

Role	Responsibilities
	<p><b>During Operation</b></p> <p>During the operation, the Crane Operator has these responsibilities:</p> <ul style="list-style-type: none"> <li>• Assume ultimate responsibility for safe operation of the crane.</li> <li>• Never start machine movement unless the load or signal person is within range of vision. Appropriate signals (audible or visual) must be given.</li> <li>• Respond to signals only from the appointed signal person, and emergency stop signals from anyone at any time.</li> <li>• Ensure that crane capacity, as shown in the load chart, is not exceeded during crane operations.</li> <li>• Be aware of helicopter traffic and follow Aviation procedures.</li> <li>• When cranes are operated at night, ensure that there is sufficient lighting for safe operation. The load and landing area should be illuminated.</li> <li>• Wear proper work clothes and Personal Protective Equipment in accordance with Chevron PPE requirements.</li> <li>• Stop any lift operation deemed unsafe (exercise Stop Work Authority).</li> <li>• Evaluate crane operations during bad weather or when ability to communicate with the signal person is impaired.</li> </ul> <p><b>Post-Operation</b></p> <p>After the operation, the Crane Operator has these responsibilities:</p> <ul style="list-style-type: none"> <li>• Ensure that the crane is properly secured and controls are turned off or to the neutral (hydraulic cranes) position before leaving the crane.</li> <li>• Do not leave crane unattended with a load in the air. Always lower the load to the deck before leaving the crane. (See Unattended Control Stations for exceptions during wireline operations.)</li> </ul>
Qualified Rigger	<p>The Qualified Rigger is an integral part of crane operations, shipping, material movement, and rigging. Qualified Riggers have certain responsibilities and duties that are critical to the safe load lifting and attaching activities.</p> <p>The Crane Operator and Rigger(s) must work as a team.</p> <p>All personnel who participate in rigging operations on Chevron facilities will be Qualified Riggers, as per API RP 2D, and will be able to provide documentation indicating that they have successfully completed a Rigger Training Course that meets the requirements of API RP 2D. Rigging operations will include, at minimum, attaching and/or detaching lifting equipment to loads and providing signals to Crane Operators.</p> <p>Communication among the Lift Team is one of the most important responsibilities. Along with the Crane Operator, the Rigger will always be a key member of the Lift Team.</p>

Role	Responsibilities
	<p>In addition to the Lift Team responsibilities listed previously, the Rigger's responsibilities also include those listed below.</p> <p><b>Pre-Operation</b></p> <p>Before the operation, the Rigger has these responsibilities:</p> <ul style="list-style-type: none"> <li>• Participate in pre-lift meeting as per Lift Team Responsibilities (see above).</li> <li>• Ensure that only Qualified Riggers and essential personnel are allowed in the work area during lift operations.</li> <li>• Verify load weights by markings on the load and documentation on the shipping manifest.</li> <li>• Select the proper rigging equipment and/or cargo container for the lift.</li> <li>• Verify the safe working loads of the equipment being used and never exceed this limit.</li> <li>• Inspect all hardware, equipment and slings before use. Destroy or render unusable any defective components.</li> <li>• Verify that all slings have proper certification tags. If the identification tag is missing, the sling will not be used. If a replacement tag cannot be obtained, the sling must be destroyed.</li> <li>• Inspect all loads or cargo containers, including permanent slings. Evaluate load stability and potential for spill or release of fluids.</li> <li>• Ensure that a designated signal person is identified and communication methods are agreed upon.</li> <li>• Barricade lifting and loading area.</li> </ul> <p><b>During Operation</b></p> <p>During the operation, the Rigger has these responsibilities:</p> <ul style="list-style-type: none"> <li>• Assume responsibility for the safety of all personnel around the crane operations and crane operating area, including personal safety.</li> <li>• When designated, act as a signal person during the lift operation.</li> <li>• Look for potentially unsafe situations and provide a warning to the Crane Operator and others in the crane operations and crane operating area.</li> <li>• Do not stand between the load and another stationary object or boat railing (pinch zone). The Rigger should be facing the crane at a safe distance and never directly beneath the load.</li> <li>• Wear proper work clothes and Personal Protective Equipment in accordance with Chevron PPE requirements.</li> <li>• Stop any lift operation deemed as unsafe (exercise Stop Work Authority).</li> </ul> <p><b>Post-Operation</b></p> <p>After the operation, the Rigger has these responsibilities:</p>

