field surveys were conducted according to the revised approach, across the range of existing WMZ's and at permanent monitoring sites (as benchmarks). The work scope had been to perform audit transects at 34 sites along the full spread of RoW and site infrastructure, but this was reduced down to 20 sites because of security concerns in certain areas. Of significance to note in relation to the Homa-Benaria Ridge Priority Ecosystem, is that of the 17 sites intended to survey between Kutubu MLV and the Hides Wash-down Facility, only 3 could be visited, and therefore no sites in the vicinity of the Priority Ecosystem were assessed. P1 species are known to be present in this originally largely weed-free zone (*Desmodium sequex, Ludwigia leptocarpa & Piper aducum*), and 2018 records do not indicate whether sufficient weed control has been possible during 2018. The Project has indicated the invasive nature of both *P.aduncum* and *L.leptocarpa*, and provided photographic evidence of targeted control of both species around Moro, the RoW south of Moro and the Kutubu MLV.

Of the 20 accessible sites, a total of 108 transects were completed, equating to an area of 54 Ha. The surveys have allowed a good characterization of the invasive species present. A widespread distribution of weeds was recorded, with the mid-altitudes (1000-1500m above sea level) having the highest diversity of weeds. The P1 weed *P. aduncum* was noted as one the five weeds most common in the weed community but was present in less than one third of transects..

The report presents the finding that altitude explains species composition better than WMZ geographical regions. It concludes that weeds remain abundant and species diverse in the Project-affected landscape across the full altitudinal gradient. The community composition is changing rapidly, that more species are decreasing in abundance than increasing, and that the most abundant species are not P1 weeds. Of the four rapidly decreasing species, three were P1, and of the seven increasing species, one was a P1 (*Cyperus involucratus*). It is already clear from previous reports that P2 and P3 weed abundance overshadows P1 abundance. We feel it would be valuable to include more analysis and interpretation specifically on P1 weeds as these have the greatest potential to affect the natural characteristics of areas where they are introduced, become persistent, or increase in abundance or distribution. For example, of the areas surveyed, which areas show the highest propensity for persistent P1 presence, what (if any) is the ecological significance of this, what is the best mitigation to minimize impacts on native regeneration/existing vegetation (or ecosystem effects), what are the potential residual impacts, etc.

The Project's Invasive Species Register was not updated with 2018 audit data at the time of the IESC visit but will be undertaken once Binatang completes its review of weed taxonomy. The Project advises that DNA sampling will also be used in future surveys to aid weed identification.

Invasive Species Control and Training / Awareness

The Feb 2018 earthquake not only hampered active weed control efforts in the field but has also provided increased expanses of disturbed/bare ground where invasive species can become established. Weed control will therefore require enhanced efforts across priority areas that are already on the Projects radar.

EMPNG continue to work with MosquitoZone (MZ) across the Upstream Project area, to determine weed presence/risk and control in priority areas. Security issues have severely restricted the ability of MZ to access some areas, including the Homa-Benaria Ridge Priority Ecosystem as flagged in our previous report. As noted in the weed audit findings above, this area was not surveyed as part of Binatang's audit and therefore must be a priority area for future weed assessment and control.

EMPNG continues to use Glyphosate as their primary weed control application agent. The Upstream MZ weed control operator has been trained in relation to safety and ecological conditions of use. Due to the risks to the environment associated with use of herbicides near water, flooding in some lowland areas has meant targeted application has been challenging and/or not possible.

At the LNG Plant, we were told the Project has been applying Glyphosate as widespread herbicide vegetation control, as opposed to targeted application for the control of persistent weeds. Lenders will be aware that governments around the world are placing restrictions on the use of Glyphosate, and good practice is that use of herbicides should only be considered after elimination of other ways to control weeds. Anecdotally we were told that weed control is becoming more challenging at the Plant and that some weeds may be becoming resistant to Glyphosate, which is common following its repeated application. We caution against widespread application of herbicides, and recommend the Project reassess their weed control approach and use of Glyphosate herbicide at the LNG Plant.

Cane toads (*Rhinella marina*) are becoming an increasingly challenging invasive pest in the Upstream Highlands area, and increased sightings have prompted the Project to develop additional tools to address this. A Cane Toad Sighting report card has been rolled out across sites, advising people on how to identify the species if seen. This will help gather data on where and how frequently the species is being observed around Project infrastructure, and

on life stages observed. In addition, the Cane Toad Management Procedure has been updated so it is fit for purpose. General awareness raising measures have been rolled out, along with training in eradication measures especially around the Hides Kopeanda waste facility and the Hides Gas Conditioning Plant.

5.5.2.2 Quarantine

Quarantine management performance data for 2018are included in the following two IESC graphs, presenting information on:

- ✓ the proportion of consignments requiring a NAQIA inspection on arrival into PNG (see Figure 5.3 showing numbers of consignments within the graph bars); and
- ✓ bottom graph (see Figure 5.4) showing the proportion of those inspections that result in the need for fumigation of that consignment i.e. the inspection outcome.

Only EMPNG Production and the contractor Wood (previously known as Wood Group PSN) are currently importing consignments.

Note:

- ✓ container inspections are typically triggered by inadequate/incomplete documentation accompanying the consignment, or the source of the consignment is a country that NAQIA deems to be higher risk. Thus, the likelihood of inspection is not always within the control of EMPNG or their Contractors; and
- ✓ container fumigations are meant to occur at the point of origin – this is a condition of EMPNG freight forward contracts. The need for re-fumigations shown in the bottom two graphs below are typically triggered by a suspicious item (e.g. insect) found during the NAQIA inspection on the container's arrival into PNG. Hence where a re-fumigation is indicated below, it should have been preventable by good housekeeping and effective contractor management at the point of origin of the consignment.

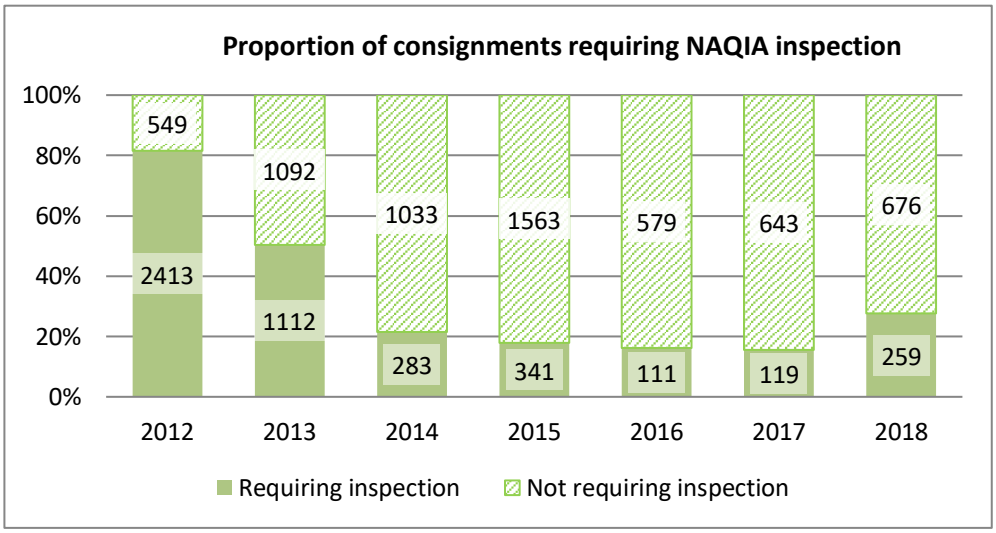

Figure 5.3: Proportion of Consignments Requiring Inspection by NAQIA

Key points on performance in relation to inspections and fumigation include:

