



REPORT OF THE:

INDEPENDENT ENVIRONMENTAL & SOCIAL CONSULTANT

ENVIRONMENTAL & SOCIAL COMPLIANCE MONITORING

PAPUA NEW GUINEA LNG PROJECT

Site Visit: October - November 2017



Prepared for

Export-Import Bank of the United States

Export Finance and Insurance Corporation

Japan Bank for International Cooperation

Società Italiana di Assicurazione dei Crediti all'Esportazione

Export-Import Bank of China

Nippon Export and Investment Insurance

Commercial Banks

REPORT OF THE INDEPENDENT ENVIRONMENTAL & SOCIAL CONSULTANT

ENVIRONMENTAL & SOCIAL COMPLIANCE MONITORING

Papua New Guinea LNG Project

Papua New Guinea

Site Visit: October - November 2017

Prepared for: Export-Import Bank of the United States
Export Finance and Insurance Corporation
Japan Bank for International Cooperation
Società Italiana di Assicurazione dei Crediti all'Esportazione
Export-Import Bank of China
Nippon Export and Investment Insurance
Commercial Banks

Prepared by: RINA Consulting S.p.A.
Via San Nazaro, 19
16145 Genova, Italia
www.rina.it

Monitoring Team Members:

Giovanni De Franchi – Team Lead – (not present)
William J. Johnson – Field Team Lead, Earth Scientist/EHS Management System Specialist
Kerry Connor – Social Development Specialist
Louise Johnson – Biodiversity and Natural Resource Management Specialist

Revision 2 – April 2018
Document No. 16-1274-H2

TABLE OF CONTENTS

TABLES	4
FIGURES	4
ACRONYMS	5
EXECUTIVE SUMMARY AND CONCLUSIONS	7
1 INTRODUCTION	16
1.1 PRODUCTION OPERATIONS OVERVIEW	17
1.2 SOURCES OF INFORMATION	17
1.3 REPORT ORGANIZATION	17
2 ISSUES TABLE	19
3 ENVIRONMENTAL AND SOCIAL MANAGEMENT	22
3.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM	22
3.2 MANAGEMENT OF CHANGE	22
3.3 INCIDENTS	22
3.4 EMERGENCY RESPONSE	23
4 POLLUTION PREVENTION	24
4.1 WASTE AND WASTEWATER MANAGEMENT	24
4.1.1 PROJECT STRATEGY	24
4.1.2 OBSERVATIONS	24
4.1.3 RECOMMENDATION	27
4.2 HAZARDOUS MATERIALS MANAGEMENT AND SPILL PREVENTION	27
4.2.1 PROJECT STRATEGY	27
4.2.2 OBSERVATIONS	27
4.3 AIR QUALITY AND NOISE	28
4.3.1 PROJECT STRATEGY	28
4.3.2 OBSERVATIONS	28
4.4 EROSION AND SEDIMENT CONTROL	29
4.4.1 PROJECT STRATEGY	29
4.4.2 OBSERVATIONS	29
4.4.3 RECOMMENDATIONS	29
5 BIODIVERSITY AND ECOLOGICAL MANAGEMENT	30
5.1 INTRODUCTION	30
5.2 BIODIVERSITY STRATEGY INCLUDING OFFSETS	30
5.2.1 PROJECT STRATEGY	30
5.2.2 OBSERVATIONS	31
5.2.3 RECOMMENDATIONS	33
5.3 BIODIVERSITY IMPLEMENTATION AND MONITORING PROGRAM	34
5.3.1 PROJECT STRATEGY	34
5.3.2 OBSERVATIONS:	34
5.3.3 RECOMMENDATIONS	36
5.4 INDUCED ACCESS	36
5.4.1 PROJECT STRATEGY	36
5.4.2 OBSERVATIONS	37
5.4.3 RECOMMENDATIONS	40
5.5 REINSTATEMENT AND REGENERATION	41
5.5.1 PROJECT STRATEGY	41
5.5.2 OBSERVATIONS	41
5.5.3 RECOMMENDATION	42
5.6 INVASIVE SPECIES, PESTS AND PLANT PATHOGENS	42

5.6.1	PROJECT STRATEGY	42
5.6.2	OBSERVATIONS.....	42
5.6.3	RECOMMENDATIONS	47
6	SOCIAL.....	48
6.1	INTRODUCTION	48
6.1.1	SCOPE OF SOCIAL REVIEW FOR THIS SITE VISIT	48
6.1.2	WAIVER	48
6.2	LAND ACCESS, RESETTLEMENT, AND LIVELIHOOD RESTORATION - STRUCTURE	48
6.2.1	PROJECT STRATEGY	48
6.2.2	OBSERVATIONS.....	49
6.2.3	RECOMMENDATIONS	49
6.3	MANAGEMENT OF DISPLACEMENT IMPACTS	49
6.3.1	OBSERVATIONS.....	49
6.3.2	RECOMMENDATIONS	50
6.4	COMMUNITY IMPACTS MANAGEMENT AND SECURITY.....	50
6.4.1	PROJECT STRATEGY	50
6.4.2	OBSERVATIONS.....	50
6.4.3	RECOMMENDATIONS	51
6.5	COMMUNITY DEVELOPMENT SUPPORT PROGRAM.....	51
6.5.1	PROJECT STRATEGY	51
6.5.2	OBSERVATIONS.....	51
6.5.3	RECOMMENDATIONS	57
6.6	STAKEHOLDER ENGAGEMENT AND CONSULTATION	58
6.6.1	PROJECT STRATEGY	58
6.6.2	OBSERVATIONS.....	58
6.6.3	RECOMMENDATIONS	59
6.7	COMMUNITY GRIEVANCE MANAGEMENT	59
6.7.1	PROJECT STRATEGY	59
6.7.2	OBSERVATIONS.....	59
6.7.3	RECOMMENDATIONS	60
6.8	STATE CLAN BENEFITS INTERFACE -UPDATE.....	60
6.8.1	PROJECT STRATEGY	60
6.8.2	OBSERVATIONS ON STATUS	60
7	LABOR AND HUMAN RESOURCES	62
7.1	INTRODUCTION	62
7.2	LABOR AND WORKING CONDITIONS	62
7.2.1	PROJECT STRATEGY	62
7.2.2	OBSERVATIONS.....	62
7.2.3	RECOMMENDATIONS	64
7.3	PROCUREMENT AND SUPPLIERS	64
7.3.1	PROJECT STRATEGY	64
7.3.2	OBSERVATIONS.....	64
7.3.3	RECOMMENDATIONS	64
7.4	NATIONAL CONTENT	64
7.4.1	PROJECT STRATEGY	64
7.4.2	OBSERVATIONS.....	65
7.4.3	RECOMMENDATIONS	67
7.5	WORKFORCE ACCOMMODATION.....	67

7.5.1	OBSERVATIONS.....	67
7.5.2	RECOMMENDATIONS	68
8	HEALTH AND SAFETY.....	69
8.1	OCCUPATIONAL HEALTH AND SAFETY	69
8.1.1	PROJECT STRATEGY	69
8.1.2	OBSERVATIONS.....	69
8.1.3	RECOMMENDATIONS	70
8.2	COMMUNITY HEALTH.....	70
8.2.1	OBSERVATIONS.....	70
8.2.2	RECOMMENDATIONS	71
9	CULTURAL HERITAGE	72
9.1	PROJECT STRATEGY	72
9.2	OBSERVATIONS.....	72

APPENDIX A: IESC 17th MONITORING VISIT – TRIP SUMMARY

TABLES

TABLE 5.1: STATUS OF ACCESS CONTROLS/MONITORS	37
---	----

FIGURES

FIGURE 4.1: PROJECT WASTE PROFILE (Q4 2016 THROUGH Q3 2017)	25
FIGURE 4.2: FLARE VOLUMES THROUGH SEPTEMBER 2017	28
FIGURE 4.3: NEW E&S CONTROLS AT THE HGCP	29
FIGURE 5.1: NUMBERS OF ROAD USERS BY PURPOSE-TYPE	39
FIGURE 5.2: BREAKDOWN OF VEHICLE USERS BY REASON FOR TRAVEL	39
FIGURE 5.3: NUMBERS OF VEHICLES USING SOUTHERN HIGHWAY FOR THROUGH PASSAGE FROM GOBE TO MORO	40
FIGURE 5.4: PRIORITY-1 WEED SPECIES ABUNDANCE ACROSS AUDITS TO 2016 (BIOTROPICA 2017)	44
FIGURE 5.5: PROPORTION OF CONSIGNMENTS REQUIRING INSPECTION BY NAQIA	46
FIGURE 5.6: INSPECTION OUTCOMES	46

ACRONYMS

AGI	Above-Ground Installation
ANUE	ANUedge–Australian National University Social development initiative
BEC	Business Enterprise Centre
BIMP	Biodiversity Implementation and Monitoring Program
BMP	Biodiversity Monitoring Plan
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
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
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 AND CONCLUSIONS

This report represents the seventeenth 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 October 23 – November 1, 2017 in PNG. IESC visits during the Production phase of the PNG LNG Project are taken annually and the last visit was in November 2016.

Production continues with stable operations reflected by the steady increase in Plant production, about 20% above the design capacity of 6.9 MTA. Approximately 8.2 MTA of production is estimated for all of 2017 with record production in August of ~ 8.6 MTA equivalent. The 300th LNG cargo load took place in May 2017 with an additional 108 expected for 2017. Downtime incidents as took place in 2016 have not happened in 2017.

Environmental and Social Management System (ESMS)

The Environmental and Social Management System (ESMS) for the PNG LNG Project is a mature and functioning system as described in previous IESC reports. As discussed in the last IESC report for the November 2016 field visit, the Production Environmental and Social Management Plan (ESMP) is not suitable for construction, other than at a small scale, and we recommended that an Addendum to the Construction ESMP be developed to cover the construction of the Angore Flowlines. This approach was followed by EMPNG and a new Construction Addendum ESMP is now being implemented in the field for the new development at Angore. During this field visit continuous improvement in terms of implementation of the ESMP to contractors was positively observed.

Government Acquisition of Project Infrastructure

With respect to the anticipated turnover of Project infrastructure to the PNG Government, as described in the last IESC field report, no activity has taken place. The PNG Government has not occupied any of the infrastructure and the status quo is being maintained. Nevertheless, the takeover of Project infrastructure is still expected to take place and the IESC position remains the same, that the opening of the Project-controlled Gobe to Kantobo Road to be potentially a more serious impact than the handover of the Kaiam bridge over the Kikori River. The MOC associated with this action must be considered a Class I MOC.

Pollution Prevention

The only significant observations from this IESC field visit are with respect to waste and wastewater management. With respect to Upstream waste management, EMPNG has asked that the IESC approve collaboration with OSL such that some OSL wastes are managed by EMPNG and some EMPNG waste, specifically those generated at Moro Camp B, are managed by OSL. As part of this field visit, the IESC reviewed OSL waste management capabilities and the basic observation is that OSL operations have greatly improved. The IESC will certify this synergy between OSL and EMPNG. EMPNG is also looking at a possible long-term solution to waste management by providing support to Total Waste Management (TWM), their current third-party waste management contractor, in their plan to develop an integrated waste management facility at a brownfield location between the LNG Plant and POM. This facility would not only service EMPNG, but also other industrial clients. Both the proposed Upstream and LNG Plant waste management concepts offer the possibility of environmental benefits that go beyond just the PNG LNG Project and the IESC therefore encourages that both concepts go forward.

Wastewater management over the course of 2017 has become problematic. 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) that have been flagged during internal inspections and audits. With the exception of Angore, the WWTPs are permanent facilities. Their performance is currently no better and possibly worse than was achieved during the construction phase when treatment was made with temporary units. Short-term off-spec discharges were common during construction, but this should not be the case for permanent WWTPs.

The issue of the presence of amines in the process water from the LNG Plant discussed in detail in the IESC report from November 2016 is being resolved. Amine discharge into Caution Bay ceased in December 2016 and an engineered solution to eliminate discharge of amines has a target completion Q1 2018. A problem at the LNG Plant is the retention pond where the off-spec sewage discharge, water from the desalinization plant, amines and OWS discharge are causing problems related to algae growth and poor water quality. Cleaning is difficult due to the liner, but a solution needs to be found to assure that off-spec water will not at some stage need to be released into Caution Bay.

The remaining topics that fall under the category of pollution prevention continue to be well managed. Stack emissions testing shows compliance with standards. Flaring is generally well below internal Project standards. Ambient air monitoring is also showing good test results and 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. The only IESC observation to this is that if the decision is made to set aside the commitment to undertake ambient air monitoring at least as often as every five years, then it will be necessary to prepare an MOC.

Erosion and Sediment Control

Erosion and sediment control has been one of the most difficult issues to manage over the course of the Project. The problems have traditionally been the most severe at HGCP and Komo. Control systems are now in place and E&S management is now fully in the realm of maintenance.

Ecological Management and Biodiversity

The biodiversity offset technical rationale continues to strengthen, and a representative biodiversity gain accounting methodology is being further explored with the use of remote sensing imagery. Progress has been made in several offset components workplans: a key deliverable has been completed by NGO partner WCS to prioritize protected area candidates in the Kikori River basin (re-engagement with CEPA is necessary to maintain alignment); further Communicating Conservation meetings and newsletters continue to provide opportunities for enhanced knowledge sharing; additional capacity building workshops to support the Lake Kutubu Wildlife Management Area committee have been coordinated and run by NGO partner IBR, and the WMA's prioritized ecosystem services have been identified – the committee have been successful in applying for several grants to fund early work activities, and are participating in a community-led management approach to help reduce the potentially catastrophic impacts of tilapia on the endemic fish populations; early engagements with communities in the Lower Kikori continue with a view to building towards future protected area initiatives; for EMPNG to make progress in their commitments for residual biodiversity impacts at the upper elevation zone, we now believe efforts to determine and establish appropriate candidate sites for demonstrable biodiversity gain would benefit from additional priority and internal resources.

The new ground disturbance procedures are being implemented at Angore, and required contractor responsibilities agreed. The recent loss of EMPNG's local biodiversity/GIS specialist leaves the team under-resourced; GIS support is being provided by ExxonMobil Australia and recruitment is underway. Several planned monitoring campaigns were undertaken during 2017 including remote sensing imagery capture and analysis, and rapid biodiversity assessments of sites surveyed in 2015 plus new sites where field surveys will help assess biodiversity values at offset locations. Violence and security concerns have restricted field surveys and impact-verification follow-up visits, so some field-work has been rescheduled. Survey reports by PMA-1 and PMA-3 external specialists are due to be completed by mid-2018. Clarity on the current scope of PMA-2 has been provided.

Recommendations focus on: closer liaison with OSL and WMA Committee on community management approaches for endemic fish species; increased prioritization and resources focused at the biodiversity offset upper elevation zone; and, ensuring that decision frameworks used to determine which impacts are attributable to the project are transparent, repeatable and defensible.

Induced Access

EMPNG reports there have been no observed signs of logging adjacent to the RoW and no bypassing of project gates or padlock tampering. At Benaria (near MLV-1) the anticipated removal of the temporary construction bridge removing access to the RoW has not yet occurred. EMPNG's commitment to control vehicle access to prevent third party damage requires them to investigate instances of unauthorized vehicle tracks on the RoW – these continue to be tracked and community liaison officers work with the community to ensure access restrictions are respected. As reported last year, EMPNG continues to need to work with communities around the Angore wellpads to resolve vehicular access incursions. We observed vehicle tracks at the pipeline landfall at the LNG Plant (where mangrove trees had been removed by some members of the community), at Angore between KP12 and KP14 (where the boom gate remains open, allowing easier access for EMPNG traffic), and at KP5 at a small village at the junction of the RoW and the regenerating RoW construction track – EMPNG are following up with communities at each these locations, and continuing to monitor the full length of the RoW.

Vehicle data gathered by monitors at open EMPNG gates at Gobe indicate a decrease in the number of vehicles requiring access along the project road, and a reducing trend in vehicles continuing up the road towards Moro – however for 1Q 2017 most vehicles entering at Gobe continued right up to the OSL gate beyond Kantobo.

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. EMPNG have completed their environmental and social risk assessment.

Recommendations focus on: 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

Natural regeneration of reinstated areas continues to progress well, with slope stability and elevation being the primary factors in determining success. Increased vegetation diversity was noted during the visit to Hides Ridge. RoW revegetation generally appeared good from our overflight between Hides Ridge and Moro, and we were especially encouraged to see the extent of vegetation coverage on the steep RoW and road side-cast slopes near Homa. We were unable to visit restablized areas at Komo.

Regeneration of mangrove roots and stands is progressing at the LNG Plant, as evidenced by photo points established previously – however, vehicle tracks continue to be observed near the pipeline landfall in the backshore area. Possibly associated with these tracks, community members have felled trees at the edge of the mangrove stands directly on the RoW – community liaison officers and environmental staff are engaging with local villages to ensure this is curtailed, as these mangrove edges are particularly vulnerable and offer protection to trees further from the RoW. The sandalwood tree noted in the EIS is being monitored for potentially fatal fire-damage from a recent scrub burn. Security cameras are being utilized to track incursions at the RoW and backshore area.

The second regeneration monitoring campaign was started earlier in 2017 and a second phase will be completed before year end. The external specialist's survey report is due to be available mid-2018.

There are no recommendations for this topic.

Invasive Species and Quarantine Management

EMPNG's review of their weed audit and management processes has continued in 2017. EMPNG notified the IESC that a key finding of this review was the term 'abundance' has been inconsistently applied during

external weed audits prior to Audit 10. They advised the implication of this is that observations relating to trends over the monitoring period Audits 1-9 are now limited to a simple presence/absence of a suite of significant priority weeds. As one of the major potential indirect impacts noted in the EIS was the invasion and spread of exotic weeds, this error is unfortunate. Reliance on this data may have reduced the effectiveness of some management interventions, including resource allocation. Previous audits have indicated the RoW and road to be one of the pathways for the spread of certain P1 from lowlands to Highlands. EMPNG have advised that not all weed data from the pre-construction surveys (PCS) have been included within the 'baseline' against which audits are compared back to – they advise this has resulted in some weeds previously identified as 'new finds' in an area may have already pre-existed in the area. Therefore the inconsistencies flagged during this trip, the data errors that came to light for our 2015 and 2016 trips, the baseline reference datasets shown to not be complete (or fully representative of the pre-construction 'state'), all influence our confidence in the data. For example, information indicating where P1 outbreaks have remained beyond the post-construction early-succession regeneration phase, and what the potential implications of this might be on the local ecology, have not been presented to us so we are not able to determine the efficacy of EMPNG's considerable efforts in mitigating invasive species impacts (see Observation).

EMPNG propose to reduce the scope of weed audits now that the RoW is regenerating, moving to focus instead only on priority ecosystem areas such as Lake Kutubu, Homa-Benaria area, Hides Spine, and main above ground installations. With the recent review findings summarized above, coupled with reduced monitoring/control due to security challenges and lack of vehicular access, we do not believe it is prudent to discontinue the assessment of weeds in any RoW/access areas at this time. We would caution against a reduction in scope of future audits along the RoW/access until more clarity is available on reliability of weed data and weed presence/persistence across and within the various WMZs.