Role	Responsibilities
	<ul style="list-style-type: none"> <li>• Properly secure loads on vessels, using equipment furnished by the vessel company.</li> <li>• Properly store and maintain rigging equipment.</li> </ul>
Qualified Rigging and Lifting Inspector/ PLE inspector	<p>An Inspector shall be either a Class Surveyor / 3rd Party Inspector authorized to issue lifting equipment inspection certificates, or a Chevron trained employee who has documentation indicating that he has successfully completed a 'Portable Lifting Equipment Inspector' training course that meets the requirements of API RP 2D and has a current valid certificate.</p> <ul style="list-style-type: none"> <li>• Ensure each piece of equipment has an identification tag labeled with manufacturer's name, certification number, rated capacity and the owner's name.</li> <li>• Perform a thorough examination of all Portable Lifting Equipment (PLE).</li> <li>• Remove from service and quarantine any equipment that is not fit for use.</li> <li>• Color code each piece of equipment with the new current color code. Complete certification documentation.</li> </ul>
Qualified non-crane equipment operator	<ul style="list-style-type: none"> <li>• The Qualified non-crane equipment operator is an integral part of Qualified Crane operations and / or Qualified Rigger to operate, shipment, material movement by using non-crane equipment such as Chain hoist, Come along, Lever Winch, Air tugger and Powered winch etc.</li> <li>• The Qualified non-crane equipment operator has certain responsibilities and duties that are critical to the safe load lifting and attaching activities</li> </ul>
Signalman (Dogman or Banksman)	<ul style="list-style-type: none"> <li>• The PIC will assign one of the Qualified Riggers to be the designated Banksman (signalman).</li> <li>• The Banksman (signalman) should wear either a high-visibility vest, hard hat cover or arm band for identification of his position.</li> <li>• The Crane Operator shall only follow signals from the designated Banksman (signalman) with the exception of the emergency stop signal which can be given by anyone.</li> <li>• Reporting to the Crane Operator, he is responsible and accountable for: <ul style="list-style-type: none"> <li>➢ The safety of the lifting operation</li> <li>➢ Safe operation of the lifting equipment assigned and in use</li> <li>➢ The careful and safe handling of all materials</li> <li>➢ Reporting defects in equipment or processes to the crane driver and/or their area supervision</li> <li>➢ Not using defective equipment</li> </ul> </li> <li>• Ensuring that others do not use defective equipment</li> </ul>
Reliability Group Manager	Be responsible and accountable for coordinating with the Maintenance Superintendents / Supervisors on all phases of crane PM's, maintenance and repair work to ensure the cranes are kept in good working order at all times.
Vessel Master	Vessel stability will be the primary concern when loading a vessel. The cargo will be positioned on the deck of the vessel to facilitate ease of rigging during offloading operations.

Role	Responsibilities
	<p>For any lift operations that involves loading to a vessel, the Master will always be a key member of the Lift Team. In addition to the Lift Team responsibilities listed in a previous section, the Vessel Master responsibilities also include the following:</p> <ul style="list-style-type: none"> <li>• Participate in pre-lift meeting, by radio, as per Lift Team Responsibilities above.</li> <li>• Participate, by radio, in preparation of written JSA/JHA's as required.</li> <li>• Ensure the vessel's stability for all cargo placed upon its deck.</li> <li>• Ensure that lashing equipment that is part of the vessel inventory is maintained in good condition. Proper fastening equipment for securing the cargo is onboard (in good working condition).</li> <li>• Ensure that cargo is properly positioned and secured before leaving the dock or offshore facility.</li> <li>• Ensure that all deck crew participating in handling the cargo on the vessel wear proper work clothes and Personal Protective Equipment in accordance with Chevron PPE requirements.</li> <li>• Ensure that all tag lines attached to cargo are properly positioned, are kept clear, and do not become trapped beneath other cargo.</li> <li>• Stop any lift operation to or from the vessel which is deemed unsafe (exercise Stop Work Authority).</li> <li>• Ensure that the vessel is maneuvered away from the load during the lift operation (crane should also swing away from the boat).</li> <li>• Maintain communication with the Lift Team during lift operations (hand signals and radio).</li> <li>• Ensure that all cargo loaded onto vessel is properly documented on the shipping manifest, with weights recorded.</li> <li>• Check that the manifest is correct and make an immediate report if it is not.</li> </ul>
Contract 3 <sup>rd</sup> Party Inspector	<ul style="list-style-type: none"> <li>• Ensure that the cranes and their accessories are periodically inspected in accordance with this procedure and good engineering practice.</li> <li>• Check and sign all crane inspection reports on a quarterly basis</li> <li>• Complete all crane inspection reports in compliance with Thai Law</li> </ul>
Site Personnel	<ul style="list-style-type: none"> <li>• Report defective lifting equipment to the Chevron Maintenance Supervisor, Site Manager or the Base Manager.</li> </ul>