- ✓ General:
  - for both EMPNG Production and Wood Group shipment volumes have increased during 2018 primarily as a result of production shutdowns and associated maintenance needs,
  - as can be seen in the top graph, the proportion of inspections resulting in the need for refumigation again once shipments arrive in PNG has risen for both Production and Wood Group during 2018,
  - the IESC queried the numbers of refumigations required in our last report – as shipments are meant to be fumigated prior to shipping, why the continuing need for re-fumigation following inspection by NAQIA. At the time, we were advised this was most likely due to dead insects being found within containers (resulting from the pre-shipping fumigation process) being sufficient to trigger NAQIA to call for a refumigation. The

Project have now provided information on their investigations undertaken for EMPNG Production Full Container Load re-fumigations for 4Q 2018. Documentation has confirmed that fumigation did occur at source. The 3 NAQIA inspection certificates all indicate 'Live Insect Pest' being the trigger for further fumigation post-inspection. The species of insect found was not noted. EMPNG has advised of corrective measures developed, including:

- implementation of a new process for FF to alert immediately when there are fumigation failures,
- ensure proper documented support gathered for opportunity to challenge NAQIA conclusion on re-fumigation (pictures of the findings to be taken during each inspection, documented report with insect species recorded) at both consolidation hubs,
- FF following up on possibility for NAQIA to provide type or species of insect findings (in progress),
- continue to work on reducing storage time for import containers arriving in country;

- the IESC has not been provided with information on Wood Group investigations into their required re-fumigations.

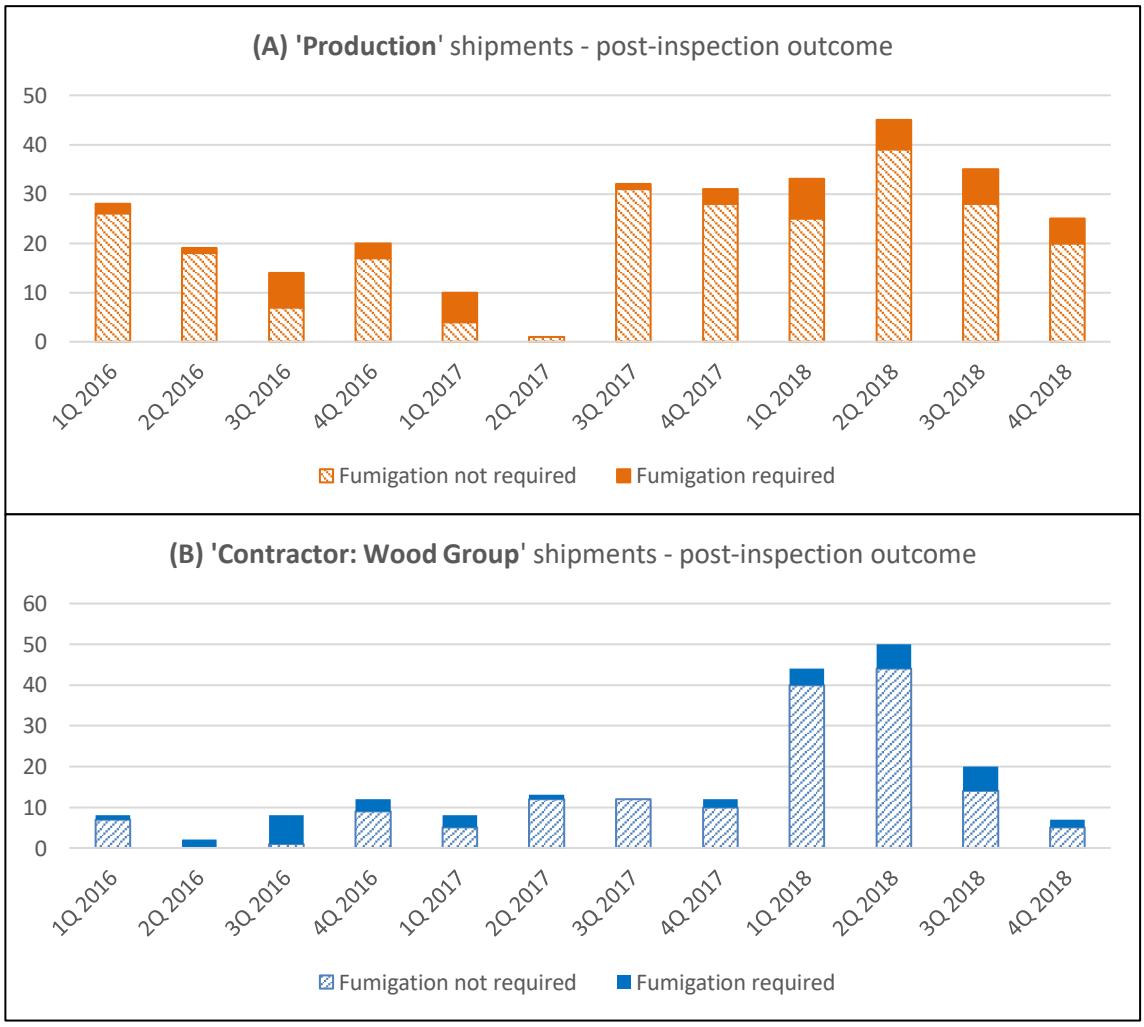

Figure 5.4: Inspection Outcomes

5.5.3 Recommendations

In addition to the Observation M17.3 in the Issues Table:

1. We recommend, as soon as it is safe to do so, that weed monitoring commence in the area between Kutubu MLV and the Hides Ridge wash-down to fill in the large geographical gap not covered in the revised weed audit approach, especially around the Homa-Benaria Ridge Priority Ecosystem.
2. When safe to do so, we recommend prioritized dedicated vehicular access and Mobile Squad be sanctioned to allow effective weed control of the Homa Access road/MLV2 area/ Homa-Benaria Ridge.
3. Considering the increased expanses of disturbed/bare ground left as a result of the earthquake, plus the duration where access to some areas has been restricted due to security concerns, we recommend the Project consider expanding the MZ resources available to maximise targeted opportunities for weed control across the Upstream area. A single operative does not appear sufficient.
4. The audit report assesses all weeds, whether P1s or P3's – it would be valuable to include more analysis and interpretation specifically on P1 weeds as these have the greatest potential to affect areas where they are introduced, become persistent, or increase their abundance or distribution.
5. We recommend the Project reassess their weed control approach and use of Glyphosate herbicide at the LNG Plant.