Weed audit 10 was conducted in Oct 2016 and the audit report was sent to IESC earlier in 2017. No new weed species have been observed, and no range extensions between WMZ's. Following the review, the re-evaluation of all presence/absence data across all audits indicates that abundance of P1 weeds is declining, where abundance is defined as the number of sites where a P1 species is observed, expressed as a percentage of all sites surveyed. Two weeds in particular are consistently found more frequently: in Audit 10, *Piper aduncum* was found at 40% of sites and *Desmodium sequax* at 34% of sites. Permanent plots are now used to monitor weeds, in addition to the more unstructured walkabout observations of targeted areas along the RoW. Audit 11 is due to occur shortly. Following Audit 11, EMPNG state they intend to change the external weed audit provider following a handover.

We visited with MosquitoZone at Lake Kutubu to discuss their invasive species control on behalf of EMPNG – this was useful to better understand their work in the field. Field access for both internal staff and contractor weed monitoring/control is proving challenging due to security restrictions in some areas, and significant control areas should be prioritized when access is safe. Cane toad presence at several EMPNG sites is still proving a challenge. Vegetation Management Plans are being developed for EMPNG facilities.

Community awareness and training is ongoing. The 'Exotic Plants of the Kikori River Basin' book has been published by Biotropica and NAQIA, an excellent resource supported by EMPNG.

Import shipment volumes have declined since the end of construction, although they do fluctuate – for example with Angore shipments last year, and the anticipated increased volumes in 2018 due to planned production shutdowns and associated maintenance needs. The need for further fumigation once shipments have arrived within PNG and inspected by NAQIA is still proving a challenge.

Recommendations (in addition to the Observation M17.3) focus on: not reducing the scope of future weed audits at this time; prioritized availability of vehicles to target known areas requiring weed control around Homa; and, additional intervention and prioritized dialogue on quarantine requirements with freight forwards.

Resettlement

The IESC concludes that the Project's obligations under IFC PS5 (Land Acquisition and Involuntary Resettlement) have been fulfilled for the original Foundation Project, including the Angore Tie-In and associated potential landslip area). Resettlement for the original Foundation Project has been completed by closure of the obligations identified through internal outcome evaluation, IESC field verifications, and an external audit. Angore Tie-In resettlement is closed based on internal outcome evaluation and IESC assessment of evaluation results. Voluntary "resettlement" of a few mainly speculative structures in a potential landslip area near to but outside of the Angore Tie-in construction footprint is also completed with the payment of speculator rate compensation.

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.

Insecure conditions represent an escalating source of risk to communities, particularly in the upstream communities where tribal fighting has become more frequent and protracted. The Project recognizes that it is not in a position to control the behavior of local people, but it takes actions to protect the Project and its workforce and to help local communities understand the value of managing conflict in a way that is more beneficial than the physical combat between clans that has been the traditional approach. The Project continues to monitor the situation interacting with Security forces, as well as supporting the CDS Law and Justice components. The Project has also established Community Volunteer Committees from Hides and Komo in order to acquire community input on the triggers of tribal violence.

Community Development Support

USD 2.75 million is allocated for 2017 projects and, though 90% of projects have been approved, only 45% of the budget has been expended due largely to tribal fighting constraints on movement in upstream areas, problems securing land for new facilities in the LNG Plant area villages and some operational inefficiencies. CDS activities, none the less, are showing signs of bringing significant improvements in the longer term. Government, for example, has become more engaged, collaborative, and positive about partnerships. Community understanding of CDS program goals and content is generating more support and higher participation levels, for example, upstream communities are supporting a planned long term water supply project. The number of males participating in the original women's livelihood projects is significantly increasing as a result of the income potential and more youths are involved in social programs and long term life skills initiatives.

IESC recommends that each CDS component be given a specific goal and objectives (actions taken to achieve the goal) and identify the indicators needed to objectively measure progress toward achieving the goal. Monitoring and evaluation should be formalized in a CDS M&E Procedure (as was done for resettlement) to ensure consistency throughout Components.

Livelihood component results *upstream* include 15 Community Groups capable of growing a variety of fresh produce, 13 Community Groups earning income through regular sale of produce, the PDL 1 Women's Association registered as a produce supplier to the HGDC camp, six groups able to develop small enterprises (rural women's bakery, flour milling) and 77 women successfully completed sewing machine maintenance training and can train others in their respective women's groups. The Needs Assessment for the Women's Empowerment program was completed and a findings report submitted. CDS projects in the LNG plant site area have focused on education and education/health infrastructure. The main *livelihood* activity was a modest vegetable gardening project that produced improvements to participating households' subsistence and some modest income increases.

The Project commissioned an independent assessment of the Livelihood component to date which has resulted in a strategy reassessment for the mid-term program. Assessment results are generally positive on the **upstream** livelihood program, but results for the **LNG Plant area** village's program were less positive and recommended a fundamental review of strategy. Through a Project Management Workshop, the Project addressed the main issues – plant area activities should be based on a more solid problem and opportunity analysis and upstream activities should be reviewed to clarify objectives and include a focus on youth. The CDS team is in the process of developing and expects to complete a *Livelihood Program Strategy Document* in Q1 2018 based on a deeper situational analysis that will define projects per site with indicators and means of verification and stakeholder input. The Project has already taken on board many of the recommendations and is addressing them in 2018 CDS planning.

Recommendations for the livelihood program focus on the preferred period (5 years) for the Interim phase, expanding upstream markets in the next three years, the use of advanced agricultural participants as extension providers, livelihood projects for Plant site villages, working with the plant area village benefits Resource Managers on infrastructure projects and augmentation of CDS field staff.

The CDS **Education** component has focused to date on infrastructure improvements and capacity building in the form of the School Board of Management training program in the LNG Plant area and an external needs assessment for upstream areas. Outputs to date include completion of the training of 132 community participants; formal agreement of Central Province to roll out the School Board of Management training across the Province; development of the School Board of Management Training Manual, endorsed by the Central Provincial Government and the National Education Department.

EMPNG signed a PGK30,000 funding agreement with the Central Provincial Government to implement the School Board of Management training program in the Central Province schools.

EMPNG is also helping to expand the School Board of Management training program to the Hela Province. In April, approximately 30 representatives from the Hela Provincial Government completed introductory training in Tari, with 10 schools in Komo, Angore and Hides trailing the training program in late 2017.

The **Health** component has provided scholarships for training new community health workers through the PNG LNG Scholarship program, as well as for infrastructure support for water facilities for three health institutions (two upstream and one plant site villages), health center refurbishments and solar power for four health institutions (three upstream and one plant site village) and awareness and donations to a number of projects. The program will continue to offer scholarship opportunities in Community Health Care and upgrade targeted health care facilities and will introduce improvements in health data collection/management working with either health facilities and/or with the provincial health authorities.

The **Law and Justice** component promotes community capacity to self-regulate and manage law and justice. This is particularly important in the Project's upstream areas where law and justice mechanisms are weak and further challenged by a combination of tribal fighting and domestic violence, thereby threatening people's safety as well as undermining economic and social development. The Law and Justice component has indirectly addressed the effects of insecure conditions through the other components of the CDS that seek to enhance livelihoods, health conditions and education levels. The Project also supports Governmental and non-governmental agencies in their efforts to address law and justice and plans to support Country donors doing peace and conflict work in the Highlands. CDS works closely with the Community Affairs unit to effectively use the recently formed Hides and Komo Volunteer Committees to identify a law and justice project.

The 2016 IESC report recommended that the Project consider addressing domestic violence as part of the law and justice component through an awareness and advocacy strategy that draws on selected male PNG staff as champions against domestic violence. The Project is in the process of determining its strategy for both domestic and tribal violence. The IESC recommends that the CDS Law and Justice component in collaboration with PNG LNG Security find a way to more directly address violence by consulting with a

representative group of the PNG workforce (especially younger people) on an approach to raise awareness of the negative consequences of violence against women/children, as well as of tribal fighting.

Stakeholder Engagement and Consultation

The IESC compliments Project leadership and staff on the collaborative effort between Community Affairs and other project units in conducting engagements on specific topics. PNG continues its wide and frequent engagement with stakeholders. Project engagements in 2017 with communities, its closest stakeholders, total to date 7,281 involving 172 communities and 62,033 participants. Participant numbers are considerably less than at this time in 2016 largely because people were focused on the 2017 National elections, travel and access constraints in upstream areas associated with tribal fighting, and protests at the LNG Plant area villages over the delay in Royalty payments.

The Project responded to IESC's concerns regarding potential in-migration facilitated by opening of Project built roads. In-migration monitoring shows that in-migration has been limited.

Community Grievance Management

Issues submitted to the Project to date in 2017 total 642, significantly less than in the past two years, though expected to rise as competence of the new Isometrix Issue Management System increases. Most of the issues involved land access/agreements, pipeline ROW Caretaking activities, Community Investments, employment, business opportunities, community health/safety, training and scholarships and delayed royalty payments. The number of **grievances** has steadily declined since 2014 with 32 grievances filed to date this year, five less than at this period in 2016. The declines are attributed to the reduction in work fronts and steady state operations during Production. As more work fronts are added, the Project anticipates an increase in grievances. Though the overall number of grievances declined, there has been a recent increase in grievances in the upstream areas (Hides and Angore) that is being assessed. Main topics of grievances include environmental (various water related issues, emissions such as flaring, traffic management, helicopter rotor down-draft impact and landslip at Pipeline ROW KP10), land (land rentals/deprivation payment related claims and damage at laydown and quarry), as well as some other individual complaints.

Grievance closure rate achieved the 75% target rate. Ten grievances required more than 30 days to close and three remain open because they require detailed field inspections and/or need frequent engagements and involvement of various parties. The IESC was given, as requested in the IESC 2016 Report, and reviewed the details on open or lengthy cases and accepts the Project decisions.

Grievance and Issues management will support the new EMPNG developments in PNG, as well as ensure Foundation Project procedures are appropriately followed and lessons are learned and incorporated in management methods.

Benefit Sharing

The distribution process for payment of royalty monies to landowners in the Project affected areas has recently progressed. Payment of royalties (current and back payment) was made to LNG Plant area villages on 13 September 2017. The IESC met with the Benefits Resource Managers for each village who supervise development of proposals from their respective villages for use of monies from the Common Fund for community improvements. The discussion indicated that the Managers are knowledgeable and active in assessing the most strategic use of these monies and that they are keen to discuss co-funding of infrastructure projects with the Project. The IESC believes co-funding would be useful to keep the Project abreast on village supported projects.

Progress has also been made toward payment of royalties to upstream clans, though some legal issues remain to be resolved. The Minister for Petroleum has publically stated that his "Department [is] focused on resumption and completion of the program [in] the upstream Project areas [when] the National Executive Council (NEC) has approved the funding". The Project's strategy remains to mitigate near-term risk, support resolution of underlying issues, and capture lessons for potential future projects. The Project

also continues its advocacy with the DPE and other key Government stakeholders toward payment of benefits to upstream clans.

National Content

The Project continues to make notable progress toward replacement of expatriate staff with PNG citizens through both targeted recruitment and training and development. Of the total workforce of 3,017, 81% are PNG citizens of which 22% are females. Origins of PNG citizen are 39% from Project areas, 31% from Project regions and 31% from non-Project areas. Work categories of PNG citizens are 7% management, 13% office workers and 61% field (includes both technical and non-technical roles).

O&M training for PNG citizens intakes I, II, and III has produced 47 technicians promoted to Technician 2 or above level replacing Technician 2 expatriates and 19 electrical technicians from Intakes I and II are working through the Electrical License process with the first licensed technicians expected in Q1 2018. Training Intake IV has 16 Junior Technician trainees who are expected to start work in mid-January 2018. Intake V is scheduled to begin in mid-2018 with successful trainees ready for work in 2020. In addition to technical training, the PNG workforce is offered a variety of other personal and career oriented development opportunities.

In terms of the local procurement aspect of National Content, spend on services provided by Papua New Guinean companies has reached 13.2 billion kina (equivalent to 4.1 billion US\$). In addition to the existing contracts, the Project has added two new local contractors (PNG Mining and Hospitality Services - PMHS and Black Swan). The Project supports the efforts of local companies by providing numerous interfaces between Project and contractors and the business development services of the Business Enterprise Centre (BEC) and Production Contracts Administration Group. BEC services for PNG companies from the Project areas are funded by EMPNG through a partnership agreement.

Labor and Working Conditions

No hours to date have been lost due to industrial action. Queries on labor matters mainly are in regard to payroll, salaries and taxes. Ten grievances have been received this year to date. These involve four harassment charges of which two required disciplinary action and six irregularities (all theft).

The 2016 IESC report recommended that the services of the female counselor continue. Magellan Healthcare has been contracted and has retained the Project's previous female counselor. The two counselors report the major issues as stress related to work-life balance and the increase in tribal fighting for males and domestic and tribal violence for females. The 2016 IESC report recommended the Project consider organizing a voluntary team of PNG male staff to engage male PNG staff on the issue of violence against women and children. A number of activities have been undertaken to incorporate a program that involves the Project workforce including consulting a senior male PNG staff. The IESC suggests that a larger cross section of employees from different age groups and different job types be consulted to get their input on the best strategy. The Project also supports a number of external projects that aim at reducing domestic violence.

Workforce Accommodation

HGCP: The Hides camp has a noticeable community atmosphere confirmed by comments made by occupants in both informal conversations and more formal discussions (such as the O&M trainees). Additional improvements have been made in the Camp such as commissary renovation and electronic payment system and a greater variety of products, refurbishment of Block 2 ablution blocks, new gaming machines, various celebrations and leisure activities and TV cable in clinic wards. Additional improvements are planned such as proposed football field, additional TV channels, sporting equipment, and re-roofing of Block 4 and the main Administration building.

LNG Plant Camp: The Plant camp is well managed, provides good accommodation, and various special activities and services. The IESC Social Expert received comments about the lack of the same sense of community as there is at Hides and the segregated female housing. The IESC Social Expert observes that

lack of community probably results from the population and layout differences between the two camps, with the plant population being much smaller and less constant and the layout being larger and more spread out. In terms of the female housing segregation, the IESC suggests that females be given a choice of segregated or integrated housing as there is at the Hides camp.

The Plant Camp has made improvements since last year, such as installation of a Public Announcement General Alarm (PAGA) System and a safe haven and improvements to rooms, kitchen and mess hall. Additional improvements are planned such as renovations to C rooms, new camp driveway, new concrete steps to accommodations and backup Gensets.

Community Health

At the start of construction the “Partnership in Health” program was initiated with the Papua New Guinea Institute of Medical Research (IMR). A key component of the agreement was the integrated Health Demographic Surveillance System (iHDSS), which was used to monitor the impact of PNG LNG on the health of communities within key areas. The results are in. The five-year review with IMR undertaken by NewFields and issued on August 17, 2017 shows that the Project has not caused adverse health impact to local communities. PNG LNG is one of the few projects in the world that can back up this claim!

The partnership with Baylor College of Medicine and Texas Children’s Hospital is coming to a close and will end at the end of the year, but the program has proved to be an enormous success in terms of providing education and training of students, physicians and nurses. EMPNG is fostering active engagements with key stakeholders to explore and firm up a pathway for the sustainability of this program in PNG.

EMPNG is leveraging their health partners to expand health programs into the Project Impact Areas, investing up to \$500k under the Strategic Community Investment (SCI) Program on eight different initiatives. This does not include major infrastructure support in the Project impact areas.

Occupational Health and Safety

EMPNG Production safety performance through Q3 2017 continues to be excellent. A Lost Time Incident (LTI) took place on June 30, 2017 and this was the first LTI since the start of Production. This incident was not actually a worker accident, but was the result of a worker assaulting a co-worker. It was recorded as an LTI, because it took place at a warehouse during working hours. The LNG Plant celebrated four years of being LTI free on August 16. Overall the LTI rate (LTIR) is 0.03 on the basis of 200,000 man hours, up from the goal of a zero LTIR, which had been achieved up until the time of the assault. The occupational health program is world class and continues to perform well in all areas (clinical operations, public health and industrial hygiene). In 2017 there have been no recordable incidents due to occupational illnesses.

Cultural Heritage

The last archaeological surveys were undertaken as part of the environmental evaluation of the 1.3 km Angore flowline, an activity that is now complete. No additional information on cultural activities was provided during this field visit, so there is effectively nothing to report.

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)¹ 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 actually 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 November 2016 there has been one certification that relates to this requirement of the CTA:

¹ IESC Team members in the field: William J. Johnson (Field Team Lead - Earth Scientist/EHS Management System Specialist), Kerry Connor (Social Development Specialist), Louise Johnson (Biodiversity and Natural Resource Management Specialist)). IESC Team members not in the field: Giovanni De Franchi (Project Manager and Team Lead).

- Certifying the “Muruk Appraisal Seismic Program” including preparatory works encompassing scouting, surveys, topographical mapping, line cutting, drilling, sound charges, recording, analysis and field sampling and preliminary community affairs work.

This action was evaluated to not have the potential to adversely impact the PNG LNG Project and was certified on September 5, 2017.

EMPNG made a request for a second certification in July 2017 concerning the current Project waste management practices in the Upstream Area of the project. This certification was not made pending a field review of the waste management processes to be undertaken, in particular a visit to OSL waste management facilities at their Ridge Camp. IESC submitted the requested certification after completion of the field visit.

1.1 PRODUCTION OPERATIONS OVERVIEW

Production continues with stable operations reflected by the steady increase in Plant production, about 20% above the design capacity of 6.9 MTA. Approximately 8.2 MTA of production is estimated for all of 2017 with record production in August of ~ 8.6 MTA equivalent. The 300th LNG cargo load took place in May 2017 with an additional 108 expected for 2017. Downtime incidents as took place in 2016 have not happened in 2017.

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 2017, but a change since the last IESC visit is that EMPNG is no longer engaged to facilitate the construction and operation of a PNG Government owned 50MW Gas-fired power generation plant in the vicinity of the LNG Plant. Leadership of this project has been taken over by a venture between OSL and Kumul Petroleum Holdings Limited and the plant is now going to be a 58 MW facility. EMPNG will supply gas to the plant over a 20-year period starting 2018. EMPNG now has the scope to provide gas with a tie-in downstream of the LNG Plant. The plant still does not have EMPNG approval, but EMPNG has procured the pipe and the skid mounted metering station. Whenever the plant is approved it will take 6-8 months for EMPNG’s construction effort.

Angore development is progressing, although some work has been slowed by civil unrest. Mobilization of the pipeline spread has started and facility works at Well Pad A and HGCP started in October 2017. The period of January – February 2018 is projected to be the peak timeframe for pipeline construction. Civil unrest prevented the IESC from visiting the Angore area, but the clearing and grading of the pipeline route could be observed from a helicopter flyover.

The Komo Airfield Camp was dismantled and has been completely removed. Civil unrest prevented the IESC from doing a ground tour of the Komo area.

The Project workforce is currently slightly more than about 3,027 with Papua New Guineans making up about 81 percent of the Project workforce. Women make up 22% of the PNG workforce.

1.2 SOURCES OF INFORMATION

The main sources of information used to prepare this seventeenth 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 – Environment;
- 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 are 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.