## 4.0 Procedures

### 4.1 Crane Requirements

All cranes working on the property of Chevron will be designed, installed, operated, inspected, maintained, and repaired in accordance with the regulations listed in the table below.

For Contractor-owned cranes (i.e., rental cranes, lift-boats, and wire-line), each Contractor will be responsible for compliance with these requirements.

**ภาคผนวก 21**

***Mercury Related Project Screening Flowchart***

# Chevron Thailand – Mercury Management



Surapat Rungruang, HES Special Project  
OE/HES Department  
Chevron Thailand Exploration and Production Ltd.



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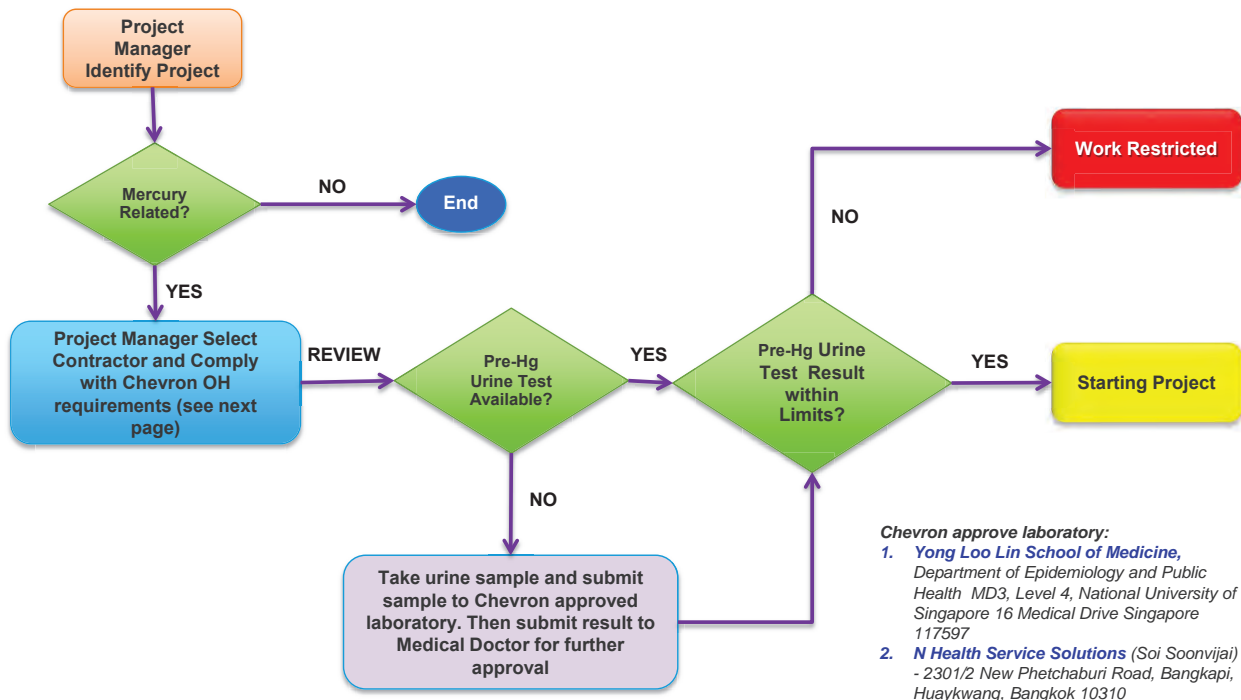
## Presentation Scope



- HOS - Mercury Related Project Screening Flowchart
- Occupational Hygiene Requirements for Mercury Related Activities
- Mercury Contaminated Material Handling and Decontamination
- PPE Preparation for Mercury Related Project
- Decontamination Zoning