6 SOCIAL

6.1 INTRODUCTION

6.1.1 Scope of Social Review for this Site Visit

The IESC consulted with a variety of people and groups during its January – February 2019 visit. Social review activities during this visit included the following:

- ✓ presentations by relevant project departments;
- ✓ discussions with Project social and community development teams;
- ✓ discussions in the field with workforce and accommodations managers (Moro and HGCP camps);
- ✓ discussions with random camp residents (More and HGCP);
- ✓ helicopter flyover RoW to KP 64;
- ✓ discussions with land slip relocated households near KP64;
- ✓ flyover to Tari via pipeline RoW to see damaged and landslip areas;
- ✓ discussions in Tari with Provincial Education Officers;
- ✓ discussions in Tari with INFRA Architecture (assessment for Tari market);
- ✓ visit and discussions with Manual Sewing Machine Care & Advance Tailoring group (LNG Plant site villages);
- ✓ discussion with LABA Holdings on potential liaison with plant area sewing group;
- ✓ discussion with Salvation Army in POM; and
- ✓ discussion with United Nations / International Organization for Migration (IOM) in POM.

6.1.2 Waiver

The IESC social review is substantially based on documents and data provided by the Project and interviews conducted with project staff, project affected people, and other stakeholders. It is not within the remit of the IESC to verify or substantiate the statements made by interviewees and, unless otherwise indicated, the IESC has taken no steps to verify or substantiate such statements. Accordingly, the IESC makes no representation as to the substance of any reported 'perceptions' or 'beliefs' of interviewees and notes that hearsay evidence should not be treated as proof of any specific statement or concern expressed.

6.2 LAND ACCESS, RESETTLEMENT, AND LIVELIHOOD RESTORATION - STRUCTURE

6.2.1 Project Strategy

The Land Access, Resettlement and Livelihood Restoration Management Plan – Production applies to any new land access required during the Production phase and for managing the commitments for land that was obtained in the construction phase. This Plan supersedes the Resettlement Policy Framework developed for construction phase land acquisition. Livelihood restoration obligations for displacement that occurred during the construction phase, as well as evaluation of resettlement and livelihood restoration outcomes and the independent external audit of the resettlement and livelihood program, are also covered by this Plan and will be concluded in the Production phase.

The Plan defines the principles and approach to be used for management of the inter-linked activities related to accessing land, resettlement, and livelihood restoration. The content of the Plan is consistent with IFC Performance Standard 5 (Land Acquisition and Involuntary Displacement).

Any future tasks for land access, resettlement, and Livelihood Restoration remain under the Public and Government Affairs (P&GA) group.

6.2.2 Observations

6.2.2.1 Previous Resettlement Status

As indicated in the IESC report of October/November 2017, the Project's obligations under IFC PS5 (Land Acquisition and Involuntary Resettlement) have been fulfilled for the original Foundation Project and the Angore Tie-In expansion (including the potential landslip area). The Project has added the IESC recommended Appendix covering the resettlement activities undertaken for the Angore Tie-in project to the Resettlement Outcome Evaluation report, thus completing documentation requirements for past resettlements.

6.2.2.2 Resettlement Required for Project Earthquake Effects Repair

A major earthquake occurred in the upstream Project areas in February 2018 causing damages to various Project facilities. The Project activated an emergency shutdown followed quickly by mobilization of an Earthquake Recovery Team to investigate damages and undertake full restoration of upstream assets. Minimization of resettlement and household asset losses was a factor in determining strategies for repair operations resulting to date in the need to resettle only one household located near KP76.8 of the pipeline. The resettlement package provided is the same package available to all previous physically displaced households with an additional in-kind compensation offer of either a water tank or solar panels to directly contribute to improving the condition of the household. There remains, however, the potential for additional resettlement as post-earthquake maintenance scoping is still in process. The IESC requests that it be provided with updates on any additional resettlement necessitated by repair or other related works in a timely manner so that it can advise on the need for outcome evaluation and reporting.

Please note that voluntary relocation of households affected by earthquake related risks is covered in Section 6.3 (*Community Impacts Management and Security*).

6.2.3 Recommendations

Provide updates to the IESC on any additional resettlement necessitated by repair or other related works.

6.3 COMMUNITY IMPACTS MANAGEMENT AND SECURITY

6.3.1 Project Strategy

Project commitments to community impacts management during Production are contained in the Community Health, Safety and Security Management Plan – Production that addresses health, safety and security from a community perspective. See Section 8.2 in this report for IESC comments on Community Health.

The objectives of this Plan are to:

- ✓ avoid or limit risks to and impacts on the health, safety and security of the community during the production phase from both routine and non-routine circumstances through implementing targeted prevention programs to reduce risks, along with the implementation of an effective monitoring and evaluation program;
- ✓ ensure that safeguarding of personnel and property is conducted in an appropriate manner that avoids or limits risks to the community's safety and security;
- ✓ maintain a monitoring and evaluation program that is community-based, participatory, and transparent and covers all phases of production and decommissioning; and
- ✓ elements of the Production Community Development Support Management Plan also apply as it relates to community development support activities undertaken to mitigate the impacts or potential risks generated by Company activities with the objective to avoid or reduce the risk of adverse social impacts on Papua.

6.3.2 Observations

6.3.2.1 Earthquake-Associated Optional Relocation

The February 2018 earthquake resulted in large areas of potential risk for landslips and soil movements within and near the PNGLNG footprint. Project geotechnical and engineering experts undertook a flyover of the pipeline Right of Way (RoW) that identified three areas considered "imminent potential risk of land slip" with potential impacts to community safety. Detailed risk assessments, as well as social assessments of and engagement with potentially

affected households were carried out to identify households most at risk and these households' willingness to relocate to a safer area.

The Project Company consulted with the PNG government and agreed to undertake relocation of affected households with the support of the PNG government as a pro-active community safety initiative in cooperation with Government. The households most at risk and interested in relocating include 20 households near KP64. Additionally, compensation was paid for several speculator structures and gardens (KP9.1-10.5) also relocated due to safety risk from landslip.

Households were offered relocation packages of compensation or in-kind materials as preferred and formal Agreements were concluded. A few of the households are thought to be vulnerable, thus the Project is following up to determine if these households need any additional assistance. Some households have relocated, and some are still in the process of relocating and a few are living in interim locations. Given that these are voluntary relocations, rather than project induced resettlements, formal monitoring and evaluation is not required. The team will, however, continue to liaise with relocated households until they are re-established to ensure records are accurate and complete.

The IESC Social Expert was given a helicopter fly-over of the pipeline to view the situation and also visited several relocated households in the KP 64 area. The households visited have reconstructed dwellings, some for immediate use, and are in the process of building additional more permanent dwellings and other structures. All expressed appreciation for the compensation and other assistance provided, though are still fearful of the potential for a landslip even though they have been informed that their current areas have not been deemed to be at risk. People are also concerned about their proximity to the pipeline because they believe that the pipeline works caused the earthquake. Project engagement has explained the reasons this conclusion is incorrect, but it is understandable that in the previously isolated environment in which these people have lived, the belief persists. The Project continues to engage with relocated households and the IESC recommends that continued engagement for a reasonable period will be important for the people to understand that they are not forgotten and to observe that Project staff are unafraid to visit the area.