	Site Visit	Closing Date	Description	Non-Conformance	Reference	Status	Comments / Report Reference
Environmental Issues – Environmental Management							
M17.1 ²	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 case the problems have worsened over 2017.	Level 1	EMP Section 9	Open	With the exception of Angore, the WWTPs are permanent facilities. Their performance is currently no better and possibly worse than was achieved during the construction phase when treatment was made with temporary units. Short-term off-spec discharges were common during construction, but this should not be the case for permanent WWTPs.
M17.2	Nov '17		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	Open	This decision is not a problem. However, if the decision is made to set aside the commitment to undertake ambient air monitoring at least as often as every five years, then it will be necessary to prepare an MOC.
Environmental Issues – Biodiversity and Ecological Management							
M15.1	Oct '15	Nov '17	The accidental introduction of alien species into new areas can be a significant threat to biodiversity, since some species can become invasive, spreading rapidly and out-competing native species. This is especially important in areas of widespread disturbance where weeds can become quickly established. The containment of priority 1 weed species, especially those known to be highly invasive with the capacity to establish and persist in a variety of habitats, is paramount. Weed audits have indicated a number of P1 weeds expanding their ranges, moving through several Weed Management Zones through the Upstream area. It has not been clear how this information is used in the field to control weeds in priority areas. A recent review of weed data collection and analysis has occurred since our 2015 visit. EMPNG are	IESC Observation	IFC Performance Standard 6, Biodiversity Strategy and EMP Section 15	Closed	We recognize the efforts taken in the recent review of weed management processes. EMPNG has developed a permanent monitoring site approach to allow for weed abundance and range extension data to be tracked through time. EMPNG have agreed to continue walk-through audits with weed experts in addition to those permanent monitoring sites. During our visit we met with EMPNG's weed control contractor in the field who was able to provide some clarity on how weed observation data contributed to control efforts, although security issues have proved challenging in their ability to visit several areas where P1 weed presence was known. The review has flagged inconsistencies in historical data, and issues relating to these are transferred to the next Observation row. We therefore close this Observation. (Report reference Section 5.6.2.1)

² 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).

	Site Visit	Closing Date	Description	Non-Conformance	Reference	Status	Comments / Report Reference
			working to improve how weed information is collated and analyzed, but data presented to IESC during both 2015 and 2016 visits has been flagged as incorrect following each visit.				
M17.3	Nov '17		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	Open	EMPNG should source invasive species/regeneration expertise to be able to: (a) Identify what weed data within the dataset can be used to determine whether the presence/distribution of P1 weeds along the RoW/access roads is consistent with what would be expected at this stage of post-construction revegetation succession; (b) Identify areas in each WMZ where P1 species have been introduced/spread through the construction footprint, defining those 'weed-challenge areas' where P1 species remain beyond the early succession/pioneer stage, and especially those where control is still ongoing or has proven difficult; (c) Determine the extent to which risks from the presence of P1 species in these challenge areas have the potential for negative ecological impacts (and taking into account whether these P1 weeds have been introduced into the area, or are now found in numbers greater than known previously). EMPNG should confirm that the PCS dataset now being used includes a comprehensive suite of invasive species reference data indicative of the pre-construction state. (Report ref: Section 5.6.2.1)

3 ENVIRONMENTAL AND SOCIAL MANAGEMENT

3.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

The Environmental and Social Management System (ESMS) for the PNG LNG Project is a mature and functioning system as described in previous IESC reports. As discussed in the last IESC report for the November 2016 field visit, the Production Environmental and Social Management Plan (ESMP) is not suitable for construction, other than at a small scale, and we recommended that an Addendum to the Construction ESMP be developed to cover the construction of the Angore Flowlines. This approach was followed by EMPNG and the Environmental and Social Management Plan – Construction: Addendum (Phase 2 Update), Document PGGP-EH-SPENV-000019 (Addendum to Environmental & Social Management Plan PGGP-EH-SPENV-000018-001) was issued at the time of the last IESC visit in November 2016 and reviewed by IESC shortly after the field visit. This Construction Addendum ESMP is now being implemented in the field.

While EMPNG retains responsibility for all ESMP obligations, several are executed via third-party contractors. As noted in the last IESC report, the rollout of ESMP requirements to contractors in place for contractors to be reviewed and ranked in terms of their performance, allowing for EMPNG to focus their effort to improve contractor performance. During this visit, the results of contractor management were reviewed and our basic observation is that the program continues to improve. Aspects of continuing advancement include:

- ongoing reporting of contractor data - 3Q17;
- contracts are started with kickoff meeting so that ESMP requirements are understood; and
- Contractor Classification Reviews for ESMP applicability are undertaken and contractors are ranked in terms of their performance.

EMPNG has developed standardized reporting requirements for contractors, which facilitates their rankings and performance evaluations.

Organizationally, the divisions dedicated to managing environmental, labor and community issues have basically stayed the same as previously reported from the IESC visit in November 2016.

3.2 MANAGEMENT OF CHANGE

Since the last IESC visit there have been no new MOCs requiring IESC review except for one related to a proposed waste management synergy between EMPNG and OSL in the Upstream area. As further described in Section 4.1, the IESC is now prepared to certify this MOC and it is expected that it will be implemented.

With respect to the anticipated turnover of Project infrastructure to the PNG Government, as described in the last IESC field report, no activity has taken place. The PNG Government has not occupied any of the infrastructure and the status quo is being maintained. Nevertheless, the takeover of Project infrastructure is still expected to take place and the IESC position remains the same, that the opening of the Project-controlled Gobe to Kantobo Road to be potentially a more serious impact than the handover of the Kaiaam bridge over the Kikori River. The MOC associated with this action must be considered a Class I MOC.

3.3 INCIDENTS

Over the past year the Project has had to deal with a general deterioration in security. In Port Moresby there has been an increase in violent crime (robbery; attacks; unrest) and civil unrest in the Highlands has impacted the Project's ability to work. The 2017 elections were a challenge. Clan conflicts in the Highlands were fueled by the elections. Clans had been fighting for more than 40 days near the old Kobalu Camp and numerous deaths have been reported and many homes have been burned. Increase in frequency and length of clan fighting in Highlands impacts Project logistics. An independent conflict in Lae has impacted truck traffic needed to support Angore operations. Although there have been no more well pad incursions since August 2016, the wellpads have all had extensive security hardening. None of the civil unrest in the

Highlands has directly affected Project personnel, except for the June 2, 2017 kidnapping an environmental field person who was held for a short time and was not harmed. This incident was reported to the IESC immediately after it took place.

A peaceful protest near the LNG Plant area in February was motivated by the significant delay in Government payment of royalties from the PNG LNG Project. Those villages have now received their benefits, though benefits have not yet been distributed in the Hides area due to still unresolved issues related to completion of the clan identification process.

In terms of environmental incidents, in 2017 there have been no Corporate reportable spills (>1 bbl) and most of the Environmental Compliance Incidents (ECIs) and EMP non-conformances (EMP NCs) assigned by EMPNG have related to discharges from the wastewater treatment plants, discussed in greater detail in Section 4.1. Flaring at both the HGCP and LNG Plant has generally been steady and below the internal targets.

In terms of process safety performance, there have been no Tier I or Tier II events in 2017 and none have occurred over 1139 days at the time of the IESC visit. There have been 16 Tier III events, most very small releases or Demand on Safety Systems (DOSS). ExxonMobil's global Facility Integrity Management System (FIMS) standards are fully in place.

3.4 EMERGENCY RESPONSE

The emergency response (ER) system is fully in place in terms of plans and procedures, equipment and personnel. Multi-skilled emergency response teams (Falck) are available at the LNG Plant, HGCP and Komo Airfield. EMPNG undertakes drills according to a predefined schedule and this past year undertook an ocean boom exercise in September with external stakeholders and a Marine Terminal ISPS Security and ER exercise in July.

Over the course of 2017 the ER team has responded to the kidnapping referred to above, land owner protests, vehicle accidents, situations associated with pre-election preparations, an accommodation block fire and PUMA spill assistance. This latter event where a third-party spill (PUMA) took place due to a pipeline break in Caution Bay involved EMPNG, as PUMA borrowed EMPNG spill control equipment. As a consequence of the PUMA spill there has been a renewed interest to develop a Tier 2 capability for PNG and a 2017 initiative of EMPNG is to work with OSRL to help develop this capability. In principal, OSRL would have a stocked warehouse to which all operators in PNG would have access, including other oil and gas companies like Total or OSL.

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

Overall, waste management continues to be well undertaken, but decisions to make a permanent camp at Moro challenge the existing system. The amount of waste generated across the project has stabilized since the demolition of the old Komo Camp in Q1 2017 where of the 5830 tons of waste generated, more than 5489 tons were demolition wastes from Komo Camp (Figure 4.1).

The Project continues to audit their third-party waste management contractors and identify new acceptable solutions to recycle/reuse wastes through these contractors. Total Waste Management (TWM) is implementing some improvements at the LNG Plant.

An issue with respect to long-term waste management is that infrastructure is starting to show its age is or has the potential to compromise performance:

- LNG Plant domestic waste incinerator ceased to operate for 2 months (June– July 2017) - damaged chimney on Pollution Abatement System and Lime Hopper motor failure;
- Sludge Incinerator in LNG Plant Process Area continues to be inoperable due to technical issues;
- LNGP Operations landfill cell nearly full. Plans are to utilize construction landfill airspace; and
- WMA high-temperature incinerator at the Hides WMA out of service due to damaged air duct. Part ordered from China not expected until the end of 2017.

EMPNG is undertaking several steps to improve its waste management.

One of the ways EMPNG is considering to manage waste at the LNG Plant is through support to TWM, a PNG company. Papua New Guinea does not currently have a commercial facility that can manage both hazardous and solid wastes. TMA has plans to construct an Integrated Waste Management Facility (IWMF) at a brownfields site (Roku site) located between the LNG Plant site and Port Moresby. This facility proposes to provide industrial and municipal waste treatment services capable of handling all routine LNG Plant waste streams in a manner compliant with EMPNG/EM expectations.

The IWMF project appears 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 thinks the project is a good idea and we hope it works out.

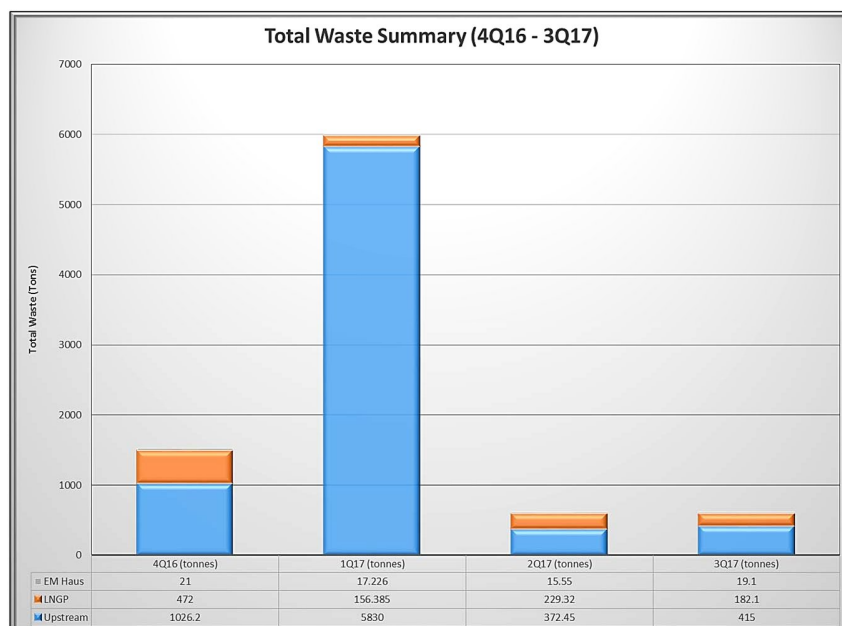


Figure 4.1: Project Waste Profile (Q4 2016 through Q3 2017)

In the Upstream area, the long-term waste management strategy is to collaborate with OSL (EMPNG/OSL Waste Management Synergy). IESC was requested in early July 2017 to approve an MOC whereby EMPNG would collaborate with OSL in the Upstream area of the Project. In essence, the synergies are grouped in terms of a Northern Model and a Southern Model:

Northern Model: EMPNG provides waste management services to OSL:

- The key infrastructure/facility is the EMPNG Hides Waste Management Area (HWMA at Kopeanda). Advantages are:
 - the HWMA is a high volume waste processing facility, including an engineered landfill, waste collection fleet, and is centrally located for both OSL and EMPNG;
 - EMPNG has expertise and experience managing difficult waste streams and can manage wastes streams difficult for OSL to manage; and
 - the HWMF has significant spare storage, processing, and disposal capacity.
- Services provided would be daily waste collections from OSL northern facilities (Nogoli Camp / Hides Gas Plant / Drilling Laydown). Advantages are:
 - these additional services would represent only moderate incremental additions to the HWMF daily waste load, with the majority of the waste processed and disposed onsite;
 - challenging wastes streams (i.e. intractable) would be consolidated and exported for treatment and disposal; and
 - EMPNG receives revenue from managing OSL waste.

Southern Model: OSL provides waste services to EMPNG:

- OSL is treated as a 3rd party waste receiver, similar to other third-party services that have to comply with EMPNG standards.
- the key infrastructure/facility is the OSL Kutubu/Ridge Camp Waste Management Area. Advantages are:
 - the OSL facility is has high volume waste processing capability and spare treatment capacity;
 - new technologies and investments in waste infrastructure exceed EMPNG Moro capabilities;

- the OSL facility is well positioned for service provision.
- services provided would be daily collections from EMPNG Facility (Moro Camp B). Advantages are:
 - the waste from Moro Camp B represents only a small incremental increase to total daily processing;
 - Both processing and disposal of Moro waste can take place at the OSL facility;
 - management of challenging waste streams can still take place at the HWMF (for management under the Northern Model) or export for treatment.

Although the concept was presented as something that would benefit both EMPNG and OSL, our concern was that OSL would not be able to achieve Project standards. IESC had visited OSL facilities at Nogoli, Gobe and Ridge Camp at the beginning of PNG LNG construction and found them to be substandard. Based on our field visit to OSL's Kutubu/Ridge Camp facility it is obvious they have made substantial advances in their waste management capabilities:

- the incinerator is high quality and OSL has a contract in place to start stack emissions testing; and
- the facility also has a variety of specialized waste management equipment OSL obtained from Spie Capag (EPC5A). IESC has previously reported on the good quality of this equipment.

IESC certified the EMPNG/OSL Waste Management Synergy shortly after the field visit before the finalization of this report. The synergy is environmentally sound and whenever it is possible to help stimulate improvements to environmental management in the Highlands, the overall environment benefits.

4.1.2.2 Wastewater Management

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) that have been flagged during internal inspections and audits. The main WWTPs are operated by the Logistics group within EMPNG and a review of the raw effluent data reveals the following, when compared to Project standards, which include and expand upon IFC EHS Guideline values:

- *Angore*: The chemical oxygen demand (COD) values in the effluent have steadily increased over the course of 2017 to the point that the most recent measurement from September exceeded the effluent standard. Fecal coliforms (MPL/100ml) are sporadically exceeded. Coliform exceedance is close to 20 percent of the samples tested. This plant has been compliant with respect to biological oxygen demand (BOD), total suspended solids (TSS), and oil and grease. Ammonia-nitrogen is not a parameter defined as part of the IFC EHS Guidelines, but is regulated in terms of aquatic life protection as part of EHL's Environmental Permit as a function of pH. At Angore, the Ammonia-nitrogen exceedances have been close to two thirds of the samples tested.
- *HGCP*: TSS and fecal coliforms (MPL/100ml) are frequently, but sporadically exceeded at this plant. This plant has been compliant with respect to COD, BOD, and oil and grease. Coliform exceedance is 25 percent of the samples tested.
- *Moro*: The only parameter sporadically not in compliance with standards is fecal coliforms (MPL/100ml). Coliform exceedance is 15 percent of the samples tested. Ammonia-nitrogen is also an issue. Although tests during the first half of 2017 showed general compliance, the situation has deteriorated such that about 75% of the tests since the beginning of August have been above the Project standard.
- *LNG Plant*: This plant has been generally compliant with respect to COD, BOD, and oil and grease. There has been only one exceedance of COD, which was measured in February 2017. The TSS values in the effluent have steadily increased over the course of 2017 to the point that the most recent measurement from October exceeded the effluent standard. Fecal coliforms

(MPL/100ml) have been consistently exceeded since the beginning of March 2017. Coliform exceedance is in more than 80 percent of the samples tested.

With the exception of Angore, the WWTPs are permanent facilities. Their performance is currently no better and possibly worse than was achieved during the construction phase when treatment was made with temporary units. Short-term off-spec discharges were common during construction, but this should not be the case for permanent WWTPs.

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. Discharge of the amine impacted water from the retention pond into Caution Bay via the two diffusers occurred from 12 November to 10 December 2016. The elimination of amine impacted water is still pending an engineering solution, but further discharge has not been required. Amine discharge to the retention pond via the oily wastewater treatment system (OWS) is low, about 5 m³ water/day/train with an amine concentration of approximately 5 ppm. However, monitoring of discharge from the OWS has shown amine concentrations below the laboratory's limit of detection. An engineered solution to the presence of amines has a target completion Q1 2018.

Also at the LNG Plant, the off-spec sewage discharge, sediment from stormwater runoff and prolonged exposure of water to sunlight in the retention pond and desalination brine bypass channel, is resulting in algae growth which in turn leads to elevated pH levels. Elevated pH levels in the retention pond makes it difficult to manage water flows as discharge from the pond is restricted which in turn exacerbates algae growth as the duration that water is stored in the pond is extended. As algae dies, increases in TSS and turbidity from the retention pond discharge is also recorded. Cleaning is difficult due to the liner. Eliminating environmental risk represented by the retention pond at the LNG Plant does not look easy. The first step will be cleaning up the WWTP such that high nutrient discharges do not enter the retention pond, but to solve the remaining problems, it may be necessary to change the configuration of the pond such that it can be aerated and chemicals added, as required.

4.1.3 Recommendation

1. Support to TWM could be considered in the area of a community development. Papua New Guinea has a strong need for having an integrated waste management facility that can serve not just EMPNG, but other waste generators.

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. There were no Corporate reportable spills (>1 bbl), but there have been 56 minor spills recorded, mainly consisting of small hydraulic fluid leaks from heavy equipment in the Upstream area, whose total volume is less than 1.2 bbl (200L). Spill awareness presentations were carried out with Upstream departments in September 2017. Most of the Environmental Compliance Incidents (ECIs) and EMP non-conformances (EMP NCs) assigned by EMPNG have related to discharges from the wastewater treatment plants, discussed in greater detail in Section 4.1. 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 2017 at the LNG Plant, except that the sludge and domestic incinerators were not tested due to technical issues and their testing is planned to be completed by the end of the year. Stack testing at HGCP and the HWMF took place in September 2017, except for the HWMF incinerator, which was not operational as discussed in Section 4.1.2. Final reports are still pending, but the preliminary results from all three locations indicate compliance. Testing for all sites is currently planned for June and October 2018.

Flaring at both the HGCP and LNG Plant has generally been steady and below the internal targets. The only slight deviation from Project targets took place in January 2017 at the HGCP related to multiple compressor trips. The January – February 2017 period also saw relatively high flaring for various reasons, but still within Project internal standards (Figure 4.2).