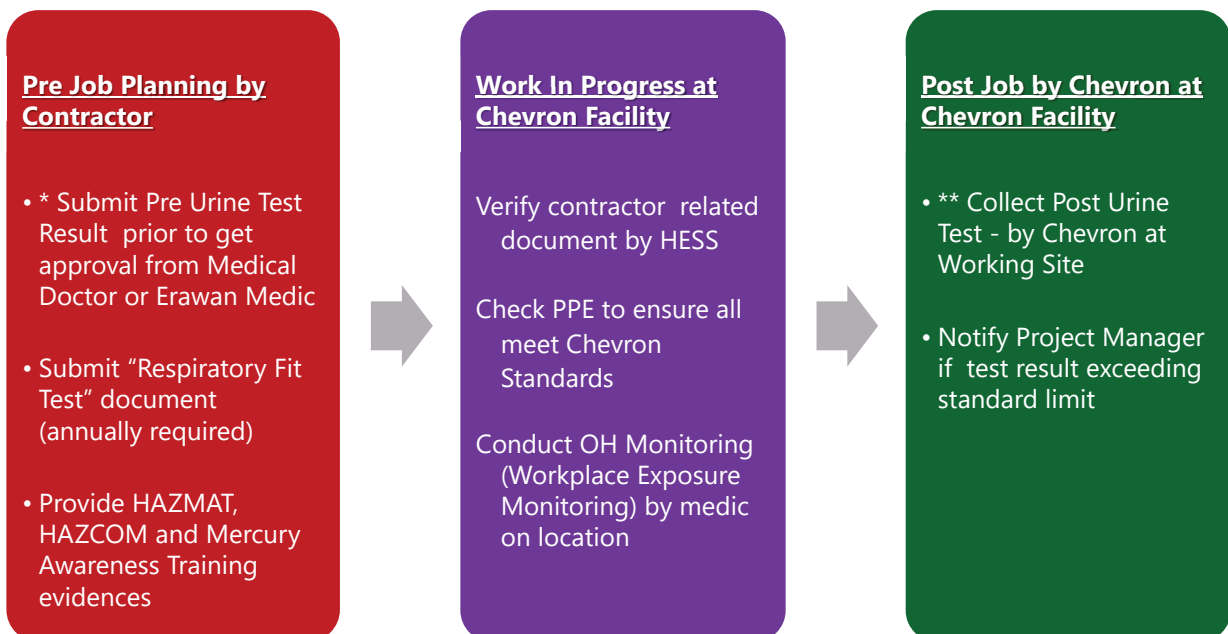
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# HOS - Mercury Related Project Screening Flowchart



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## Occupational Hygiene Requirements for Mercury Related Activities



\* Urine Hg result is valid within 3 months prior to work (must not perform activity related to mercury exposure)

\*\* Post urine mercury can be used for Pre test for other project when getting the result from laboratory

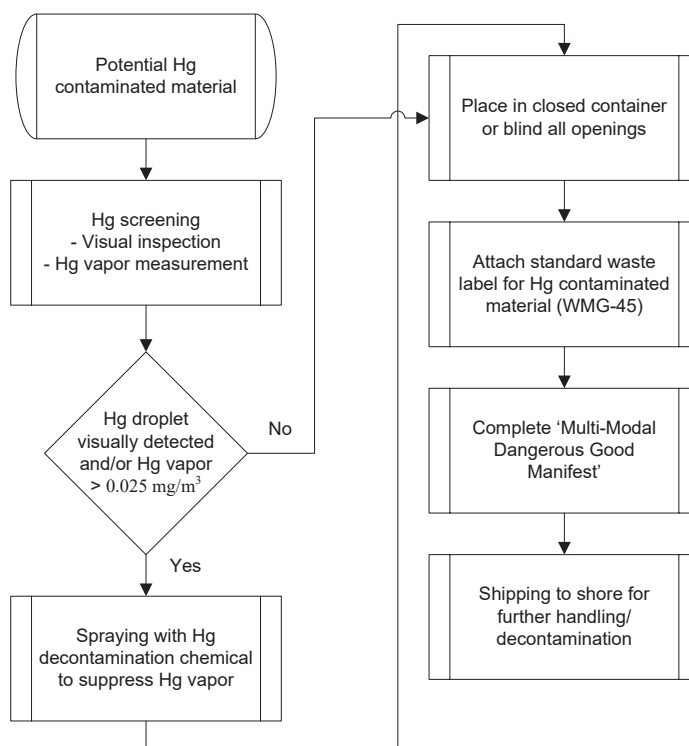
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# Mercury Contaminated Material Handling and Decontamination