The IESC notes that that PS5 does not apply in this case because the need for households to relocate is unrelated to the Project and because relocation of households is purely voluntary, and expropriation was not an option. The IESC recommends that all documentation on this optional relocation be kept separate from any resettlement reporting.

6.3.2.2 Upstream Risk from Conflicts

The last IESC Report indicated that tribal fighting has become more frequent and protracted, thereby posing a risk to communities. Tribal fighting continued in 2018, abating only at the end of the year, and the Provincial government is actively involved in promoting and supporting clan peace treaties. Local police and Government security forces are taking a more active community approach helping communities by, for example providing emergency first aid response.

The Law and Justice component of the Project's Community Development Support (CDS) 2019 program is also promoting improvements tied to reducing conflict, such as support to the Village Courts Secretariat, Advocacy and awareness around domestic violence, provision of small infrastructure support for district and provincial courts and supporting PNG actors working on law & justice advocacy and leadership.

6.3.3 Recommendations

1. Continue engagement with voluntarily relocated households from high risk landslip areas for a reasonable period to promote their confidence and reduce fear of location near the pipeline.
2. Maintain all documentation on the optional relocation separate from resettlement reporting.

6.4 COMMUNITY DEVELOPMENT SUPPORT PROGRAM

6.4.1 Project Strategy

Project commitments related to community development support are described in the Community Development Support Management Plan – Production. This Plan covers all community development support activities undertaken by the Project. This includes activities undertaken by the Land and Community Affairs team (L&CA) during construction, currently under Public and Government Affairs (P&GA) and the Medicine and Occupational Health team (MOH), as well as to other functions undertaking relevant community support initiatives.

The objectives of EMPNG community development support activities are to:

- ✓ promote development of conditions that strengthen communities' ability to benefit from the Project's presence;
- ✓ avoid or reduce the risk of adverse social impacts on PNG communities;
- ✓ provide opportunities for sustainable development benefits in a culturally appropriate manner; and
- ✓ ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples, thus meeting both local regulatory and IFC Performance Standard 7: Indigenous Peoples (2006) requirements.

6.4.2 Observations

6.4.2.1 The Community Develop Program Concept

Revisions to CDS planning and narrowing project focus are progressing, but progress toward achieving a concrete plan seems slow. The IESC recognizes that the Project and CDS have been occupied with responding laudably to the effects of the earthquake both inside and outside the project fence. The IESC having followed CDS planning for some years observes, however, that finalizing planning is impeded by a lack of recognition that community development belongs to the Project as a whole and the CDS unit is meant to facilitate and coordinate the project-wide response.

A community development program that is useful for both the community and a project involves intentional collective actions to improve social, economic, physical, and environmental well-being, while preserving valuable aspects of the culture of the particular geographic area. Many projects mistakenly implement community development as a discrete social program without an over-arching project goal and/or without the project-wide collectivity necessary to achieve the over-arching goal. The PNGLNG project falls somewhere in-between – an overarching program goal has been established and some interaction between project units in planning and implementing CDS projects occurs. The program goal – to promote development of conditions conducive to enhancing economic self-reliance of individuals while also mitigating potential impacts, however, does not seem to be sufficiently recognized as a Project-wide goal – the driving force for all kinds of community development CDS development support. In other words, all the development support provided by the Project itself or in partnership with others combine to represent the Project's CDS contribution. The IESC observes that this is the ideal time to ensure that all the core activities are selected based on good potential to contribute to achieving the over-arching goal and are planned, integrated and reported on in a collective process.

In addition to the over-arching CDS goal, each CDS component (Livelihood enhancement, Education, Health and Law & Justice) has its own goal. These components are wide enough to accommodate a variety of activities implemented by various Project units as long as there is agreement on selection of each activity based on the extent to which an activity contributes to the CDS and the CDS component goal. Going forward, the Project might develop a special committee (perhaps a community development support Stewardship Committee) to give final approval for projects the various units will implement.

6.4.2.2 CDS Activities 2018

Livelihood Enhancement Component Activities

At the strategic level, CDS commissioned a Livelihood Strategy Scoping Study, at least partly in response to an IESC recommendation in the November 2017 report, as the basis for developing a Joint Stakeholder livelihood strategy. The scoping phase has been completed and involved discussions with senior management and with departmental heads (Security, MOH, Environment, Production, Field), review of studies and data on the existing livelihoods program, meetings with EMPNG representatives to identify key stakeholders and interviews and focus group discussions involving key stakeholders. The Plan will use the findings and recommendations emerging from the scoping phase as the basis for articulating a livelihood strategy and measurement indicators and get agreement of all stakeholders. The IESC observes that this is a step in the right direction, but it does not address the totality of the Project's and Company's contributions to community development.

The main livelihood activities conducted by CDS are listed below.

Upstream Communities:

- ✓ ANUE CLIP Agricultural Program focused on food gardens recovery, but also continued income generation through fresh produce market;
- ✓ DFAT PNGLNG Scholarship supported the Agribusiness short course for 20 participants in project area;
- ✓ Awareness raising and income activities through existing cultural promotion activities – Digaso show.

Plant Area Communities:

- ✓ capacity building and women's empowerment initiatives;
- ✓ peer Education training for young women and men in communities at Plant site;
- ✓ sewing machine maintenance and tailoring training;
- ✓ agribusiness training.

In terms of livelihood evaluation improvement, the ANUE CLIP project has established a monitoring and evaluation framework (Partnership Performance Assessment Tool) to monitor and assess the advanced community groups in order to qualify them to become extension trainers. The framework ranks the groups from limited up through excellent performance in five categories: technical knowledge & skills, delivery of Program activities, planning capacity, overall management and financial systems. The IESC notes that the tool is useful for improving evaluation, as recommended in the October/November 2017 IESC report.

The IESC Social Expert visited the Manual Sewing Machine Care & Advance Tailoring Training center supported by PNGLNG that serves women from the four Plant site villages (Papa, Lealea, Porebada and Boera). The project appears quite well organized and the participants with whom we met are enthusiastic about the training and its potential to have a significant positive impact on household income from both sale of clothing and sewing machine repair because there are very few clothing manufacturers in the nearby capital of Port Moresby (POM) and surroundings. Project management demonstrates good understanding of the market and ways to expand sales. Current sales are enhanced through the project-supported Global Women in Management who take clothing items to markets in POM. Discussions with various potential support partners are on-going. LABA Holdings, for example, is considering providing financial assistance for purchase of equipment, Quality Standards and transport of material which must come from outside PNG. Financial assistance would be repaid against payments for clothing items (e.g., uniforms for LABA staff). The Project is also talking about partnerships with International NGOs. The sewing/maintenance group ultimately hopes to expand into a factory that could provide clothing items schools and businesses in and around POM.