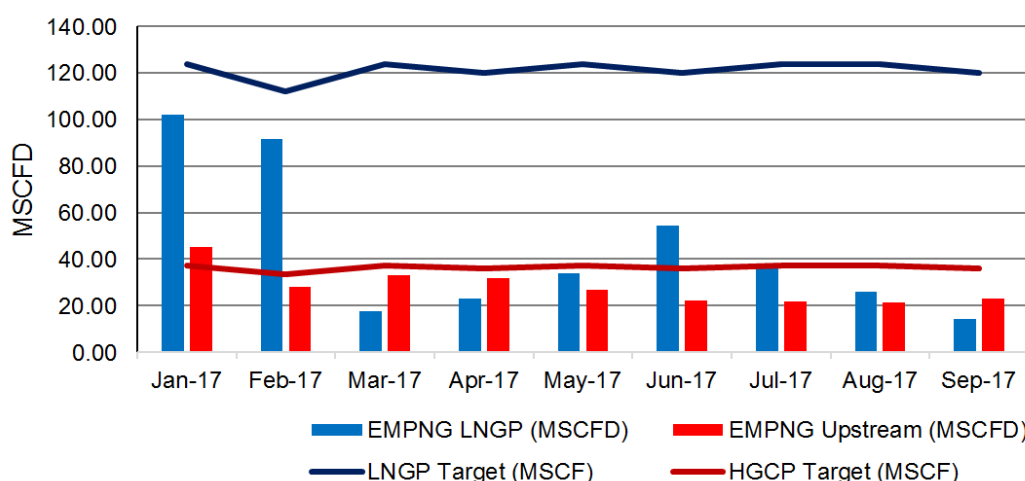


Figure 4.2: Flare Volumes through September 2017

A topic not reviewed in detail by the IESC for the past several visits is ambient air monitoring. Ambient air monitoring was undertaken with the startup of flaring at both the LNG Plant and the HGCP as reported in the IESC field visit from June 2014. The frequency of ambient air monitoring as defined in the Upstream and LNG Plant EMPs is that it would be determined on the basis of need and environmental risk, but in any event would be undertaken no less than every five years. A year of ambient air monitoring was completed in June 2016 with follow up work needed for ozone. In February ozone testing at the LNG Plant was undertaken that confirmed compliance with the 8-hour standard. Dust monitoring was also undertaken at the LNG Plant in association with maintenance on the fan coolers with no particulate matter (PM) impacts at the fence line. 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.

Noise monitoring surrounding Project facilities has shown that noise is not an issue, except at the HWMF at Kopeanda, where the situation has not changed from what was reported in the IESC report for the November 2016 field visit. There are still people living inside the buffer zone, where noise levels are above

criteria. The eviction of these people remains the responsibility of the Department of Petroleum and Energy (DPE).

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

Erosion and sediment control has been one of the most difficult issues to manage over the course of the Project. The problems have traditionally been the most severe at HGCP and Komo. Control systems are now in place and E&S management is now fully in the realm of maintenance.

During this field visit, civil unrest prevented an inspection of the final E&S controls at the Komo airfield, but they were observed from the air and appear to be in place. Big erosion gullies as have been observed in the past have been remediated and problem slopes are for the most part stabilized by vegetation.

At the HGCP a significant effort has been placed in the establishment of permanent drainage infrastructure and undertaking maintenance. Much of the drainage is now concrete lined (see Figure 4.3) and the field visit revealed no blockages of culverts as has been observed in the past. Overall, the E&S systems look to be effective and maintenance is now the only required activity.

Erosion and sediment control activities along the Pipeline RoW are constantly ongoing as part of routine maintenance. The number of work crews has increased from three to four. The major works completed in 2017 have included slope repairs at KP 9, completion of a retaining wall at KP 100, completion of repairs to the Kutubu Main Line Valve access road and completion of sinkhole repairs. At the time of the field visit, the most significant issue was the washout of the pipeline at KP 25, which exposed and subsequently damaged the fiber optic cable.. Civil unrest was preventing repairs at this location and over 2017 has been an impediment to the ability of the maintenance crews to be able to do their work.



Figure 4.3: New E&S controls at the HGCP

4.4.3 Recommendations

None at this time.

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/retention of roads, tracks and the pipeline RoW corridor.

The whole Upstream Project area is deemed to be Critical Habitat in accordance with IFC Performance Standard 6 (2006) and therefore no net loss (NNL) of biodiversity will be key. EMPNG's overall strategy for biodiversity and ecological management is described in the Biodiversity Strategy 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 of weeds, 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 monitoring studies and surveys.

5.2 BIODIVERSITY STRATEGY INCLUDING OFFSETS

5.2.1 Project Strategy

EMPNG's objective is to avoid impacts to specific features of ecological importance. 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 standard 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, the following objectives were defined, and now refined in 2016:

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

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

- (i) The large scale, which is the entire Upstream Project Area;
- (ii) The medium scale, which is represented by particularly valuable areas referred to as 'priority ecosystems'; and
- (iii) The small local-scale, which are sensitive habitats referred to as 'focal habitats' and significant ecological features.

To address residual impacts on critical habitat, and in accordance with the Biodiversity Strategy, EMPNG has developed, and 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 now publicly available at www.pnglng.com.

The BS is being implemented across EMPNG's work plans and infrastructure, including at sites of new disturbance such as the recent clearance and construction near Angore. This has required 1.3km of greenfield clearance for laying flowlines from Angore well pad A (WP-A) to the existing main RoW, and will require temporary re-disturbance of the regenerating RoW from the WP-A flowline intersection to the HGCP. Mitigation measures implemented to date include pre-construction surveys, assessment of suitable side-casting areas, baseline water quality sampling, top-soil storage, assessment of appropriate raw material sources, and weed inspections, as per the Angore EMP. Key to impact avoidance will be contractor environmental management, and EMPNG have assured the IESC this is a key focus area.

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, and observations of positive actions by bush-felling crews.

A local biodiversity/GIS specialist has recently left the organization. GIS support is being provided via ExxonMobil in Australia.

Offset Framework & Technical Rationale

Refinement of the technical rationale of EMPNG's biodiversity offset program continues, with a focus on identifying the most suitable methodology to assess and account for biodiversity gains. To ensure representativeness, loss and gain calculations are being progressed in terms of habitat hectares at the Broad Vegetation Group (BVGs) level; as discussed previously not all BVG's affected will be accounted for, but those of significant ecological value will be tracked for the purposes of PS6 NNL requirements.

Earlier this year, EMPNG consulted their key biodiversity monitoring specialist contractors on the extent to which current monitoring data could determine change in condition for the purposes of assess biodiversity offset gain. The company is trialing the use of remote sensing data to assess condition improvement/deterioration within EMPNG offset areas.

EMPNG is planning an independent review of their offset calculation methodology and preliminary results in 2018.

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: Kikori-wide landscape scale. This component provides support to CEPA in meeting its international Convention on Biological Diversity (CBD) commitments via production of a 'Protected Area Plan' for a Kikori-wide river basin (on World Heritage 'Tentative' list), that in subsequent offset planning phases can be taken forward for implementation:
 - Update: A key early deliverable in the component workplan, the EMPNG-commissioned report 'Protected Area Planning for the Kikori River Basin' (undertaken and published by WCS), is now complete. Using pre-existing survey data and taxonomic/conservation expert input, the Marxan analysis identifies priority sites from a combination of spatial layers depicting important conservation features within the catchment. Notwithstanding a few

reasonable exceptions, the analysis results agree broadly with those of the recent Kikori Blueprint work³. Planned Component-1 work activities continue including further stakeholder liaison – EMPNG advise they seek dialogue with CEPA to ensure continued alignment in objectives. Reported budgetary challenges at CEPA could present a risk to the successful development and progress of the offset component.

- 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: another in the ongoing series of Communicating Conservation meetings was held, this time with a focus on the state of knowledge and management of endemic and flagship species. Over 70 attendees participated from the conservation and local communities, national government, industry and development agencies, and EMPNG report the meetings provide an excellent opportunity for community protected area networking. A further meeting is planned before the end of the year, and two conservation workshops are due in 2018. The anticipated New Guinea Biology Conference has been postponed to 2018 due to budgetary limitations. Two Biodiversity Digest newsletters have been produced since our last visit, providing summaries of PNG biodiversity relevant news; we suggest these also be made available electronically to ensure the widest possible audience.
- Offset Component 3: Enhancing Conservation Capacity Program (ECCP). EMPNG’s support is focused on developing and institutionalizing Post-Graduate Diploma and Masters degree courses at University-PNG (U-PNG), providing scholarships, and establishing a framework for placements and mentorships with field-based conservation NGOs:
 - Update: The U-PNG Conservation Management under-graduate certificate program has been finalized, and trialed with a nominated group of candidates. Candidate students have been selected for scholarships on the U-PNG Conservation Management Masters and Post-Grad Diploma courses. Although taking longer to setup than originally planned, the ECCP program courses are now fully formalized within U-PNG, the first 30-40 certificate students are due to graduate during 2018, and funding disbursements are to be awarded shortly allowing Post-Grad/Masters scholarship students to commence their studies in 2018.
- 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:
 - On behalf of EMPNG, IBR continues to work with the Lake Kutubu WMA Committee to enhance their capacity to be able to manage the protected area effectively. Several workshops have been held including the identification and prioritization of ecosystem services by the Committee, their organizational structure, and a strategic visioning exercise to help the Committee define the vision, mission statement, goals and core values of the WMA (precursors to determining conservation priorities, objectives, and outcomes). During our short visit with the Committee, the enhanced contribution and capability of a number of committee members was apparent. Indications of committee members (other than the Chairman) taking on roles and responsibilities for various WMA activities were noticeable, including women,

³ Tabunakawai K, Bristow M & Rokonadravu M (2015) Kikori River Basin Conservation BluePrint. WWF.

and are to be welcomed. Further capacity enhancement activities are planned, including the establishment of conservation objectives and field monitoring skills development.

- In very high level discussions with the Committee on threats to the WMA, the IESC is able to confirm a number of issues were raised, including impacts on endemic fish species from the presence of tilapia, the number of large trees used (e.g. for traditional festival race canoe building), the challenges for the next generation to maintain the WMA, and the ability of communities to maintain livelihoods within the WMA. The Committee also spoke of solutions to some of these concerns e.g. grant-funding, raising awareness with festival canoe-builders, fish surveys, etc.
- in relation to the existing lake ecosystem pertinent to conservation values within an offset location, and specifically the resilience of endemic fish species within this RAMSAR site, the IESC was informed of ongoing studies and programs supported by OSL. As part of a community-led management approach, the WMA Committee is working with villages to trial tilapia-targeted fishing methods.
- The part-time onsite Coordinator continues to support the Committee in their activities, including their successful applications for small grant funding for livelihoods and cultural programs within the WMA. EMPNG delivered a refurbished boat to the Committee to help them implement their activities. The Committee have also initiated WMA awareness-raising through school visits and at Lake Kutubu community events including World Environment Day, and at the Kundu and Digaso Festivals.
- 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 intention is that the creation of a new community-based, legally-designated protected area will build on the existing Aird Hills WMA as a nucleus for conservation. To achieve this, EMPNG plans to work with the former Barging Route Waterways Committee members and the Aird Hills WMA Committee.
 - Update: Two EMPNG team visits have been made to the Kikori delta since our last visit, to further engage with and build profiles of the communities in the area. Additional villages have now been engaged in relation to developing an offset program in the area, and SWOT analyses performed. EMPNG advise the IESC that communities are keen to engage and discuss their conservation concerns, such as prevalence of invasive species (fish and weeds). Biodiversity surveys were undertaken during one visit by the PMA-3 team (see Monitoring update below). EMPNG's Lower Kikori on-site coordinator is now in place and has made repeated visits to the area to maintain engagement. However, the communities are very isolated so logistics are challenging, and community education and health issues are prevalent.
 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: EMPNG have held discussions on biodiversity topics with community groups in the Hides area. A change of government in the Hela Province will require renewed efforts for dialogue. Little progress has been made in determining appropriate candidate sites for biodiversity gain under the offset program at this higher elevation level.

5.2.3 Recommendations

1. Implementation of EMPNG's offset obligations and commitment would benefit from increased prioritization and resources focused at the upper elevation zone. This zone represents the greatest proportion of residual impact (biodiversity loss) across EMPNG's

operations. We realize the importance of provincial government buy-in, but comparing early progress made in other elevation zones, we now recommend increased urgency in progressing appropriate biodiversity-gain candidate sites at this vital higher elevation.

5.3 BIODIVERSITY IMPLEMENTATION AND MONITORING PROGRAM

5.3.1 Project Strategy

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):

- Intactness of forest;
- Trends in species diversity and abundance;
- Conditions of focal habitats;
- Occurrence of invasive species/pathogens; and
- 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 and 2015 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 those 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;
- 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; and
- 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.

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.

5.3.2 Observations:

Monitoring data gathering and reporting is undertaken on a two-yearly cycle, and results to date were reported in detail in our 2016 report. For 2017, EMPNG efforts again have concentrated on data gathering,

and we anticipate that results will be available for write-up in our 2018 report. More work has also been undertaken to refine various aspects of the methodology, based on on-going analysis of previous assessments and monitoring results. Observations on monitoring work since our last visit include:

- PMA-1 Remote sensing updates:
 - In response to 2015's results indicating change in land use potentially attributable to EMPNG, the company advises they still have not been able to perform follow-up verification in the field, due to security concerns for field staff. Separately, we understand the results of the 2015 assessment are being used to refine the PMA-1 protocol, for example, the criteria used to determine whether observed changes to land cover can be deemed attributable to EMPNG.
 - EMPNG's external contractor has acquired and pre-processed imagery for 2017 as planned, and analysis is in progress. Additional RapidEye imagery was acquired to support PMA-4 monitoring i.e. to expand the area previously analyzed at enhanced resolution to encompass offset site locations (Kutubu and Lower Kikori). The analysis report will be completed mid-2018.
 - The company's local biodiversity/GIS technical specialist with internal oversight of PMA-1 has recently left the company. GIS support is being provided by ExxonMobil Australia.
- PMA-2 'Condition' surveys of focal habitats and significant ecological features, update:
 - As reported last year, areas along the RoW are naturally regenerating, therefore vegetation growth is making access to some sites more difficult. Visual inspection of the full range of PMA-2 sites has also been hampered by on the ground security concerns for field staff. Therefore efforts were focused on 4 focal habitat sites adjacent to the RoW around Hides, which were observed to be in good ecological condition. Due to security restrictions during 2017, EMPNG instead plans to undertake a full suite of PMA-2 inspections in 2018, again dependent on a safe and secure working environment.
 - As methodologies and adaptive management approaches have evolved since PMA-2 was first conceived, it is now clearer to the IESC that the intention to assess ecological condition in the traditional scientific sense has been replaced by simple visual inspection. Where originally PMA-2 surveys of these focal habitats and ecological features were anticipated for the long term, now inspections of sites deemed 'recovered' (e.g. no evidence of human access, no evidence of litter) will be curtailed. EMPNG's intention is that any post-construction impacts that may arise from enhanced access will be captured by PMA-1 looking at broad-scale forest impact, with on the ground verification where forest loss is attributable to EMPNG – this will continue to be reviewed during subsequent IESC visits to ensure the approach is sufficiently comprehensive to capture project related impacts. Currently such field surveys have not been occurring due to security concerns for staff.
- PMA-3 Biodiversity survey updates:
 - Field surveys were undertaken during 2Q 2017 by external expert teams used on previous PMA-3 surveys including various taxa specialists (including now a Butterfly expert). The team performed transect surveys on Hides Ridge and the Moro area near Ridge Camp, as per those areas surveyed in 2015. New sites in north-west Kutubu and the Kikori delta were also surveyed to gather reference data for ongoing offset monitoring. The team deployed an increased number of camera traps as they'd recommended in their 2015 survey report, and utilized DNA analysis to facilitate species identification. The survey team welcomed the participation of community members at some sites. The survey report should be completed mid-2018.
 - They have noted that the number of data points required to show a significant trend statistically depends on the number of replicates, but that due to the nature of the rapid biodiversity assessments, there are actually few replicates in each Biodiversity Area. The feasibility of trend analysis will be discussed further.

- Building on the 2015 survey results, the survey team members have several peer-reviewed scientific papers due for publication in the near future.
- PMA-4 Offset efficacy updates:
 - IESC provided further feedback on the PMA-4 protocol earlier in 2017, and these were discussed during our visit.
 - The first scorecard assessment for qualitatively tracking progress on work activity within each offset component (see Offset section above) is due for completion following our visit. IESC will review it once available.
 - As noted above in observations on the offset technical rationale, EMPNG's process for quantitatively tracking biodiversity gain continues to mature. Several calculation scenarios and examples have been discussed in detail and we are aligned on ways in which this can be further considered. EMPNG are consulting with their PMA external monitoring experts, and are considering how to best assess condition and to measure change in condition over time in offset areas. To this end, use of remote sensing data is being trialed and 2015 data will be compared to 2017 to assess gains/losses (see PMA-1 above).
 - EMPNG advises that they plan to engage an external offset specialist during 2018 to support the offset accounting process.

Freshwater Ecology

As noted in the preliminary findings in our last report, the completed Freshwater Ecology monitoring report findings indicate a continued recovery at all sites since 2015 (see IESC's 2016 report, Section 5.3.2 for background). The most pronounced recovery is shown at Akara Creek where the macroinvertebrate community composition and diversity is now comparable to that found at the equivalent reference site. The Wakuba River site downstream of Komo airfield, although showing an improvement in macroinvertebrate indices since the site was first sampled in 2011, still remains impacted with low freshwater macroinvertebrate diversity.

Freshwater monitoring was unable to be performed during 2017 due to security reasons, but will continue in 2018.

5.3.3 Recommendations

1. We encourage EMPNG to continue to develop a transparent and defensible set of rules that determine which impacts observed via PMA-1 remote sensing may be attributable to the project. This is especially relevant at this early stage of monitoring not only as the RoW is aligned with the Gobe-Kantobo project road that is experiencing increased levels of access than originally foreseen in the PNG LNG EIS, but also as 2015 results suggesting impacts attributable to the project (detailed in our last report) are yet to be actually verified in the field due to security concerns.

5.4 INDUCED ACCESS

5.4.1 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."

5.4.2 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. In addition, EMPNG reports a number of situation updates to access controls since our last visit. These are listed in the following status table and observations noted below.

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 wellpad access road. All vehicle access is logged, and all vehicles washed on entry to the road.
CV-1	AGI (Above ground installation)	Update: <u>Now different from EMP.</u> 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 wellpad access road	Producing wells (future)	<u>Different from EMP.</u> Boom-gate installed but open, & not permanently manned. In an attempt to control access onto the wellpad 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	<u>Different from EMP.</u> No boom-gate is currently installed. Vehicle Access Monitor at Benaria village, not at project bridge/infrastructure. EMPNG previously advised 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	AGI / Road	As per EMP. Boom gates (two) installed and locked, one at MLV-2 and one at the intersection

Access location	Access reason	Current Vehicle Access Control/Monitor Status
access road		of the tax-credit public road and MLV-2 Homa Ridge access road.
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 Kaia. See updates in paragraphs below on Southern Highway. <i>Access from the north (Moro to Kantobo):</i> 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). <i>Access from the south (Kantobo to Gobe):</i> 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.
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 requests 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 report 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.

EMPNG advised that since our last visit, unauthorized vehicle tracks were observed on the RoW near KP14, picked up via aerial patrol. Public and Government Affairs representatives are working with the community to reinforce the message that driving on the RoW is prohibited and breaks a condition of the RoW Clan Caretaking Agreement. To discourage further access at this location, EMPNG will increase the height of earthen berms intended to deter access. During our flyover of the RoW we noted these tracks at KP-14, which we assume were linked to vehicle tracks observed emanating from KP-12 and the Angore WP-B access track to the RoW. As noted in the status table above, the boom-gate is installed at the Angore wellpad access track but currently left open.

We also observed additional vehicle tracks near the RoW at KP-5, at the junction of an EMPNG reinstated construction access track linked to a public road. The tracks did not appear to venture onto the RoW but stopped at the junction of the access track with the RoW at a village. EMPNG’s commitment was to ensure the majority of new construction access tracks were made impassable at the end of the construction phase, with only a small number remaining open for access during production. This particular access track had

been assumed impassable due to natural regeneration; we therefore flagged this incursion to the project. Subsequently, we were told the tracks occurred during the election period, and following Community Affairs discussions with communities, there has since been no further travel along that route.

EMPNG informed the IESC that vehicle incursions have been made in the bare backshore area of the RoW at the LNG Plant, and we observed their tracks during our visit. We are advised a number of accessible mangrove trees at the edge of the RoW in the mid-shore area had been chopped down, potentially removed on the vehicles driven into the area. Again, Community Affairs are liaising with the local communities to reiterate access restrictions.

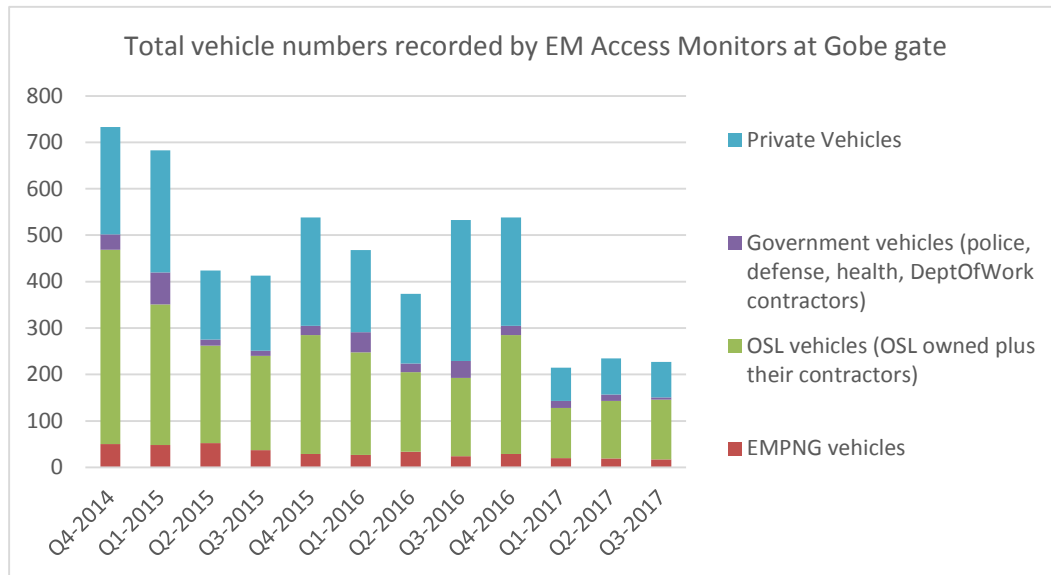


Figure 5.1: Numbers of Road Users by Purpose-Type

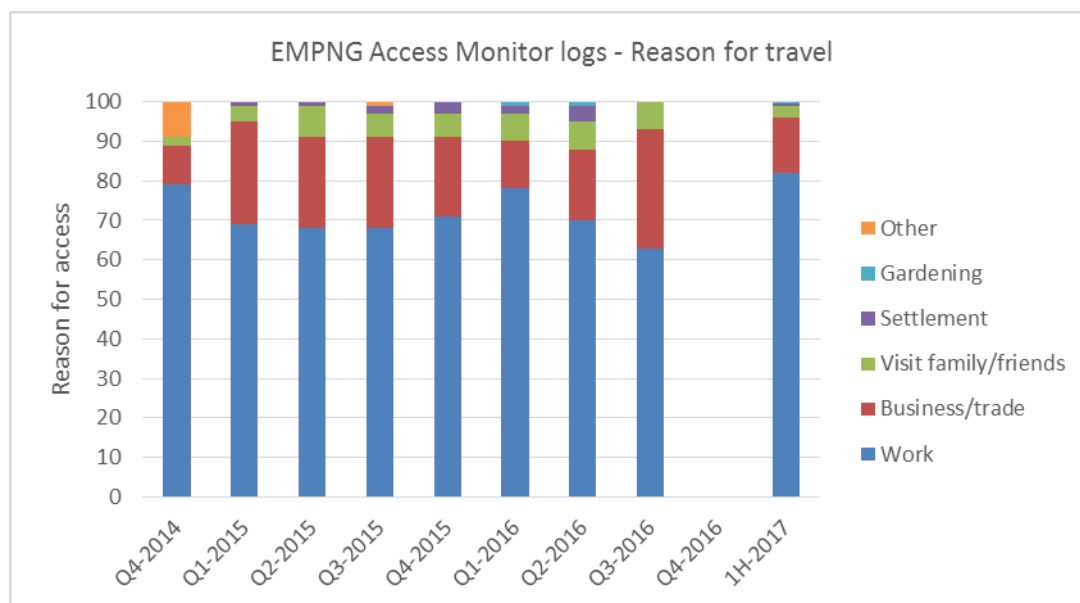


Figure 5.2: Breakdown of Vehicle users by Reason for Travel

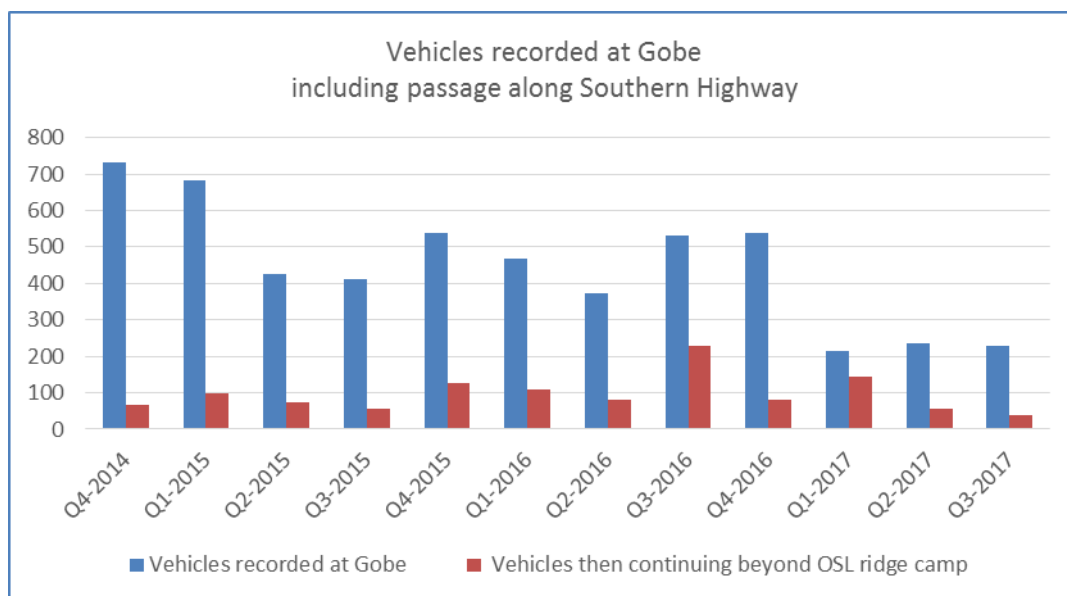


Figure 5.3: Numbers of Vehicles using Southern Highway for through passage from Gobe to Moro

The first graph indicates a marked reduction in the number of vehicles recorded using the EMPNG road at Gobe since our last visit. EMPNG confirm there has been no reduction in recording effort, and propose the increase seen during the second half of 2016 might have been due to the elections in the Highlands, and a reduction this year due to election related violence in the Southern Highlands. OSL have also now completed a work project which means their vehicles use the road less frequently. The second graph indicates those vehicles recorded at Gobe, there is a lower proportion of vehicles conducting private business or trade, and much lower visiting friends and family. The third graph reflects the lower number of vehicles overall, and shows a reducing trend in vehicles continuing up the road to Moro during this year, although Q1 2017 did indicate that most vehicles using the road traversed the full length of road constructed by EMPNG. Data collection will continue for tracking and analysis.

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 have 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.

5.4.3 Recommendations

1. EMPNG should ensure as part of its negotiations with the PNG government regarding transfer of ownership of roads/infrastructure, that every effort is made to retain controls on vehicular access 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.

5.5 REINSTATEMENT AND REGENERATION

5.5.1 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. This is detailed in Appendix 3 of the Upstream EMP available at www.pnglng.com, and supplements EMPNG's regular in-house assessment of regenerating areas to check for evidence of encroachment.

5.5.2 Observations

5.5.2.1 Reinstatement

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.

During chopper flyover of the RoW from the HGCP to Moro, we were encouraged to see expanded vegetation coverage on the steep RoW and access road side-cast slopes around the Homa-Benaria Ridge and MLV-2.

As last year, we again did not have the chance to visit areas at Komo where soil erosion challenges observed in 2015 had meant certain isolated areas were not stabilized or regenerating. Security concerns in the Komo vicinity meant we could only catch brief glimpses of areas around the airstrip during chopper and plane take-off and landing.

Static photo-points are also now set up at the LNG Plant pipeline landfall RoW, as mangrove restoration and re-growth will take time. A localized bush-fire started by community members burnt the scrub in the backshore area, and may have affected the sandalwood tree noted in the pre-construction surveys/EIS between the jetty and the pipeline landfall – site personnel are monitoring the tree and site security have adjusted security cameras to track incursions. LNG Plant environmental staff is working with Community Affairs to reiterate the value of the coastal forests with the community.

5.5.2.2 Regeneration

Survey results from the 2015 regeneration monitoring campaign conducted by New Guinea Binatang Research Centre were summarized in our last report.

The 2017 campaign was partially completed in Q1 2017 but then halted due to security issues – further surveys are anticipated in Q4 following our visit. Target monitoring areas are the same as in 2015: Hides Ridge, Benaria Ridge, RoW near Gobe, and near Kopi Scraper Station in the lowlands. The same monitoring protocol is being used, and two groups work in parallel focusing on botany and entomology. The monitoring report should be completed mid-2018.

A paper 'Regeneration Monitoring on Pipeline Projects: the PNG LNG Experience' was presented by EMPNG's biodiversity staff at the Society of Petroleum Engineers Health, Safety, Environment and Social Responsibility conference in Malaysia earlier in 2017 (paper reference: SPE-17APHS-P-196-SPME-MS).

5.5.3 Recommendation

There are no recommendations on this topic at this time.

5.6 INVASIVE SPECIES, PESTS AND PLANT PATHOGENS

5.6.1 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. Supporting the Upstream and LNG Plant EMP's are a Weed Identification Manual, an Invasive Species Monitoring Protocol (currently finalized at Rev.0), 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 regular 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, with separate objectives and monitoring priorities. EMPNG's approach to weed management utilizes the identification and prioritization of weeds with each WMZ. 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.

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.

5.6.2 Observations

5.6.2.1 Invasive Species

Weed audit scope and analysis

EMPNG's review of the external weed audit methodology reported in our 2016 report has continued into 2017. EMPNG notified the IESC that one of the key findings of this review was that the term 'abundance' has been inconsistently applied during external weed audits conducted prior to Audit 10. When local abundance was recorded within a WMZ, it was applied across the entire WMZ, meaning that comparison of weed abundance data from one weed management zone (WMZ) to another, and from one year to another, is not possible. Weed distribution data presented previously was therefore not necessarily indicative of the spread of weeds within a WMZ or between WMZs boundaries. Previously observed weed range extensions should be considered simply as the anticipated wave of weed opportunism that follows the temporary expanse of bare ground associated with the RoW construction zone, which shifts from the lowlands to the Highlands. In addition, not all weed data gathered from the pre-construction surveys (PCS) were included within the 'baseline'; therefore some weeds later identified as 'new finds' in an area may have already pre-existed in an area. EMPNG therefore concludes that the only way to reliably present any trends from weed data gathered prior to Audit 10 is to use a simple presence/absence of weeds recorded across multiple audits, regardless of which WMZ they were recorded in the Upstream area. This provides a high-level representation of which weeds have been present/absent through time.

EMPNG has generally tracked weed observations by diversity, abundance and distribution, as per the EMP. For Lenders, one of several key reasons for tracking weed observations is to ensure that potential impacts

predicted in the EIS are avoided, and that mitigation measures proposed to avoid or reduce such impacts are effective. The EIS notes the invasion and spread of exotic/known weeds as one of the major potential indirect impacts i.e. the impact of invasive species being introduced and/or spreading through areas newly opened up by the project. For example, *Piper aduncum* was noted as a particularly serious risk due to its ability to alter forest habitats, potentially changing ecology and biodiversity. The magnitude, probability and significance of residual impacts were assessed in relation to mitigation measures being successfully implemented, such as restricted access.

Previous audits have noted the continued spread and increase in abundance of a number of P1 weed species, and that the spread of weeds between WMZs indicates the ROW and road to be a pathway for the spread of P1 species between lowland and upland areas (in addition to the other means of spread e.g. birds, walkers, etc.). From a *distribution* data perspective, we now have concerns on not being able to rely on historical distribution data within and across the WMZs of the Upstream area; from a *temporal* perspective, some changes in abundance through time may also not be accurate.

We agree that weeds opportunistically colonize areas where construction provides bare ground, and that the phased nature of the RoW construction results in a wave of ground exposure from lowlands to Highlands. We assume that inconsistencies in ‘abundance’ terminology don’t mean that records of the presence of a weed within a particular WMZ at a particular time can’t still be used when trying to understand distribution changes across WMZs over time. This information is especially relevant for weeds newly recorded in a WMZ that continue to exist in an area beyond early succession regeneration, or for aquatic weeds where their presence is newly recorded in a neighboring WMZ’s (i.e. in aquatic environments where typical succession phases are less applicable). We presume all weed audit records gathered previously have been recorded with date, species, lat/long GPS location, as represented in WMZ maps in weed audit report appendices. For significant priority weed species, we recommend investigating which significant weeds had indeed been newly recorded in WMZs, whether their presence had continued beyond the pioneer succession phase, and whether this had any potential for negative ecological impact (see Observation).

EMPNG reports they are intending to reduce the scope of weed audits of the RoW, particularly in the Upstream South area and proposes that audit inspections will instead focus only on priority ecosystems such as Lake Kutubu, the Homa-Benaria area, Hides Spine and main above ground installations. With the notification to IESC that historical species abundance has been inconsistently defined and applied, and the security/weather challenges to regular weed monitoring/control, we do not believe it is prudent to discontinue the assessment of weeds in any RoW areas at this time. We would caution against a reduction in scope of audits along the RoW until more clarity is available on reliability of weed data and weed presence across and within various WMZs (see Recommendation).

Weed Audit 10 was conducted in Oct 2016 by external invasive species specialists from the consulting firm Biotropica. Overall, no new weed species were recorded, and no range extensions between WMZs were observed. Audit Report 10 defines weed species ‘abundance’ as the number of sites a species occurs at during a given audit, expressed as a percentage of all sites. Using re-defined abundance data, trends over ten audit events indicate all P1 (Priority 1) weeds are decreasing in frequency across the broad Upstream area as a whole – see Figure below. Two weeds in particular are consistently found more frequently than other weeds when all sites are taken into account: *Desmodium sequax* and *Piper aduncum*. During Audit 10, *Desmodium sequax* was found at 34% of sites surveyed, and *Piper aduncum* at 40% of sites. Total weed diversity has decreased across all weed priority-rating classes since the PCS. Weed priority-rating categories are reviewed regularly, and Audit 10 finds that ten weed species previously rated as P1 should be downgraded to P2.

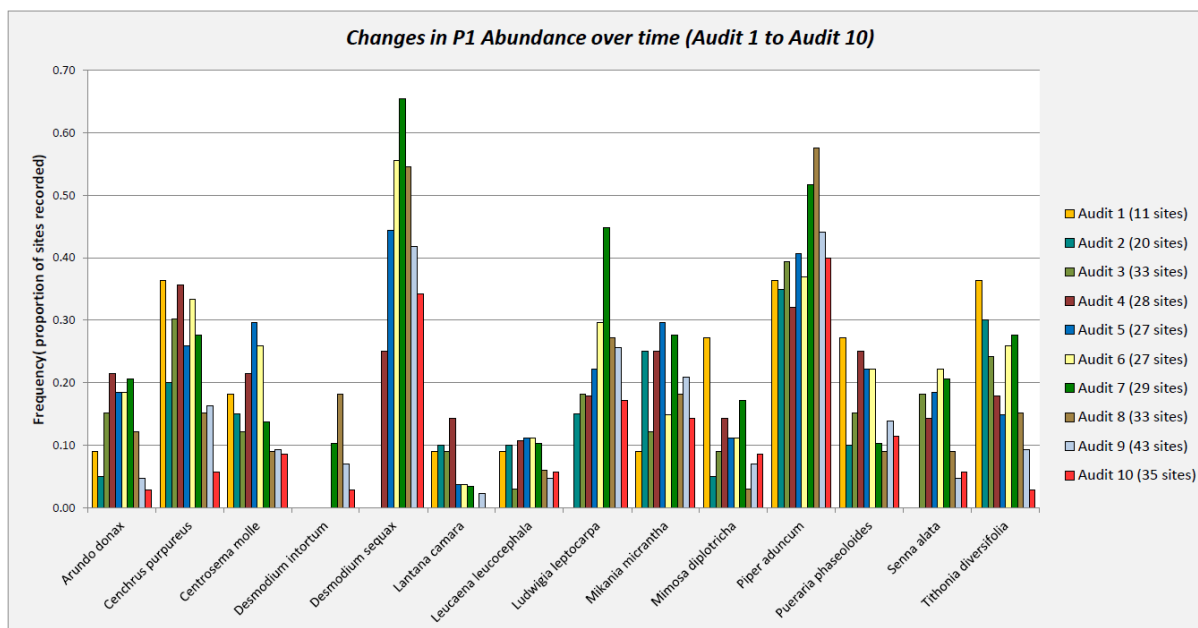


Figure 5.4: Priority-1 weed species abundance across audits to 2016 (Biotropica 2017)

This weed audit also reports on findings from the permanent monitoring plots that EMPNG added to the audit scope in 2016. These plots comprise 35 separate locations across all current WMZs, with static photo points at each to demonstrate changes in vegetation cover. The intention is to assess these plots during each audit, in addition to the more-unstructured walkabout observations of targeted areas along the linear RoW by the external weed specialists.

Audit 11 is scheduled to occur in a few weeks. After this audit, EMPNG intends to transition from their existing external invasive species specialists to a different provider, following a handover.

IESC has previously recommended that audit reports include additional context and analysis of results so that the reports benefitted from the expertise of the external specialists, as per earlier audit reports (e.g. context and advice provided in Audit Report 3) – this used to help highlight issues and potential areas of significance. Audit Report 10 contains little WMZ context and analysis, and contains zero recommendations.

As noted in the EIS, over the 30-year operational life of the PNG LNG project, potential indirect impacts such as weed and pest invasion (along with enhanced access to remote and pristine parts of PNG) will present some of the greatest challenges to the project. Understanding the spatial and temporal dataset of invasive species is necessary to deduce how successful mitigation measures are, know exactly where priority challenge areas might still exist, and where actions/resources should still be prioritized. This information, for example indicating where P1 outbreaks have remained beyond the post-construction early-succession phase, and where this may cause negative ecological impacts, is required for the IESC to determine the efficacy of EMPNG's considerable efforts. At this time, we therefore retain a weed-related Observation in the Issues Table.