The October/November 2017 IESC report indicated that the IESC agrees that expanding the number of markets it supports in the upstream areas should be the focus of interim phase livelihood activities. Since the end of 2017, proposal development is underway for a market in Tari in partnership with HPG, DFAT and UN Women, discussions are underway for market development in the Para/Komo areas and the Komo Women's' group is working with Mama Helpim Mama and CPL Supermarkets in Port Moresby.

The IESC Social Expert met in Tari with INFRA Architectural Alliance (the Consultant), the firm contracted by EMPNG in late 2018 to develop a concept and proposal for the market at Tari town (upstream Hela Province). The purpose of the assessment is to develop a market concept and proposal to submit to the Incentive Fund for the Tari Market. The assessment will address all applicable legal and regulatory requirements, define the components of partners, and identify the approach for market development. The Consultant discussed with the IESC the pros and cons of the market being situated in the current market location in town or in another area in the direction of town growth where a larger amount of land would be available. The location issue will be decided in consultation with market stakeholders and development partners. The IESC observes that the Consultant is able to speak knowledgeably about the technical aspects of market development, the health and safety issues and social and environmental considerations aspects that need to be considered in market development and management, including the importance of gender consideration is particularly important because markets in PNG and elsewhere are typically run by women.

Education Component Activities

Plant Site Communities:

- ✓ continued with school governance capacity building, infrastructure support and sports initiatives for students;
- ✓ school BOM Training roll out to Provincial government officers;
- ✓ constructed two new classrooms (Porebada Preschool and Boera Elementary School);
- ✓ provided four new WASH facilities to four schools at Plant site;
- ✓ sports program roll out in all four primary schools at Plant Site.

Upstream:

- ✓ restored two school staff houses;
- ✓ teacher training programs for elementary school teachers in Hela and Southern Highlands Province.

The IESC Social Expert visited with Provincial Education officers for Hela Province, including the Education Services Officer, the In-Service Coordinator of Training, the Planning and Information Deputy Director and the School Inspector. The Province is new and has many needs. They are hoping the Project will provide more assistance to its Education system which is operating with poor facilities, lack of well-trained teachers, and little equipment. They indicated that the Esme Sinapa capacity building training for Tari (Hela capital) was useful, but was interrupted by the earthquake and clan conflicts, thus they are very keen to get more support from the Project and from other groups. The Province has developed an Education Plan and would like assistance to monitor the results of its implementation. A workshop to discuss the Education Plan has been conducted and the Project is using workshop results to determine how it best can help the Province. IESC observes that Hela province's education needs are greater than those of Central Province, but lack of capacity at all levels is clearly its greatest need. Consequently, the IESC agrees with the CDS strategy of addressing capacity as its primary contribution, particularly as the Project has experience and proven partners in education system capacity building across a province.

Health Component Activities

Upstream:

- ✓ started construction and refurbishment of 3 targeted health care facilities (Komo, Hides and Juni);
- ✓ responded to basic medical care through PNG Salvation Army health workers;
- ✓ provision of sterilizers to Tari hospital operating room;
- ✓ continued support to 13 students in the Community Health Certificate Program.

Plant Site:

- ✓ institutional strengthening and health awareness programs;
- ✓ awareness raising on key health areas – TB and Malaria;
- ✓ provision of medical equipment to the new health facility at Porebada.

In terms of psycho-social health promotion, the Project is responding to Gender Based violence (GBV) with support to and/or participation in the following activities:

- ✓ Male Champions panel discussion with "the Kumuls" on the theme "Strongpela Man Respektim Meri" ("Strong Men Respect Women");
- ✓ Wanwok coordinated a Lantern Release Event at the Era Kone APEC Precint. Male champion, Sam Koyama spoke as a guest speaker on the theme STAND UP- SPEAK OUT #endthe cycle: stop family violence;
- ✓ Global Campaign against Gender-Based Violence (16 Days of Activism Against Gender Based Violence Campaign);
- ✓ Unconscious Bias awareness.

These activities involve male members of the EMPNG workforce in addressing GBV as recommended in the November 2017 IESC report.

Law and Justice Component

- ✓ Community outreach program by Tertiary Students Association;
- ✓ provision of support to the Village Courts Secretariat, advocacy and awareness around domestic violence, provision of small infrastructure support for district and provincial courts and supporting PNG actors working on law & justice advocacy and leadership.

6.4.2.3 National Content Program Component

Project Strategy

The main objective of the Project's National Content strategy is to replace expatriate staff with PNG citizens through both targeted recruitment and training and development. In addition, national content requirements set out in a National Content Exhibit are contained in agreements with key contractors. The exhibit states that contractors shall "develop and implement a Local and National Content Plan in accordance with the requirements in this Exhibit." The Exhibit requires maximization of employment of PNG citizens in all job categories and sourcing of all PNG works will be in accordance with the requirements of this Exhibit and relevant law. First priority is to be given to local persons (proximate to Company locations), second priority to regional citizens, and third priority to persons

elsewhere in PNG. It also specifies that contractors should give preference to local LANCOs for provision of employees.

CDS is now responsible for reporting on National Content commitments, thus enabling the Project to find synergies and efficiencies, such as linking workforce development and community investment activities (such as Volunteer Program/ Wanwoks Program/ WEN etc.), providing a wider pool of staff to draw from in project execution, and linking the Project's supplier development with other MSME (micro, small and medium enterprises).The Project supported IBBM Enterprise Centre may help with some of the work the Project is doing with households, farmers and local MSME initiatives.

Workforce Statistics

The Project continues to make notable progress toward replacement of expatriate staff with PNG citizens through both targeted recruitment and training and development.

Table 6.1 below shows workforce statistics.

Table 6.1: Workforce Statistics

Statistics on Workforce	Number
Total Workforce across Project	3,295
Foreign Nationals	465
PNG Workforce	2,797(85%)
EMPNG Workforce (direct hire employees or employees from recruiting agencies)	543
3rd Party Contractor Workforce	2,228
PNG Citizens Female workers	539
Origins of PNG Workforce	
Local origin	1,160 (42%)
Regional origin (P2)	902
From non-Project areas	709
Job Categories	
Management Responsible for supervising workers or for managing a SOW)	250
Office	284
Field – Both technical and non-technical roles	2,237

Recruitment and Training

Engineering

The 2018 recruitment program produced 11 new graduate employees. A multi-disciplinary team meets quarterly to discuss staffing and development plans for PNG citizen technical workforce. A detailed 5-year succession plan has been completed and candidates identified for supervisory positions. The formal mentor / buddy program started at the end of 2017 continues. The IESC notes that the mentor/buddy program is greatly appreciated by PNG staff with whom she has spoken. The internship program that trains and evaluates students for future hire has 11 interns hired for 2018-2019 program. Two PNG engineers started expatriate assignments in 2018 (Singapore and Houston).

The Project is working on promoting engineering training in PNG for future LNG operations. To that end, the Project is working with the University of Technology (Unitech in Lae) to become accredited and to improve its currently obsolete facilities. An independent evaluation of Unitech's engineering program has been completed and

discussions are underway for international accreditation for STEM related courses. The Project is also engaging actively to support development of an international accredited engineering program in Port Moresby.

The Project has developed a recruitment database and initiated a Technical Talent Sourcing Initiative in 2017 with a Chartered team to identify options and recommend an engineering sourcing strategy for near, mid and long-term recruitment. Papua New Guinean engineers were recruited at Australian universities for first time in 2017 and recruitment was expanded in 2018 to include new PNG graduates from Chinese and Turkish universities. The engineering scholarship program has also been enhanced.

Operations and Maintenance (O&M) Technician Progress

Current statistics on PNG citizen participation as O&M staff are shown in Table 6.2 below.

Table 6.2: PNG Citizens in O&M Technical Levels

Tech Level	Total in Level	Number
Tech 1	178	55 (31%)
Tech 2	178	107 (50%)
Tech 3	178	15 (8%)
Tech 4	178	1
Progressed to next tech level in 2018	178	49 (28%)

Training Roadmaps have been reviewed and implemented for all crafts. A career progression model is being developed. Some notable accomplishments are:

- ✓ 16 of the 22 Control Room Technicians are filled by PNG citizens, six of whom are female;
- ✓ a second PNG citizen has been promoted to Supervisor level;
- ✓ all scheduler positions are filled by PNG Citizens;
- ✓ 13 Electricians have become qualified to receive PNG Power Licenses;
- ✓ a project Electrical Technician was awarded the 2018 NATTB Best Tradesperson of the Year Award;
- ✓ an Operations Technician is advancing as a WMS Trainer.

The next training intake (fifth) will involve 29 candidates selected for EMPNG sponsorship. The Junior Tech 12 months program began in January 2019. Figure 6.2 shows locations and gender split of the 29 selected candidates.

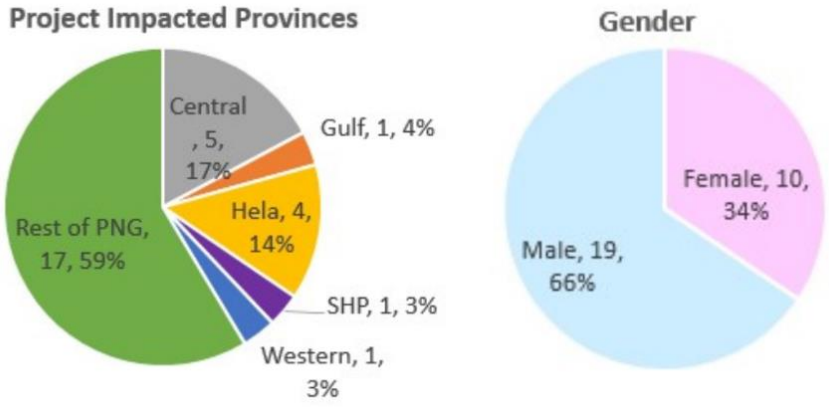

Figure 6.1: Spread of 29 Candidates

Local Procurement and Supplier Development

The Project recognizes that developing local contracting companies brings long term benefits to both PNG and the oil/gas industry. The Project's contributions are part of a long-term focused effort that provides numerous interfaces between the Project and the contractors, well as development of the Project supported Enterprise Centre and Production Contracts Administration Group.

During 2018, more than PGK 563.7 million was spent by EMPNG in-country with Papua New Guinean businesses. Of this, almost PGK181.6 million was spent on services from 16 Lancos and 250 non-Lanco Papua New Guinean businesses for production-related activities and PGK 153.2 to foreign businesses located in PNG.

The Enterprise Centre established in 2010 to help build local business capacity has assisted to date 19,728 local businesses / entrepreneurs, conducted Business Assessments of 656 local businesses and provided 1,268 advisory and mentoring services.

6.4.3 Recommendations

CDS

The IESC recommends that all community development support activities, whether they are implemented by CDS or by another Project unit or the Project as a whole should contribute to the overarching goal of "promoting development of conditions conducive to enhancing economic self-reliance of individuals while also mitigating potential impacts." Many kinds of support can be accommodated within the four CDS components of Livelihood Enhancement, Education, Health and Law & Justice, as long as each activity is agreed based whether it has the potential to contribute directly to achieving the overall and component goals and each selected activity should be evaluated and reported on through a collective process. The Project might develop a special committee (perhaps a community development Stewardship Committee) to give final approval for projects the various units will implement.

National Content

None arising from this review.

6.5 STAKEHOLDER ENGAGEMENT AND CONSULTATION

6.5.1 Project Strategy

The Project commitments with respect to stakeholder engagement are contained in the Stakeholder Engagement Management Plan – Production. This Plan describes the processes and actions applicable during production. The overall objective for stakeholder engagement during Production remains to keep all stakeholders informed with respect to their specific interests, engage people in decisions that directly affect them, and maintain stakeholder confidence and trust in the Project and its activities through open, informative, inclusive and timely communications. A Village Liaison Officer Strategy for the Production Phase supports implementation of the Management Plan and the Land and Community Affairs Plan.

6.5.2 Observations

6.5.2.1 Overview June 2018 – Jan 2019

The number of engagements declined from 2017 in the upstream as the result of mobility restrictions caused by the earthquake, tribal conflicts in Hides, civil unrest in the Komo and Angore areas, law and order issues in Tari township. In POM, the APEC meeting reduced the opportunity for community engagement. The Project conducted 4836 engagements with 213 communities, including 188 communities in the upstream areas, 10 communities in the Plant site area and 15 communities in the vicinity of EM Haus. Engagement topics varied with area with many of upstream engagements addressing Project responses to earthquake impacts, Government benefits, law and order issues, pipeline safety awareness and right of way land access. Engagements with plant site communities focused mainly on monitoring of Government equity benefits, various health/safety issues, and CDS projects and programs. Engagement with communities in Port Moresby/EMHaus discussed the APEC meeting, law and order issues, security and land support for POM based upstream land owners. The engagement topics are consistent with the need for information and other issues as indicated by the nature of the issues submitted to the Project (see Section 6.6 below).

6.5.3 Recommendations

None arising from this review.

6.6 COMMUNITY GRIEVANCE MANAGEMENT

6.6.1 Project Strategy

The Project's grievance mechanism for management of project related individual and community grievances is described in Section 6 of the Stakeholder Engagement Plan. The Community Grievance Mechanism accepts and manages both issues and grievances. Issues are questions, comments, concerns, suggestions, and observations. Grievances are complaints lodged by an individual, group, or community alleging damage, impact, or dissatisfaction resulting from Project actions or a lack of action. A grievance is usually submitted in expectation of a corrective action, compensation or both.

6.6.2 Observations

6.6.2.1 Strategy

The Project applies a Risk-Based Strategy for Issues/Grievances Management as part of OIMS 10-1 based on the premise that community issues can pose significant risk to the business. The steps to effectively manage issues are to:

- ✓ Identify social risk and consider mitigations and work residual risks;
- ✓ Use social data and risk management process to formulate strategy;
- ✓ Implement the approved Strategy;
- ✓ Employ continuous KPI evaluation to ensure meaningful measurement of Grievance.