Invasive species control and training/awareness

During our trip we spent time in the field with one of EMPNG's external weed-control contractors from MosquitoZone. We discussed their program and their approach in the field, and visited a number of areas near Lake Kutubu.

Field access for both regular and contractor weed monitoring/control is proving challenging due to security restrictions in some areas, prolonged wet weather in the south and access to vehicles. One area of note where lack of access is especially problematic is on the high altitude forest in the Homa area (a Priority Ecosystem) where *Piper aduncum* has been observed growing rapidly (see Recommendation).

EMPNG report that landowners continue to manage vegetation and weed removal through Clan Caretaking Agreements. Vegetation Management Plans are being developed for each project facility, where weeds are managed as part of general facilities maintenance. Collaboration with OSL occurs at Lake Kutubu. Cane toad management continues to be a challenge.

New ground disturbance procedures were used at greenfield and brownfield locations, prior to vegetation clearance and ground disturbance associated with the work at Angore.

Training and awareness programs have continued, not only for employees and contractors but also communities in the Upstream area, including engagements with various community groups at Hides.

EMPNG supported Biotropica's collaboration with NAQIA to produce and publish 'Exotic Plants of the Kikori River Basin', an excellent reference resource providing color photographs and detailed descriptions of 100 invasive plants.

5.6.2.2 Quarantine

Quarantine management performance data for 2017 YTD are included in the following two IESC graphs, presenting information on:

- top graph (see Figure 5.5): the proportion of consignments requiring a NAQIA inspection on arrival into PNG (showing numbers of consignments within the graph bars); and
- bottom graph (see Figure 5.6) 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 containers 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.

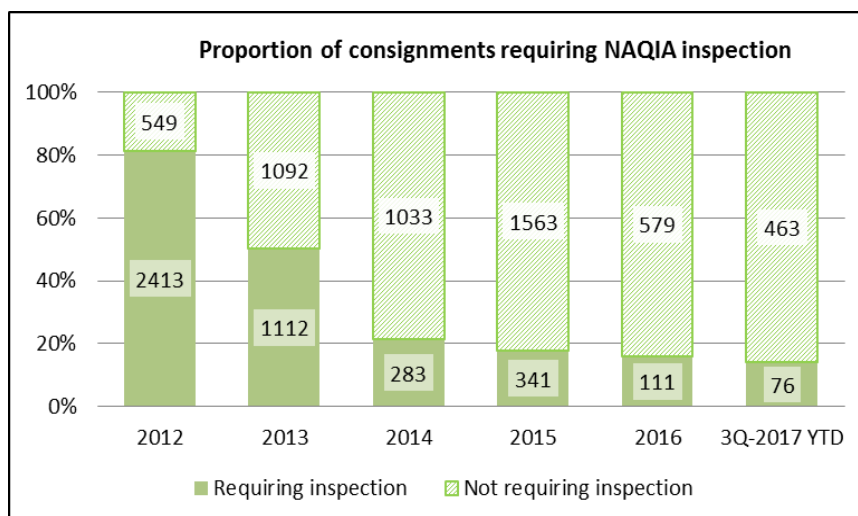


Figure 5.5: Proportion of Consignments Requiring Inspection by NAQIA

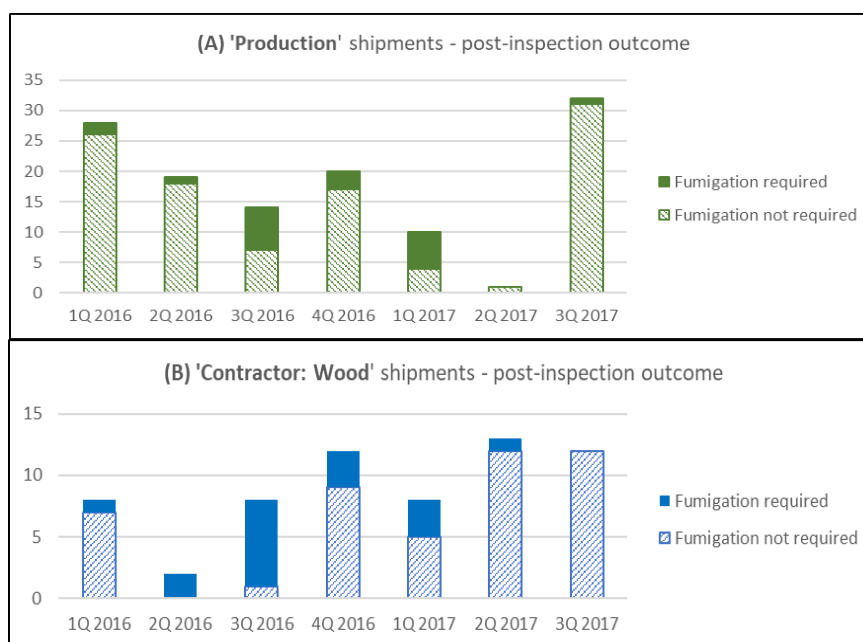


Figure 5.6: Inspection Outcomes

As can be seen in the bar values in the top graph, in general import shipment volumes have decreased from those handled during construction, although EMPNG predict they will be higher in 2017 (when full-year data is known) than in 2016 due to construction works at Angore.

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

- Production:
 - the need for containers to be re-fumigated following inspection remains at 16% YTD (same as 2016, although this masks differences through the year, as can be seen from graph (A) in Fig 5 above. A large proportion of full-container-loads (FCL) required refumigation during the

period 3Q 2016 to 1Q 2017 and also Wood's less-container loads (LCL) during 3Q 2016. The quarantine management of FCLs is within the control of EMPNG's freight forwarding contractors, as the container only contains EMPNG freight. Note: managing the quarantine-risk of LCLs can be more difficult due to only taking up partial space within a container, the rest of the space being used for another customer's freight. EMPNG Freight Forwarding Contracts stipulate the requirement for fumigation for all FCL at point of origin, so it is unclear why the high numbers of re-fumigations were required.

- EMPNG have advised us that investigations will be conducted, and a full analysis undertaken for each re-fumigation undertaken, to determine root causes and corrective actions.
- EMPNG air-freight shipments are up in 2017 compared to 2016.
- Wood contractors:
 - import shipments volumes remain similar to last year, with the slight majority as air freight;
 - there has been a marked improvement in the proportion of shipments requiring re-fumigation on entry into PNG, as shown in the lower of the two bottom graphs.

EMPNG anticipate that shipments are anticipated to increase in 2018 due to planned production shutdowns and associated maintenance needs (see Recommendation).

5.6.3 Recommendations

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

1. We recommend not reducing the scope of weed audits in the Upstream South area as proposed. With the notification to IESC that all previous abundance data is unreliable, and the security/weather challenges to regular weed monitoring/control, we do not believe it is prudent to discontinue the assessment of weeds in any area at this time. We would caution against a reduction in scope until more clarity is available on reliability of weed data and weed presence across and within various WMZs.
2. When safe to do so, we recommend prioritized dedicated vehicular access be sanctioned to allow effective weed control of the Homa Access road/MLV2 area.
3. Reiterating the recommendation made last year, and in light of the increased need for re-fumigation of Productions full container loads experienced since our 2016 visit, plus the increased shipments expected during the forthcoming quarters, we see the need for additional intervention and prioritized dialogue with EMPNG's Production freight consolidators/forwarders as previous interventions regarding performance improvement have not addressed the issue.

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 October 2017 visit. Social review activities during this visit included the following:

- Presentations by relevant project departments;
- Discussions with the resettlement and CDS teams;
- Discussions with National Content and Grievance Management teams;
- Discussions in the field with workforce management and accommodations managers;
- Discussions with O&M local staff at HGCP and LNG plant;
- Discussions at HGCP with ANUE CDS agricultural program team;
- Visit to and discussions with vendors from the eight women's groups participating in the community vegetable market at 3 Ways, a CDS activity that assists growers to sell vegetables to the HGCP food service;
- Flyover of Angore extension area to view Right of Way current condition and potential landslip area;
- Group discussion on use of royalty funds with the Village Resource Managers for the LNG Plant area villages;
- Visit to the Health Centre Papa Village (Plant Site area) being upgraded as part of CDS program;
- Visit to the NDB Women's Market Centre in POM supported by the CDS program; and
- Discussion with Esmie Sinapa on the School Board of Management training and general conditions in the upstream Project area.

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).

6.2.2 Observations

Remaining functions for land access, resettlement, and Livelihood Restoration remain under the Public and Government Affairs (P&GA) group. The Strategy and implementation of remaining tasks continues to be well organized and effectively managed and implemented.

6.2.3 Recommendations

None arising from this review.

6.3 MANAGEMENT OF DISPLACEMENT IMPACTS

6.3.1 Observations

6.3.1.1 Closing Out Original Resettlement Obligations

The IESC concludes that 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 landslide area). For the original Foundation Project resettlement, the Project conducted internal outcome evaluations of standard of living and livelihood conditions, a sample of which were field verified by the IESC. An experienced resettlement expert conducted a resettlement audit. Recommendations made by the IESC and External Auditor have been addressed.

The Project implemented the actions set out in the RAP for the Angore Tie-In Project using the processes documented in the Project's Resettlement Handbook. An internal outcome evaluation was done and the IESC has verified the results based on observation and detailed documentation. The Project has submitted a draft of the close out documentation to be added as an appendix to the full Resettlement Close Out Report.

Original Foundation Resettlement

Resettlement for the original Foundation Project has been completed by closure of the obligations remaining at the time of the IESC 2016 report. Outstanding obligations involved one remaining household that was in the process of resolving a compensation dispute with another party and two vulnerable households the Project was unable to close out because of their location in the Tumbi Quarry landslide area on which travel restrictions were temporarily imposed. Assessment of these three households indicates that (i) the household with a 3rd party compensation dispute has settled out of court and (2) the two vulnerable households have received all necessary compensation and livelihood assistance. The IESC has reviewed these cases and considers them closed.

Angore Tie-In Resettlement

The Angore Tie-in connects Angore Well Pad A and the mainline ROW through to the Hides Plant Site and involves:

- Approximately 1.3 km “greenfield” section between Angore Well pad A and kilometer point (KP) 10 on the operating PNG LNG Pipeline right of way (ROW);
- Approximately 10 km “brownfield” section that generally follows the alignment of the operating PNG LNG Pipeline ROW between KP 0 to KP 10;
- A 1800m² “brownfield” area located on the positive (approx. north) side of the Tagari River that will be used as a platform for the horizontal directional drilling (HDD) operations;
- A 5m by 100 m long “brownfield” area to join the existing track to the HDD platform; and
- A 30m by 1000m long “brownfield” area to string and fabricate the Angore pipelines' sections that will be installed across the Tagari River using the river crossing methodology – HDD.

Land acquired for the above expansion activities affected six households, most of whom had built “speculative” structures on the land in anticipation of compensation. Of the six households, one lost a bush

dwelling and newly planted garden, four lost fallow gardens, and one lost a fence. All affected households have gardens nearby. Affected households were adequately compensated and economically displaced households were offered participation in the livelihood restoration program. Most of the households were either employed and/or already had received multiple lots of livelihood materials and training under the Foundation Project Resettlement program. Results of an outcome evaluation of these households found that two households have improved conditions and four have maintained conditions. The IESC reviewed the evaluation documentation and concludes that obligations have been met.

Landslip Area Voluntary Relocation

In addition to the resettlement directly associated with the Angore Tie-In expansion, the Project discovered and investigated a potential landslip area outside of the Production ROW and the current Angore Tie-in construction footprint. The Project informed the IESC of the landslip potential and results of the technical assessment that indicates that the slope is sufficiently unstable to slip at any time thereby causing serious down slope damage. Though the Project does not need the down slope area, the Company encouraged landowners to relocate from the at-risk areas. Structure owners admitted that the structures were speculative, and agreed to leave the area and accept compensation at the speculator rate. The affected households are members of an extended family along with their pastor and all have well established and good quality structures (father has 19 houses elsewhere) and gardens at their normal place of residence. All households have returned to the original locations at Panguma (near TT Noa camp), Pandu (on the Tari to Nogoli Rd) and Hayanore (between TT Noa and KP 6 ROW).

6.3.2 Recommendations

None arising from this review

6.4 COMMUNITY IMPACTS MANAGEMENT AND SECURITY

6.4.1 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 New Guinean communities during production.

6.4.2 Observations

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.

Insecure conditions represent an escalating source of risk to communities, particularly in the upstream communities where tribal fighting has become more frequent and protracted. While tribal fighting is outside the Project's control, the Project is addressing it in several ways including monitoring, interaction with Security forces, and initiatives supported by the CDS Law and Justice components. Project Security supported establishment of Community Volunteer Committees from the Hides and Komo areas where much of the increase in tribal fighting occurs. The IESC observes that these Committees are a positive step toward acquiring community input on the triggers and measures the Project can take to help prevent or, at least, minimize the impact of tribal violence. The CDS Law and Justice component will work closely with Community Affairs to use these Volunteer Committees to identify law and justice projects.

6.4.3 Recommendations

1. See Section 6.5.3 *Law and Justice* for IESC recommendation.

6.5 COMMUNITY DEVELOPMENT SUPPORT PROGRAM

6.5.1 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.

6.5.2 Observations

6.5.2.1 Overview of CDS Program Achievements

Allocation of funds for CDS projects in 2017 is USD 2.75 million. Of the 24,000+ people benefiting from CDS projects, 47% are female. Approval for project execution reached 90% by September, but only 45% of the 2017 budget has been expended to-date for a variety of reasons, of which the main factors are:

- Increased security risks in the upstream Project areas, often due to tribal fighting, that constrain or prohibit movement. For example, delivery of seed, women's markets (14 out of a planned 47 cancelled), and School Board of Management (BOM) training have been interrupted, sometimes for long periods;
- Difficulty of securing land from villagers in the Plant site area on which to construct new facilities; and
- Operational inefficiencies, such as partners' contracting processes and inadequate technical capacity.

CDS activities, however, are showing signs of potential to bring significant and fundamental improvements on a wider and longer term level, for example:

- Government has become more engaged, collaborative, and positive about partnerships with the Project, partly in response to positive results of the School Board of Management Plant Site area program, illustrated by the roll out of this program to all of Central Province.
- Improved community understanding of CDS program goals and content is generating more support and higher participation levels. The IESC observes that community interest is growing from a combination of good communication between the Project and participants and community recognition of encouraging results. This is especially notable in the upstream areas where increasing numbers of males are participating leading to more sustainable livelihood improvements, as well as to more constructive family relationships between men and women.
- The IESC Social Expert visited the produce market set up collaboratively by CDS and by the Hides Alliance Group (HAG) to purchase produce for the HGCP camp from eight CDS supported women's/community groups who are now Project vendors. A group discussion was held with vendors, all of whom had participated earlier in the Women's agricultural program that was part of the resettlement livelihood program. The women are very enthusiastic about the market for the income they derive, as well as indirectly for freeing them from having to consume all the produce they grow. The women also mentioned that their ability to earn income has improved their status and encouraged men to become counterparts in the endeavor. Women continue to be responsible for the use of income earned from their produce, most often using it for education and health care purposes or to reinvest in income earning activities. All the women consulted also are eager to turn their efforts into a fully functioning business and see their soon to be finalized Vendor status as an important step forward.

6.5.2.2 CDS Program Component Highlights

The sections below describe inputs to, outputs of, and preliminary outcomes from each CDS component.

Livelihood Component

The main livelihood *inputs* for ***upstream communities*** in 2017 are:

- The Community Livelihood Improvement Project (CLIP) implemented by ANUE;
- A feasibility study for long term water supply for Hides, Angore, and Komo;
- Training for women in sewing machine care and maintenance & garment sewing; and
- Needs Assessment for Women's Economic Empowerment Strategy.

Key capacity *outputs* from the above activities include:

- Capacity to grow a variety of fresh produce has been acquired by 15 Community groups and six of these groups are now able to develop small produce enterprises;
- Sewing machine care and maintenance training was successfully completed by 77 women who are now able to train others in their respective women's groups; and
- The Needs Assessment for Women's Empowerment was completed and a findings report submitted.

Outcomes that have been observed to date (not yet quantified) include:

- Thirteen Community Groups are earning income through regular sales of produce sales resulting in improved livelihoods;
- The PDL 1 Women's Association is now registered as a supplier for fresh produce to HGDC and will acquire formal supplier status allowing payment through invoicing as soon as travel restrictions are lifted;

- A number of small businesses have been established (such as a Rural Women’s Bakery, flour milling);
- Communities have taken ownership and are supporting a planned long term water supply project; and
- More youths are becoming involved in social programs and long term life skills initiatives.

CDS *downstream projects* for the indirectly affected LNG Plant area villages have focused on education and education/health infrastructure. The main livelihood activity was a modest vegetable gardening project that was inhibited by lack of good soils and a prolonged drought, though improvements to participating households’ subsistence and some modest income increases have occurred.

6.5.2.3 Going Forward – Strategy Reassessment for Mid-Term CDS Livelihood Program

A third party review of the first phase of the CDS Livelihood Component was undertaken in early 2017 by Coffey Services PNG LTD. EMPNG management accepted the review report in July 2017. Review results were generally positive on the strategic relevance, effectiveness, impact, and women’s economic empowerment aspects of the *upstream* livelihood program, but made some recommendations for improvements were given. Review results for the **LNG Plant area** village’s livelihood program were less positive and recommended a fundamental review of strategy.

The Project, in response to the review findings, organized a Management Response Workshop, the objectives of which were to:

- Discuss and prioritize key next steps based on review results;
- Review the Livelihood Program Design to determine the way forward for the interim (next 5 years) for each target geographical area, involving:
 - Revision of Livelihood Program design based on review of the key outcomes sought from investments,
 - Identification and prioritization of key projects to be undertaken in the next 5 years,
 - High level implementation strategy/ road map for the next 5 years,
 - Initial design of a monitoring plan at the program level.

The IESC’s review of the Coffey report found many of the observations and recommendations to be correct and constructive, though rather weak in terms of evidence for its conclusions. The Coffey recommendations the IESC considers most critical are summarized below:

- The overall strategy of the livelihood support program lacks a focus on youth which is a significant issue of concern with respect to the prospects for sustainable community development. The IESC adds that a focus on growing the livelihoods of youth is also important for its potential to give youth the status to address issues such as family and clan violence.
- The program focus in the LNG Plant area does not appear to be based on any robust problem analysis, and to have merely evolved from previous activity rather than any purposeful intent to design a project with clear and achievable objectives. Agriculture does not appear to be a strength of local communities who are in a peri-urban area near POM that offers livelihood improvement options that extend beyond agriculture. The IESC adds that agriculture as an income enhancement measure beyond some individual households is inhibited also by lack of water, poor soils, and lack of tradition in the area. The Plant area villages, in contrast, have a long history of fishing and already were marketing fish to POM and that income opportunity is now enhanced by the presence of the new fish market in POM. Fishing and the marketing of fish would also offer an opportunity for both males and females to be play a larger and more equal role by using a common approach wherein males (and some females) do the fishing and the women prepare and help market the fish.

- The CLIP upstream agricultural project design should be reviewed to clarify project objectives and establish a simplified framework that clearly defines planned outputs and a higher level outcome linked to the project purpose, together with a limited number of meaningful indicators aligned with each level of the hierarchy of objectives. The IESC adds that it has requested in the past the outcome indicators for *each CDS component*. These indicators are necessary to measure achievement toward meeting the goals and objectives of each component which together help define achievement of the CDS *program* goals.

The CDS team is in the process of developing and expects to complete a *Livelihood Program Strategy Document* in Q1 2018 utilizing input from the review and workshop and based on a deeper situational analysis. The Program Strategy document will define projects per site and include indicators and means of verification and stakeholder input.

The Project has already taken on board many of the recommendations and is addressing them in 2018 CDS planning. The most important revisions or additions are listed below.

2018 Planning Upstream:

- Continue supporting the 15 community groups through CLIP;
- Working with ANUE to shift to 5 year CLIP strategy;
- Add to ANUE program strengthening the capacity of targeted agricultural group members to deliver extension outreach to the larger groups of participants;
- Explore market development with Provincial government;
- Collaborate with government and other partners to implement long term water supply project;
- Identify, partner for and develop a youth targeted empowerment strategy focusing on life skills and leadership training; and
- Develop women's empowerment strategy that adds focus on adult literacy and leadership training.

Longer term Upstream: Explore with Provincial Government longer term agriculture sector plan

2018 Planning Plant Site Villages:

- Develop a more diversified livelihood strategy for Plant Site communities (e.g., fishing and marketing, business development, retaining some gardening for subsistence purposes); and
- Investigate marine economy involvement and tourism, including training & promoting sustainable coastal development and management of marine bio-diversity & resource management.

Longer term Plant Site Villages:

- Improving food, energy and water security of the local population.
- Catalyze development of new industries and business by leveraging off farm income generating opportunities & models for skill development. Examples include industries based in hospitality and other vocations where employment pathways exist given proximity to POM. Introduce low cost access to training programs, development of open access training facilities and strategic partnerships for multiple levels of supply chains to support new business formation and job creation. Advancing PNG-WLN members and their various institutions.

Longer Term Right of Way

- Promote in collaboration with National Content, Community Affairs and Environment, eco-tourism development by supporting local efforts to manage bio-diversity and eco-systems. Incentivizing investment into underutilized landscapes to enhance eco-tourism which recognizes and maintains social, economic and cultural benefits of biological heritage.
- Identify and develop strategic partnerships through fostering adaptive capacity of Lancos/Communities to support enabling new eco-system based industries.

CDS Education Component

The CDS Education component has focused to date on infrastructure improvements and capacity building in the form of the school Board of Management Training (BOM) in the LNG Plant area. During 2016, an external education needs assessment (by Esmie Sinapa) was conducted in the Upstream areas involving 10 schools in Hides (Hela Province).

Key accomplishments of the Education program include:

- School BOM Training completed for 132 community participants;
- Based on the success of the BOM program in the Plant area, the Central Province of PNG formally agreed that BOM training will be rolled out across the Province;
- The Board of Management Training Manual was published and endorsed by the Central Provincial Government and the National Education Department;
- The upstream province of Hela with Project support is now able to finalize and launch its 5 year Education Plan;
- Work plan for School BOM Trainings for 2018 in Hela province; and
- Improvements (classrooms, computers and labs, WASH facilities, etc.) were made to 10 upstream schools.

Next steps include:

- Continue support to Central Province Government for roll out of School BOM Training Manual;
- Launch EMPNG 5-year Education Strategy for Hela Province aligned to the Hela Provincial Education Plan;
- Continue school facility upgrades or improvements identified through targeted School SLIPs (School Learning Improvement Plans); and
- Identify and roll out teacher training either through existing scholarship program or targeted trainings.

CDS Health

The CDS Health component has provided the following support in the last year:

- Scholarship support to increase community health workers for health centers in the Project area. Twenty students from Project area are enrolled in and seven will graduate this year from the community health worker course through PNG LNG Scholarship program.
- Infrastructure support for water facilities for three health institutions (Nipa and Tari Hospitals upstream and Papa sub-health center near the Plant site area);
- Health center building refurbishments and solar power projects done for 4 health institutions (Para, Baguale and Komo upstream and Papa SHC near the Plant site area); and
- Health awareness and donations (TB, Cancer, Conjunctivitis and lifestyle diseases) through sponsorship and contributions programs.

The Para Sub-Health Center has seen significant patient uptake as result of the upgrading (clinic building with pre-and post-natal care, staff house and ambulance) supported by the Project. For example, pre-natal and deliveries increased by 37% and in-patient care was able to be provided for the first time (120 patients). Staffing also will increase from two to four full time staff with 1 IMR staff due to new staff accommodation. Strong community ownership and support of the facility continues, illustrated by a new community set and patrolled rule that prohibits weapons in the clinic area.

The Health program will continue to offer scholarship opportunities in Community Health Care to project area persons and physically upgrade targeted health care facilities. The program also plans to support much needed improvements in health data collection and management working with either the health facilities

themselves or with the provincial health authorities. These improvements will assist in health trend analysis.

Law and Justice

The goal of the Law and Justice component is to improve safety in the communities around the Project sites by supporting the capacity of communities to self-regulate and manage law and justice. This is particularly important in the Project's upstream areas where law and justice mechanisms are weak and challenged by a combination of tribal fighting and domestic violence. The security situation is increasingly a threat to both communities and the Project. Security is less of a risk in the Plant site area and POM, though domestic violence and crime are problems that are, reportedly, escalating in frequency. In addition to posing threats to people's safety, these conditions undermine economic and social development.

The Law and Justice component to date has indirectly addressed the effects of insecure conditions through the programs implemented under the other CDS components that seek to enhance livelihoods, health conditions and education levels. The close community involvement of the Project with communities and local Government afforded CDS components also provides the Project with a better understanding of law and justice conditions in order to develop more direct assistance to enhancing law and justice.

The Project is supporting both government and non-governmental agencies in their efforts to address law and justice (such as United Church Youth Ambassadors for Peace program) and is planning to support other Country donors doing peace and conflict work in the Highlands. The Project is also initiating discussions with Government on potential support. CDS is working closely with PNG LNG Community Affairs to use the recently formed upstream Hides and Komo Volunteer Committees to identify a law and justice project. Additionally, the CDS sponsored youth and women empowerment strategies have a component on law and order (particularly domestic violence, at this stage).

The 2016 IESC report recommended that the Project consider addressing domestic violence as part of the law and justice component. The IESC proposed that the Project consider an awareness and advocacy strategy that draws on selected male PNG staff as champions against domestic violence inside the Project and, depending on the results of the "inside Project," supports a similar awareness campaign in Project area villages using champions perhaps chosen from among the school BOM program male participants. The IESC continues to recommend that the CDS Law and Justice component in collaboration with PNG LNG Security find a way to more directly address violence by consulting with a representative group of the PNG workforce on an approach to raise awareness of the negative consequences of violence against women/children, as well as of tribal fighting.

Tribal fighting represents a fundamental barrier to livelihood growth and other development, particularly in the upstream project areas. The IESC recommends that the Project use the strength, skills and status of its PNG younger workforce to address clan violence. Youths (males and females) are in a position to help the Project decide how best to approach violence as they have been exposed to concepts of psychological well-being and self-worth through Project trainings, as well as to a wider world view and different ways of looking at life through interactions with people from other parts of PNG and other countries. Considerable actual and anecdotal evidence was given to or overheard by the IESC Social Expert that indicates these experiences are having a positive influence on youth perceptions and behavior leading to questioning of the purpose and wisdom of traditional violent behaviors. Young people who have improved their lives as a result of on or off Project employment or participation in Project support programs do not want to lose their gains (jobs, new houses, less conflict in their lives, etc.). Moreover, male community youth are becoming increasingly involved in project livelihoods programs, thus have a vested interest in preserving them.

The Project might lead an initiative such as the one described above or support existing Government initiatives. An example of a Government initiative appears in a November article in PNG's Post Courier describing a violence awareness forum in Tari Pori District co-hosted by District Development Authorities Youth Office and Voice of Hela (an NGO). The initiative is meant to provide an open forum for Government and communities to better understand the causes of tribal fights with a special emphasis on

ways youths can be assisted to resist tribal fighting and “lead a changed life.” A number of international agencies, such as UNICEF and the International Committee of the Red Cross (ICRC) are also tackling domestic and tribal violence.

6.5.3 Recommendations

Livelihood Program

Revised Planning

1. The goal is of the CDS *program* as a whole is clear - to “promote development of conditions conducive to enhancing economic self-reliance of individuals while also mitigating potential harmful impacts” [of the project]. The goal and the objectives of the *livelihood component*, however, are less clear and, in the opinion of the IESC, this lack of a clear goal inhibits the planning process. A goal can be described as the ultimate destination and objectives are the strategies or implementation steps to attain a goal. Objectives are precise and directly targeted to meeting the goal, are measurable, and have a defined completion date. Measurement of objectives, thus, provides timely signals on the progress toward meeting the ultimate goal. In order for the livelihood strategy revision to be effective, a specific goal and specific objectives need to be set so that the actions chosen are those that have the highest potential for achieving the goal and that actions that, though in some way related to a goal, are recognized as non-essential to meeting the goal and are eliminated.
2. Program and component level monitoring and evaluation (M&E) need to be formalized in a CDS M&E Procedure (as was done for resettlement) to ensure consistency throughout CDS implementation. Component level indicators that will be used to measure achievement toward meeting the goals and objectives of each component (in this case livelihood) need to be identified *before* implementation begins and any baseline data to measure pre-versus post project conditions collected.
3. The IESC strongly endorses the five year period for an Interim Phase livelihood program proposed by the CDS team with an evaluation at the end of year three. Long experience with community livelihood programs indicates that shorter periods generally do not bring long term benefits, particularly where participants are like the communities in the PNG highlands who have few other opportunities) and tend to need extensive follow up.

Programmatic

1. Upstream: The IESC agrees that expanding markets (Tari being considered) should be the focus of interim phase livelihood activities, though advises the Project not to be overly ambitious thus focusing on perhaps two additional markets in the next few years as considerable pre-training in quality and quantity and marketing business practices and follow up will be needed. The Project could also examine the possibility of using the Komo airport for export of community products in the long term.
2. The IESC endorses the proposal by ANUE to use advanced agricultural participants as extension providers, as long as ANUE is prepared to train and monitor and report on them.
3. Upstream: Lack of security of movement is a significant constraint to CDS programs. Adding youth as a focus group for livelihood support could have the additional benefit of reducing family and clan violence. See recommendation in Law and Justice Section 6.5.2.
4. LNG Plant site villages: The IESC agrees with the Coffey evaluation’s conclusion that agriculture as the main community livelihood activity is not warranted for a number of reasons, including lack of water, poor soils, and lack of tradition which have led to benefits to only a minority of households. The IESC suggests that gardening for household use could be

continued as long as community members are interested enough to participate actively, but would be an adjunct to a larger effort that focuses on fishing, accessing markets (such as the new fish market at POM), and acquiring the necessary marketing and business and money management skills. This program would require the services of external expertise in managing and training for such a project.

5. LNG Plant site villages: The IESC endorses working with the Village Resource Managers (VRMs) who are responsible for managing use of the portion of Royalty payments earmarked for community use. The IESC met with VRMs who demonstrated that they are knowledgeable and active in assessing the most strategic use of these monies and that they are keen to discuss co-funding of infrastructure projects with the Project. The IESC, based on its discussions with the VRMs, believes that co-partnering would have the added benefits of keeping the Project aware of royalty use and giving communities the ability to demonstrate resolve to take an active part in their development.

Implementation Resources

1. CDS field staff is doing admirable work, particularly considering the demand for their input, the distances between activity locations, and the constraint of a difficult security environment. The IESC observes that an additional community person for the upstream areas would greatly enhance the outcomes of the CDS program.

Law & Order

1. Violence Law and Justice program: Consult with younger members of the PNG workforce regarding activities best suited to helping other youths recognize the downside of domestic violence and tribal fighting and promote ways to discourage it more effectively and widely.

Education

1. During the 2018 IESC visit, the IESC would like to have a discussion with at least one highlands education “group” participating in the CDS program. Note that the Project scheduled a visit for 2017, but it had to be cancelled due to insecure conditions.

Health

None arising from this review.

6.6 STAKEHOLDER ENGAGEMENT AND CONSULTATION

6.6.1 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.

6.6.2 Observations

The IESC compliments Project leadership and staff on the collaborative effort between Community Affairs and other project units in conducting engagements on specific topic. This collaborative approach is critical to ensure that messages are consistent and methods of engagement are appropriate for the subject of the engagement as well as for each participant group. PNG continues its wide and frequent engagement with stakeholders. Project engagements in 2017 with communities, its closest stakeholders, total to date 7,281

involving 172 communities and 62,033 participants. Participant numbers are considerably less than at this time in 2016 largely because people were focused on the 2017 National elections, travel and access constraints in upstream areas associated with tribal fighting, and protests at the LNG Plant area villages over the delay in Royalty payments.

Community Engagement topics in upstream areas have covered a wide range of environmental, safety/security and social issues. Social issues addressed in both upstream and plant areas now reflect community interest in the Project's community development efforts.

The Project responded to the IESC's concerns regarding potential in-migration facilitated by opening of Project built roads. In-migration monitoring shows that in-migrants have not been as numerous as expected undoubtedly because of the clan based land tenure/use system and diminished economic opportunities post Project. Community Affairs continues to support "outside the fence" activities including the iHDSS data that is used to monitor in-migration.

6.6.3 Recommendations

None arising from this review.

6.7 COMMUNITY GRIEVANCE MANAGEMENT

6.7.1 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.

6.7.2 Observations

6.7.2.1 Issues and Grievances Submitted

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.

Issues submitted to the Project in 2017 to date total 642, significantly less than in individual years from 2014 through 2016. The Project attributes the decline to the initial competence level of users of the new Isometrix Issue Management System. As competence grows, issues can be expected to rise. Issues submitted fall into the following categories:

- Land access and agreements, PL ROW Caretaking activities (CAA/CCA) and requests for change of clan agents (22%);
- Strategic Community Investment activities and initiatives, employments and requests for business development opportunities (21%);
- Employment, Community health and safety awareness programs (18%);
- Requests related to school improvements, community support, training, scholarships(15%); and
- Delayed Government payment of royalty benefits and other outstanding government issues (11%).

The number of grievances has steadily declined since 2014 with 37 grievances filed to date in 2016 and 32 filed by the same period in 2017. The Project attributes the reduction in grievances to the far fewer number of work fronts than during the construction phase and steady state operations during Production. The Project anticipates an increase in grievances as more work fronts are added. A recent increase in grievances occurring in the upstream areas (Hides and Angore) is being assessed.

The main topics of grievance filed are given below:

- Environment 25%: Related mostly to various water related issues, emission such as flaring, traffic management, helicopter rotor draft impact and landslip attributed to heavy machinery traffic at ROW KP10;
- Land 19%: Land rentals/deprivation payment related claims due to internal clan disputes and/or court orders, use of limestone without consent, environment damage at laydown and quarry, and under payment of rentals by a clan despite owning a larger portion of land hosting Kutubu MLV and associated facilities;
- Social 17%: Impact by helicopter operation, refusal of a community member to remove fencing put up to keep pigs out; and
- Other 19%: Mainly in Angore - helicopter rotor landing wind draft impact to garden crops/dwelling structures, new garden improvements in wrongly demarcated area due to damages during works, and death of pig claim attributed to consumption of geo-fabricated material from construction site.

Grievance closure rate achieved the 75% target rate with six periods above 75%. Ten grievances required more than 30 days to close and three remain open for much the same reasons as in 2016, such as requiring detailed field inspections, need to involve various parties within and outside the Project, and frequent engagements to agree on resolution. A few cases were advised to resort to the court system as a proposed resolution could not be reached. The IESC was given, as requested in the IESC 2016 Report, and reviewed the details (including photos) on each of the open or lengthy cases and accepts the Project decision.

6.7.2.2 Going Forward

The Project will maintain continuous focus on managing and identifying trends in grievances and issues and evaluating KPIs in light of the recent increase in submittals in the upstream Project areas. Grievance and Issues management will support future EMPNG expansion in PNG, as well as ensure Foundation Project procedures are appropriately followed and lessons are learned and incorporated in management methods. Isometrix IMS users will receive additional training to enhance implementation of the Grievance Mechanism.

6.7.3 **Recommendations**

No new recommendations arising from this review. All recommendations in the 2016 IESC report have been met.

6.8 **STATE CLAN BENEFITS INTERFACE -UPDATE**

6.8.1 **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.

6.8.2 **Observations on Status**

The distribution process for payment of royalty monies to landowners in the Project affected areas has recently progressed. For the *LNG Plant area villages*, Ministerial Determinations were made public on 21 October 2015 followed by a delay in payment until LNGP area landowners staged a peaceful protest on 20 Feb 2017. In March, the Mineral Resources Development Corporation (MRDC) began the process of having a person from each village elected to serve as Directors on the Gas Resources (GR) Board of Directors and elections were completed by 25 March. Payment of royalties (current and back payment) was made to downstream villages on 13 September 2017. Focus has now shifted to payment of equity dividends from MRDC into the clan accounts by the end of 2017.

The allocation of royalties within each village is divided into the following three categories:

- 40 % to Clans which in turn divide the monies among clan members (paid in cash);
- 30% to a Future Generation Trust Fund; and
- 30% to a Common Fund for village improvements.

The IESC met with the GR Directors (called Benefits Resource Managers) who supervise development of proposals to the GR Board for use of monies from the Common Fund for community improvements. The discussion indicated that the Managers are knowledgeable and active in assessing the most strategic use of these monies and that they are keen to discuss co-funding of infrastructure projects with the Project. See Section 6.5.1 No. 5 for IESC recommendation.

Progress has also been made toward payment of royalties to upstream clans, though some legal issues remain to be resolved. The previous term “clan vetting” as the basis for payments has been replaced by the term Land Owner Beneficiary Identification (LOBID) in an attempt to make the process more inclusive. A press statement from the Minister for Petroleum states that his “Department [is] focused on resumption and completion of the LOBID programme in the other Project [upstream] areas. . . the National Executive Council (NEC), on 2nd November 2017, approved the funding. . . LOBID programme and the team structure to recommence the work immediately.”

The Project’s strategy remains to mitigate near-term risk, support resolution of underlying issues, and capture lessons for potential future projects. The Project also continues its advocacy with the DPE and other key Government stakeholders toward payment of benefits to upstream clans.

7 LABOR AND HUMAN RESOURCES

7.1 INTRODUCTION

The IESC consulted with a variety of people and groups during its October 2016 visit. Activities included the following:

- Presentations from labor related Project staff;
- Tour of the LNG plant accommodation and discussion with camp management;
- Discussions with O&M trainees at both HGCP and the LNG plant;
- Visit to the HGCP accommodation and discussion with camp management; and
- Discussion with the counselors for the Workplace Assistance Program.

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 labor grievance management process is part of the Project’s Procedures & Open Door Communication Policy. Nearly all grievances and issues are initially addressed by immediate supervisors. 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 hours have been lost due to industrial action. Seasonal payroll queries remain the main issue largely related to tax calculation and exemption during Qs 1 and 2 of 2017, while salary packaging/sacrificing was the main issue in Q3.

The number of grievances filed to date is remains low. The 10 grievances received in 2017 to date are identified below:

- Harassment: Two from direct hires and 2 reported by contractors, of which two were determined invalid and two required disciplinary action; and
- Irregularities (all theft): one POM contractor reported, two upstream contractors reported, one LNGP EMPNG reported and two upstream EMPNGs reported.

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.