The Project continues to raise user proficiency in Isometrix IMS to ensure effective data uploads for management and external reports. The Risk-Based strategy will be used to support Expansion Projects (P'nyang, Papua LNG, (Angore) and ensure Foundation Project procedures are appropriately followed.

6.6.2.2 Issues and Grievances

Issues Registered

Issues submitted in 2018 totaled 609, slightly lower than the 878 issues submitted in 2017. In both 2017 and 2018 capturing of issues was affected by a decline in law and order and in 2018 by the earthquake in the highlands and consequent reduction of community engagements possible. The law and order situation has significantly improved in 2019, thus capturing of issues is likely to increase.

Most of the issues submitted relate to the following topics:

- ✓ Land (144/24%) - land compensation, PL RoW management, land access and agreements, and clan disputes;
- ✓ Social (116/19%) - Project employment, community safety;
- ✓ Requests (98/16%) - improvement of schools and other community support, training, scholarships;
- ✓ Economic (100/17%) - Strategic Community Investment activities and initiatives, employment and requests for business development opportunities; and
- ✓ Government (55) 9% - Delayed royalty benefits and other outstanding government issues.

6.6.3 Recommendations

None arising from this review.

6.7 STATE CLAN BENEFITS INTERFACE -UPDATE

6.7.1 Project Strategy

The PNG Government is responsible and accountable for determination and payment of landowner beneficiary royalty and equity dividends. EMPNG's goal is to influence and support the Government in its effort to pay landowner State Cash benefits in accordance to the laws of PNG. Its main challenge in this objective is to help ensure safe, accurate, timely and effective delivery of cash benefits without having any actual control over the process. The IESC notes that the Project's assiduous documentation of its support for the benefit sharing process is critical for risk management.

6.7.2 Observations on Status

The Project's strategy remains to mitigate near-term risk, support resolution of underlying issues, and capture lessons for potential future projects. To these ends, the Project continues to engage in positive engagements with PNG Government and other stakeholders. The involvement of the Judiciary in the process of determining benefit recipients remains a challenge.

The current status of benefit payments is given below:

- ✓ Plant Site:
  - royalty monies paid to all four LNGP site villages in Sept 2017,
  - equity dividends paid to all four LNGP site villages in July 2018;
- ✓ Upstream Petroleum Development License (PDL) areas:
  - PDL1: Clan vetting process (CVP) launched on15 Jan 2019 (clans will be vetted before Ministerial Determinations (MDs) are finalized),
  - PDL 2 and 5/6: CVP/LOB-ID (Landowner Beneficiaries Identification) completed,
  - PDL 4: Currently subject to LTC after Alternative Dispute Resolution (ADR),
  - PDL 7: Field validation completed – Ministerial Determinations (MDS) pending,
  - PDL 8: Another ADR round done mid-2018. One block has disagreements on total clans that is not yet resolved, thus delaying finalization of ADR,
  - PDL 9: CVP/LOBID done for two ethnic groups,
  - PL 4: Onshore pipeline clan vetting completed by end 2017 and MDs finalized. The current plan is to progress up pipeline using same process.

7 LABOR AND HUMAN RESOURCES

7.1 INTRODUCTION

The IESC consulted with a variety of people and groups during its January-February 2019 visit. Activities included the following:

- ✓ information from Project Human Resource and Labor and Workforce related staff; and
- ✓ overnight visits to Moro and HGCP camps and discussions with camp management and selection of workforce living in camps.

7.2 LABOR AND WORKING CONDITIONS

7.2.1 Project Strategy

Project labor commitments are defined in the Labor and Working Conditions Management Plan – Production (the "Plan"). The Plan describes the requirements and expectations in terms of compliance, reporting, roles, supervision and training with respect to labor and working conditions, including camp accommodation. It covers all production activities for Upstream Facilities, the Pipelines and the LNG Plant. This Plan is expected to be adopted and applicable to EMPNG contractors, recognizing that EMPNG's effectiveness in managing third parties will vary in accordance with the leverage EMPNG is able to exercise. To the extent that EMPNG can exert influence over its supply chain, the principles in this Plan will also apply.

The objectives of the Plan are to:

- ✓ promote fair and equitable labor practices for the fair treatment, non-discrimination and equal opportunity of workers;
- ✓ establish, manage and promote a healthy management-worker relationship;
- ✓ protect workers' rights including migrant and third-party workers; and
- ✓ promote healthy, safe, secure and comfortable accommodation that does not impact negatively on the communities in the surrounding area.

7.2.2 Observations

The information received on compliance of policies, procedures, guidelines, and reporting formats covering labor and working conditions to the obligations of IFC PS2, international labor standards, and PNG labor law adequately demonstrates compliance of the Project and its main contractors. Specific labor and working condition features are presented below.

7.2.2.1 Labor Grievance Management

The information received on compliance of policies, procedures, guidelines, and reporting formats covering labor and working conditions to the obligations of IFC PS2, international labor standards, and PNG labor law adequately demonstrates compliance of the Project and its main contractors.

The labor grievance management process remains part of the Project's Procedures & Open Door Communication Policy. Nearly all grievances and issues are initially addressed by immediate supervisors and nearly all are promptly resolved at the supervisor level. In the event an employee is dissatisfied with a response from an immediate supervisor, the employee is entitled to further review by the applicable level of management. No time has been lost to disruption related to grievances or any other form of industrial dispute. Seasonal payroll queries remain the main subject of issues and the number of grievances continues to be very low. There have been no breaches of the Project's harassment policy. The Project continues to conduct sessions on EMPNG's values, policies and guidelines, provide conflict management training and develop the Inclusion & Diversity (I&D) framework.

7.2.3 Recommendations

None arising from this review.

7.3 WORKFORCE ACCOMMODATION

7.3.1 Observations

Workforce field accommodation continues to be well-managed and consistently updated, particularly at the Plant site and HCGP camps. The Plant site camp has completed the upgrades of residence block A. Both HGCP and the Plant camp will install a Pervasive Wi-Fi system. The Plant camp is considering expanding the mess to accommodate a larger number of people, some of whom will be associated with the Expansion. The IESC Social Expert notes that the menus at Moro and HGCP include many high calorie and high salt and sugary food items, but not enough healthy options and portion control is not practiced leading to consumption of very large portions of mostly carbohydrates and high fat meat products. The IESC recognizes that food intake is a difficult issue to address and that the Project continues to work with all camps to ensure that healthy options are available based on a PNG diet. The Project will also roll out a Culture of Health program that promotes a healthy lifestyle to all workers at site. MOH will present the Culture of Health initiatives at the next IESC review.

7.3.2 Recommendations

The IESC requests a meeting during the next IESC visit with camp management and other relevant Project staff to discuss camp food quality and portions. In the meantime, explore the experiences of other projects in dealing with portion control.

8 HEALTH AND SAFETY

The PNG LNG Project has a well-developed program to manage both occupational health and safety of workers, as well as a community health and safety program. The success of both programs has been based on the understanding that community and occupational health and safety are linked and interdependent on one another.