7.2.2.2 Gender Issues

Counseling Service

The 2016 IESC report recommended that the Project continue the services of the female counselor at HGCP. The Project has contracted counseling services under the Project's Employee Health Advisory Program from Magellan Healthcare. The male counselor has considerable experience in employee counseling in similar projects and Magellan has retained the Project's previous female counselor. The Project disseminates a notice regarding their visit times/days to the various Project sites, as well as telephone numbers employees may call or text regarding appointments and other issues. The IESC met with the male counselor who indicated that the major concerns are stress and work-life balance and stress related to the increase in tribal fighting for males and domestic and tribal violence for females.

Domestic Violence

The 2016 IESC report recommended the Project consider organizing a voluntary team of PNG male staff to engage male PNG staff on the issue of violence against women and children. The Project has taken steps to explore the development of a culturally appropriate program to heighten awareness of domestic violence in the community and the role of men in curbing that violence, within a framework that supports current initiatives being carried out internally and externally in the wider community. A number of activities have been undertaken to incorporate a program that involves the Project workforce, including:

- Consultation with Business Coalition for Women (BCFW) – understanding the components of their Family and Sexual Violence Model Policy;
- Testing the male champions model with a senior a well respected Papua New Guinean male employee; and
- Consultation with Aila Consulting – a local consulting firm experienced in discussing domestic violence.

The IESC agrees that seeking input from knowledgeable groups is useful to developing the strategy. IESC, however, suggests that the Project consult with a larger cross section of PNG employees of different age groups and job types to contribute their ideas on the use of staff in such a strategy.

The Project also supports a number of external projects that aim at reducing domestic violence, including:

- **Digicel Men of Honour** – Sponsorship to the Digicel Men of Honour Campaign that awards and recognizes the outstanding contributions of men in the community to curb domestic violence at all levels;
- **Coalition for Change (CFC)** - Funding to CFC who were instrumental in developing and having the National Executive Council (NEC) approve the Family Protection Act (FPA) legislation;
- **Partnership between ExxonMobil PNG Limited, Advancing PNG: Women Leaders Network Inc. and The Kutubu LLG Council of Women** – A community outreach program dedicated to raising awareness on the elimination of violence against women; and
- **Partnering with PNG Tribal Foundation - Senisim Pasin Campaign** – using the film 'Senisim Pasin' (change our ways) to foster open conversations at work and in communities about Gender Based Violence.

Continuing frequent engagements with a variety of organizations including BSP-Meri Safe, Population Services International, City Missions-House Ruth Ginigoad-Meri Safe Bus and Femili PNG, National Capital District Gender

7.2.3 Recommendations

1. The IESC suggests that the Project consult a larger cross section of employees to contribute their ideas on the use of staff in the domestic violence strategy.

7.3 PROCUREMENT AND SUPPLIERS

7.3.1 Project Strategy

Project commitments for procurement and supplier management are contained in the Procurement and Supplier Management Plan. The objectives of this Plan are the same as they were for construction:

- maximize procurement from local suppliers and economic benefit for local businesses;
- improve capacity and skills of local business to capture business opportunities associated with the Project, both locally and nationally; and
- ensure that EMPNG environmental and social standards and commitments are adequately communicated by the contractor to its subcontractors and suppliers and included in their contractual arrangements (as outlined in Table 4.1 of the Plan – *Risks and Impact Mitigation*).

The Procurement Manager is responsible for implementation of this Plan and owns this Plan from an OIMS functional perspective. Contract Owners and Administrators and Site Managers are responsible for contractor management in relation to this Plan on a day-to-day basis. Contract administrators monitor the actual compliance to the conditions of each contract.

7.3.2 Observations

The Project continues to purchase as much as is possible from local suppliers and to support local suppliers and contractors in implementation of the Production ESMP. The Project has added two new local contractors (PNG MPHS and Black Swan). ESMP requirements are now formally specified in contracts. All contracts are reviewed in accordance with OIMS 8-1 Contractor Classification Reviews for ESMP Applicability. Contractor data are formally stewarded quarterly by the Lender Advisor, the National Content Team, and CAs/COs. Closure of any gaps in compliance is reported using Project provided templates. See Section 7.4.2.2 for information on local contractors as part of the National Content program.

7.3.3 Recommendations

None arising from this review.

7.4 NATIONAL CONTENT

7.4.1 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.

7.4.2 Observations

7.4.2.1 National Workforce

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

Statistics

The table below shows statistics for various aspects of the workforce.

Statistics on Workforce		
Total Workforce across Project	3,027	
Foreign Nationals	588 (19%)	
PNG Workforce	2,469 (81%)	
EMPNG Workforce (direct hire employees or employees from recruiting agencies)	494 (20%)	
3 rd Party Contractor Workforce	1,975 (80%)	
PNG Citizens Female workers	552 (22%)	
Origins of PNG Workforce		
Local origin	957 (39%)	
Regional origin (P2)	758 (31%)	
From non-Project areas	754 (31%)	
Job Categories		
Management Responsible for supervising workers or for managing a SOW)	PNG 171 (7%)	Foreign 197 (34%)
Office	PNG 324 (13%)	Foreign 30 (5%)
Field - Both technical and non-technical roles	PNG 1,974 (80%)	Foreign 361 (61%)

Training

Trainees from Intakes I, II and III Operations & Maintenance (O&M) training have had 47 technicians promoted in August to Tech 2 or above thereby replacing Tech 2 expatriate staff. Training Roadmap review and implementation for Maintenance have been completed and supervisor roadmaps are under review to address step up requirements. Nineteen Electrical Technicians from Intakes I and II are working through the Electrical License process with the first licensed technicians expected in Q1 2018.

Training Intake IV, begun in August 2016 and is expected to end mid-December 2017, focuses on 16 Junior Technician trainees and consists of training in Oil and Gas Fundamentals, Live Processing Plant construction & commissioning and behavioural development in safety & work management. In May 2017, separate craft specific training was started for operations (9 trainees), instrumentation (3 trainees), mechanical (3 trainees) and electrical (1 trainee). Trainees are expected to start work in mid-January 2018.

Intake V is scheduled to begin in mid-2018 with successful trainees ready for work on the Project in 2020.

In addition to training, the Project's PNG workforce is offered a variety of less formal development opportunities, such as:

- Em Pasin bilong ExxonMobil long PNG (Em pasin bilong ExxonMobil long PNG or “the way we do things at ExxonMobil in PNG”);
- Eda Wanwok Toastmasters Club;
- Science Ambassadors Program (SAP);
- Women in Energy Network (WEN); and
- ExxonMobil Social Club (EMSC).

The objective of the Toastmasters Club is to help employees be productive and comfortable in their workspace by promoting open and confident communication. The IESC Social Expert sat in on a Toastmasters Club gathering during this visit, and observed that speaking openly, clearly, and with confidence are important skills for PNG staff to acquire as they tend to be, as the Project put it, “once reserved individuals.” The IESC Social Expert has experienced this characteristic working with field teams on resettlement outcome evaluation and saw vast improvement in their speaking ability as a result of being encouraged to express their opinions openly and clearly. Female field staff caught on more quickly than the males, but rallied the males with lots of often humorous encouragement. Discussions with O&M trainees also highlighted the significance of these kinds of skills development. When asked what they liked most about the training and work experience aside from acquiring technical skills, they agreed that the confidence they gained was invaluable in and outside of the work environment. Several trainees noted that they initially found it difficult to speak freely at work, but overcame this reluctance fairly rapidly as a result of the encouragement they received from their foreign mentors and supervisors.

7.4.2.2 Local Procurement

Spending on services provided by Papua New Guinean companies has reached 13.2 billion kina (\$4.07 billion US). In addition to the existing contracts, the Project has added two new local contractors (PNG MPHS and Black Swan).

Helping local contractors grow

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.

The TWM contractor illustrates the kind of development support the Project provides. TWM has operated a range of potable and wastewater treatment plants across the PNG LNG facilities for a number of years. Once the Project realized that TWM, though experienced, needed some additional training and qualifications, it helped the company contract a training institution to provide formal training and qualifications in water operations to its plant operators. As a result, TWM has been employed on several major PNG LNG shutdown works, most recently completed was the catalyst and activated carbon change out of the molecular sieve vessels and the Amine carbon filter medium vessel respectively. This project was high risk and the first of its kind to occur on the PNG LNG project

The Business Enterprise Centre (BEC) was established in 2010 to help build local business capacity. It now has 1500+ local businesses registered, including Land Owner Businesses Companies (Lancos) and other local companies some of which are women owned. Business development services for PNG companies from the Project areas (for example, LABA & HDGC have 318 trainees in 2017, up from 215 in 2016) are funded by EMPNG through a partnership agreement. Service categories include business training, business advisory, mentoring and coaching, SME Leadership Awards, PNG Employment and

Supplier Database, and the Project Information Centre. Business training and development involves basic, business writing, director training, project management, and proposal writing.

7.4.3 Recommendations

None arising from this review.

7.5 WORKFORCE ACCOMMODATION

Both the HGCP and LNG camps are well managed. The two camps serve rather different purposes in terms of number and length of time occupants remain. The IESC has stayed at the HGCP camp many times and for reasonable lengths of times during which we have had opportunities to interact with occupants. The IESC visits the LNG camp during its Project monitoring visits, but a short visit is not the same as being an occupant even if for only a few days. Some observations on the LNG camp, therefore, may be less informed than are those for the HGCP camp.

7.5.1 Observations

7.5.1.1 HGCP Accommodation

Camp Management has introduced some useful community engagement activities including the weekly local community markets, community group visits to the camp and refurbishing of a community hall.

As mentioned in previous IESC reports, the Hides camp has a noticeable community atmosphere confirmed by comments made by occupants in both informal conversations and more formal discussions (such as the O&M trainees). Camp management continues to make improvements including:

- Renovations to the commissary including installation of EFTPOS (electronic payment system) and greater variety of products;
- Refurbished ablution blocks in Accommodation Block 2;
- New gaming machines;
- Fitted local carving decorations in the Mess Hall;
- PNG Independence Day Celebration;
- EdaWanwok Toastmaster Club;
- Trivia Nights / Basketball Tournament;
- Hosting sports final events - TV airing in Laitebo Hall or BBQ area (football, boxing); and
- TV cable connections in HGCP Clinic Wards.

Future improvements at HGCP include:

- Proposed football field at old C1 Camp location;
- Improving TV cable connections at Police Barracks;
- Adding TV channels in HGCP Camp;
- Adding sports equipment, e.g. pool tables; and
- Re-roofing of Accommodation Block 4 and Main Administration Building.

7.5.1.2 LNG Plant Accommodation

The Plant camp is well managed, provides good accommodation, and a large variety of special activities and services, such as Theme Nights. Celebrations and sports and entertainment facilities. The IESC Social Expert, however, received a number of comments about the lack of a sense of community at the Plant camp from residents at the Plant camp as well as residents of Hides who previously stayed at the Plant camp. Several Plant camp residents also complained about the segregated housing for females. The IESC Social Expert observes that this “lack of community” may result from population differences between Hides and

Plant camps. The Plant camp's location near to POM and many villages obviates the need for local workers and some foreign staff to reside in the Camp. The number of camp occupants, thus, is much fewer and changes more frequently than the occupants of Hides camp (aside from rotational changes shared by both). Additionally, the Plant camp is physically larger, more spread out and lacks a central approximation "town center" as is found at the Hides camp. The IESC observes that the continuous improvements made and planned at the Plant camp are important compensations for lack of a strong community environment. The IESC suggests that Management also consider changing the female segregation rule to the arrangement at Hides wherein females may choose to live in a segregated or a mixed block.

Improvements at the Plant Camp since last year are listed below:

- Security improvements - installed Public Announcement General Alarm (PAGA) System and Safe Haven in the old Mess Hall;
- Room improvements for A&B and C rooms and kitchen and mess hall:
 - A&B rooms:
 - New Furniture
 - Sofa sets
 - Interior Texturize & Painting
 - LED Light Fixtures
 - Inbuilt Cupboards
 - New Shower units
 - New Handwash sinks & Mirror
 - C rooms:
 - new AC units
 - Kitchen and mess hall:
 - New Furniture
 - New Pressure Push Door
 - Interior Texturize & Painting
 - LED Light Fixtures
 - Turnstile to capture entry
 - New serving equipment
 - PAGA speakers
 - AV LNGP Notice TV's
 - 2 x New LFC's
 - New Grease Trap
 - Planned improvements include:
 - 4 New backup Gensets (Whole Camp & Clinic)
 - C Rooms Interior Renovations/ Refurbishment
 - Camp Driveway
 - Relocation of Security office & Potable Water Refill Station
 - Flag Poles for PNG and Exxon Flags
 - Accommodation Concrete Steps & Foot Paths

7.5.2 Recommendations

The IESC suggests that Management also consider changing the female segregation rule to the Hides arrangement wherein females may choose to live in a segregated or a mixed block.

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 is 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 Q3 2017 continues to be excellent. A Lost Time Incident (LTI) took place on June 30, 2017 and this was the first LTI since the start of Production. This incident was not actually a worker accident, but was the result of a worker assaulting a co-worker. It was recorded as an LTI, because it took place at a warehouse during working hours. The LNG Plant celebrated four years of being LTI free on August 16. Overall the LTI rate (LTIR) is 0.03 on the basis of 200,000 man hours, up from the goal of a zero LTIR, which had been achieved up until the time of the assault.

Twelve recordable injuries have taken place in 2017. This is more than took place in 2016 and the TRIR rose from 0.13 in 2016 to 0.32 in 2017.

EMPNG is actively working to understand why accidents increased in 2017, but it must be recognized that the accident statistics are much better than industry averages. The U.S. Bureau of Labor and Statistics (2015) has 0.1 as the average LTIR for crude petroleum and natural gas extraction. The reported average TRIR is 0.6.

The number of Observations and Interventions (O&Is) has stabilized since Q2 2016 and average about 5,600 per Quarter. The Near Miss incidents reported have also remained at a more or less constant level over the past two years, ranging from a low of 28 to a high of 47 per quarter since Q1 2016. Both the leading and lagging indicators demonstrate that the EMPNG worker safety program is functional and effective.

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 2017 there have been no recordable incidents due to occupational illnesses.

Focal points of the program in 2017 have been the following:

- Startup of online medical data management;
- Early identification and containment of communicable diseases as part of the Infectious Disease Outbreak Management program; and
- Maintenance of clinical services, pathology (lab) and medical emergency response capability at the highest level across all camp clinics with continued efforts to keep up with latest in medicine.

Significant effort is placed in having good kitchens and evidence of the success in food management is reflected by the fact that in 2017 there were no outbreaks of food borne illness anywhere in the Project. In April 2017 there was an outbreak of conjunctivitis in the villages surrounding the LNGP plant which was detected by the LNG Plant clinic. A total of 33 workers who live in the villages near the LNG plant were found to have conjunctivitis when they reported to work at the plant. They were immediately isolated and treated. Procedures were implemented at the Plant to screen, detect and treat workers who may have conjunctivitis. There were no transmissions of cases in the camp.

The medical staff continues to be nationalized at the LNG Plant Clinic and fully managing the occupational health program. One of the HGCP doctor's position has also been nationalized.

8.1.3 **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**

At the start of construction the “Partnership in Health” program was initiated with the Papua New Guinea Institute of Medical Research (IMR). A key component of the agreement was the integrated Health Demographic Surveillance System (iHDSS), which was used to monitor the impact of PNG LNG on the health of communities within key areas. The results are in. The five-year review with IMR undertaken by NewFields and issued on August 17, 2017 shows that the Project has not caused adverse health impact to local communities. PNG LNG is one of the few projects in the world that can back up this claim!

The partnership with Baylor College of Medicine and Texas Children's Hospital is coming to a close and will end at the end of the year, but the program has proved to be an enormous success in terms of providing education and training of students, physicians and nurses. Accomplishments include:

- Improvements to clinical care at Port Moresby General Hospital;
- Provision of lectures for medical students and residents (864 undergraduate student taught; a Masters in Public Health curriculum established; and a Field Epidemiology Training Program established);
- Assistance in developing and implementing research programs (three published papers with UPNG; one international conference presentation; and mentoring provided for research undertaken by 35 students); and
- Developing a monitoring and evaluation framework to capture impact on education, research, and clinical care.

EMPNG is fostering active engagements with key stakeholders to explore and firm up a pathway for the sustainability of this program in PNG.

EMPNG is leveraging their health partners to expand health programs into the Project Impact Areas, Investing up to \$500k under the Strategic Community Investment (SCI) Program on eight different initiatives. This does not include major infrastructure support in the Project impact areas.

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

The last archaeological surveys were undertaken as part of the environmental evaluation of the 1.3 km Angore flowline, an activity that is now complete. No additional information on cultural activities was provided during this field visit, so there is effectively nothing to report.



APPENDIX A

IESC 17TH MONITORING VISIT – TRIP SUMMARY

TRIP SUMMARY

Sunday October 22:

Travel to Port Moresby (POM). L. Johnson arrives; W. Johnson and K. Connor do not arrive due to Qantas flight cancellations and delays.

Monday October 23:

IESC environmental and social team members W. Johnson and K. Connor arrive in POM early afternoon and the entire team attends kick-off meetings covering Project status, production, activities in Angore, the new power project, EMPNG expansion projects, security and safety.

Tuesday October 24:

IESC Environmental Team - POM – updates on current environmental and biodiversity activities presented by EMPNG. Overnight in POM; K. Connor travels to HGCP via Komo, undertakes a helicopter flyover to Angore and holds discussions relative to camps. Overnight in HGCP.

Wednesday October 25:

IESC Environmental Team - Port Moresby – Environmental team visits the LNG Plant, returns to POM and reviews access controls, pipeline geotechnical issues, and contractor management. Overnight in POM. K. Connor undertakes a field visit to review community development support (CDS) at a local market in Hides, has discussions on community grievances and resettlement. Overnight in HGCP.

Thursday October 26:

IESC Environmental Team – flies to Komo, but civil unrest prevents land transport to HGCP, so team is helicoptered to HGCP. The expected visit to the SpineLine is cancelled due to civil unrest and the team reviews inside-the-fence erosion and sediment control infrastructure at the HGCP. K. Connor is able to go by vehicle from HGCP to Komo and flies back to POM. In the afternoon she reviews national content and continues to review the CDS program. Overnight in POM.

Friday October 27:

IESC Environmental Team flies to Moro to review OSL waste management infrastructure and also does pipeline flyover, has lunch at OSL Ridge Camp, and visits regeneration areas along the pipeline ROW in the afternoon. Overnight in Moro Camp B. K. Connor visits LNG Plant and surrounding communities. Overnight in POM.

Saturday October 28:

IESC Environmental Team visits the Lake Kutubu Wildlife Management Association (WMA) in morning; returns to HGCP via helicopter. Overnight in HGCP. K. Connor visits NDB Women's Centre in morning and continues topical discussions in the afternoon. Overnight in POM.

Sunday October 29:

IESC Environmental Team is restricted from visiting the HWMA due to civil unrest. Nevertheless, the team does visit the SpineLine with a Security escort. Overnight in HGCP. K. Connor has final discussions with EMPNG social staff and starts closeout presentation.

Monday October 30:

IESC Environmental Team travels from HGCP to Komo and then flies to POM. In the afternoon the entire IESC team attends a presentation on the Benefits Sharing program. Overnight in POM.

Tuesday October 31:

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

November 1:

Closeout meeting in morning; IESC team departure.