8.1 OCCUPATIONAL HEALTH AND SAFETY

8.1.1 Project Strategy

Occupational health and safety are managed independently of the Production ESMP within the ExxonMobil Operations Integrity Management System (OIMS), which is summarized within the ESMP such that the linkages between OIMS and environmental and social management are well defined. The ultimate goal of managing personnel safety is to achieve an incident-free workplace where “Nobody Gets Hurt”. Specific, measurable objectives that contribute to this goal are:

- ✓ reduce at-risk behavior (both on and off-the-job) and manage hazards associated with the work environment to significantly reduce Occupational Integrity (OI) risks; and
- ✓ hazard identification and correction programs are comprehensive and widely used across the Unit.

OIMS also provides the structure for identifying and managing health exposures with the following goals:

- ✓ protect the health of personnel on company premises and the public in proximity to our operations from adverse health effects that may result from our operations; and
- ✓ protect the personnel on company premises from environmental and health hazards prevailing in the environment.

The concept of protecting company personnel from health hazards prevailing in the environment is recognition that there needs to be a linkage between occupational and community health programs.

8.1.2 Observations

8.1.2.1 Worker Safety

EMPNG Production safety performance through Q4 2018 continues to be excellent. There were no Lost Time Incidents (LTIs) that took place in all of 2018 with close to 12 million man-hours worked. Twelve recordable injuries took place in 2017. Six took place in 2018 and the Total Recordable Incident Rate (TRIR) correspondingly decreased by 50% from 2017 to 2018. There was a slight increase in first aid cased, due mainly to the earthquake. This is a remarkable testament to a robust safety program.

8.1.2.2 Worker Health

The occupational health program is world class and continues to perform well in all areas (clinical operations, public health and industrial hygiene). In 2018 there were no recordable incidents due to occupational illnesses. Clinical services, pathology and medical emergency response is maintained at the highest level across all camp clinics with continued efforts to keep up with the latest in medicine. The Robust Infectious Diseases Outbreak Management program was successfully implemented in November 2018 with successful containment of a norovirus outbreak at HGCP. The Malaria Control Program has been revised to reflect a revised risk profile in Port Moresby allowing Port Moresby-based non-immunes to be excluded from the Malaria Chemoprophylaxis Compliance Program. Although the risk is not as great as previously assessed, it is still a risk and the malaria control program undertaken by MosquitoZone has been expanded into community training undertaken around the LNG Plant with the distribution of 2,400 treated mosquito nets. 2019 is proposed to be the start of a Culture of Health Program.

8.1.2.3 Recommendations

The H&S program continues to be implemented as a “best practice” system. We do not offer any recommendations arising from the present review.

8.2 COMMUNITY HEALTH

8.2.1 Observations

EMPNG has maintained a robust community health program, now reflected as a component to the CDS program, over the course of the entire PNG LNG project, as documented in past IESC reports. Where the project had a major contribution to community health in 2018 was the response to the February 2018 earthquake.

One of the results of the February earthquake was to highlight inadequacies in Hela Province health infrastructure and the Project is investing K2.3 million to rebuild and equip three local health centers as part of its on-going support to invest in infrastructure improvements and support earthquake affected communities. The Mananda and Para sub health centers are managed by the Evangelical Church of PNG (ECPNG) while the Juni sub health center is staffed and operated by National Department of Health through the Hela Provincial Health Authority. EMPNGs strong short-term humanitarian response included provision of food, drinking water, medical items, and monetary aid. EMPNG's community partners in this effort included the UN International Organization for Migration, United Church PNG, Salvation Army PNG, Adventist Development Relief Agency (ADRA PNG), ANU Enterprise (ANUE) and Caritas PNG.

The health support in response to the earthquake has tied in with long-term community development support to the health sector in the Upstream area. In the LNG Plant area support has related to institutional strengthening and health awareness. The health awareness programs have focused on TB and malaria. EMPNG is also complimenting a construction project of new health facility for Porebada with supply of new medical equipment.

8.2.2 Recommendations

None arising from this review.

9 CULTURAL HERITAGE

9.1 PROJECT STRATEGY

Production has adopted Cultural Heritage (CH) Program from Construction:

- ✓ Cultural Heritage Management Protocol;
- ✓ Cultural Heritage Investigation and Salvage Protocol; and
- ✓ Chance Finds Protocol.

EMPNG's objectives are to avoid impacts to cultural heritage sites, including archaeological and oral tradition sites and to manage cultural heritage sites in consultation with landowners.

9.2 OBSERVATIONS

Cultural heritage surveys have continued to be undertaken in association with the PNG LNG Project, most recently for the gas pipeline to the Niu Power Plant. Surveys along the pipeline route, the power plant site, and access road were undertaken in November 2016. In October 2018 additional surveys were undertaken along the transmission line route involving a small group of archaeologists (three in total) walking 10 m apart along the proposed transmission line easement. Sites that contained archaeological material were tagged and further investigated where the type and extent of artefacts present were recorded for each site, and GPS co-ordinates collected. Based on the ground surveys, the archaeologists then classified the significance of each of the site to determine appropriate mitigation measures Sites were predominately isolated surface flake scatters or shell material, although pottery shards and stone artefacts were recorded. All sites were considered to be of low significance and are being managed as per EMPNG's Cultural Heritage Management Plant.

Appendix A
IESC 18th Monitoring Visit
Trip Summary

Doc. No. 16-1274-H3 Rev. 0 - July 2019

TRIP SUMMARY

Sunday/Monday January 27-28:

Travel to Port Moresby (POM). Team arrives .

Tuesday January 29:

Briefings on project status, earthquake recovery and ongoing activities made to the entire team. Separate environmental and social discussions in the afternoon

Wednesday January 30:

IESC Environmental Team - POM – updates on current environmental and biodiversity activities presented by EMPNG. Overnight in POM; K. Connor travels to HGCP via Moro, undertakes field visit in Moro/Kutubu area. Overnight at Moro.

Thursday January 31:

IESC Environmental Team flies to Komo, undertakes Komo Airport inspection and participates in a pipeline flyover and spineline visits – overnight in HGCP; K. Connor checks out Moro Camp, undertakes flyover of pipeline route to observe earthquake damage on the way to Tari to with Provincial education officers and with INFRA Architecture (assessment for Tari market) . Overnight in HGCP.

Friday February 1:

IESC Environmental and Social Team – flies to POM in morning; the Environmental Team receives EMP update in afternoon; K. Connor has discussions with Salvation Army and United Nations / International Organization for Migration (IOM) and reviews community engagements and the grievance process with EMPNG staff. Overnight in POM.

Saturday February 2:

IESC Environmental Team tours the LNG Plant and returns to POM. K. Connor visits LNG Plant and surrounding communities and has a meeting with LABA Holdings on potential liaison with plant area sewing group. Overnight in POM.

Sunday February 3:

Miscellaneous communication with EMPNG staff by entire team and preparation for Closeout meeting.

Monday February 4:

Closeout meeting in morning; IESC team departure.

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