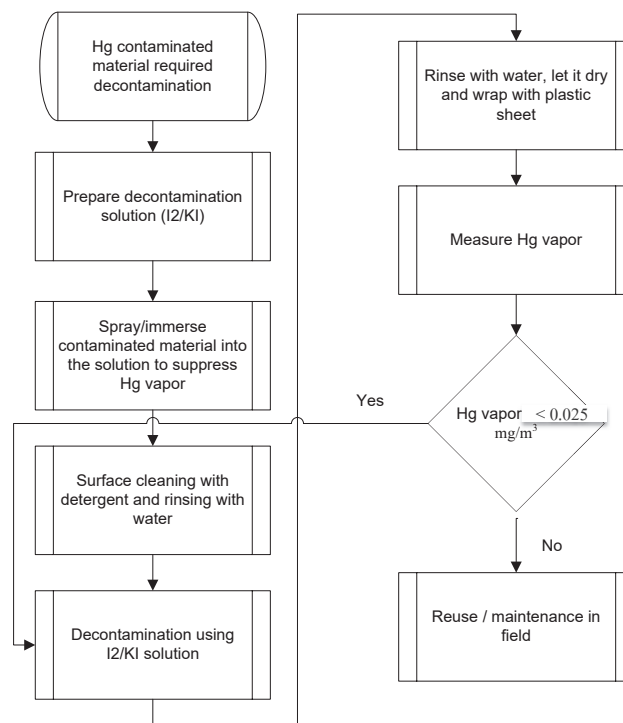


- **Material Pre-cleaning:** clean material by rinsing with water and detergent and then rinsing with water again.
- **Mercury Decontamination:**
  - Apply the chemical on material surface or into enclosed units. Isolation of decontamination unit or section might be required. Allow 20-30 minutes contact or retention time.
  - Rinse the unit/material with water and allow them to air dry.
  - Repeat the decontamination cycle until the required mercury level as specified
  - Other recommended method for isolated equipment part, material, piping spool or valves is to immerse the equipment and part into decontamination solution and allow the reaction to happen for 20-30 minutes.

## Mercury Contaminated Material Handling Flowchart



# Mercury Contaminated Material Decontamination Flowchart



# Mercury Contaminated Material - Storage Container and Packing Requirements



- Mercury contaminated materials, when possible, should be placed into plastic bag that is strong, leaked-proof and punctured-resistant.
- The bag must be impervious to the elemental mercury and completely surrounds/seals the contents of materials.
- Plastic bag is then placed into UN standard plastic drum or other suitable container.
- The plastic drum/container should be equipped with 100% top cover and securely closed before moving or shipping.
- For materials that cannot be contained in closed containers e.g. pipes, valves, PSV, tube bundles, etc, these materials shall be wrapped with plastic sheet and all openings shall be blinded and sealed to the extent that is practically feasible.
- Using metal drums/containers are not recommended due to possible deterioration over the extended storage period and amalgamation property of mercury.

- 

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## HAZARDOUS WASTE ของเสียอันตราย

### WMG-002 Waste Mercury Contaminated Parts and Equipment



DMF Waste Code: 14 01  
DWY Waste Code: 17 09 01

UN 2825 PG I

<div style="text-align: center; margin-bottom: 10px;">  <p><b>TOXIC</b> G</p> </div> <div style="text-align: center; margin-bottom: 10px;">  <p><b>CORROSIVE</b></p> </div> <div style="text-align: center;">  </div>	<div> <p><b>Health Risk</b></p> <ul style="list-style-type: none"> <li>• Danger of cumulative effects</li> <li>• Harmful: danger of serious damage to health by prolonged exposure through inhalation and in contact with skin</li> <li>• Very toxic by inhalation, and in contact with skin</li> <li>• Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment</li> </ul> <p><b>Safety Info</b></p> <ul style="list-style-type: none"> <li>• Keep locked up</li> <li>• Do not breath gas/fumes/vapour/spray</li> <li>• In case of insufficient ventilation wear suitable respiratory equipment</li> <li>• Use only in well ventilated areas</li> </ul> <p><b>Spill and Disposal</b></p> <p>Prevent from entering drains. Contain spillage by any means. Absorb with dry agent. Stop leak if safe to do so. Take off immediately all contaminated clothing. This material and its container must be disposed of in a safe way. To clean the floor and all objects contaminated by this material, Use water and detergent.</p> </div>
<p><b>Outer Packing:</b> Basket or 20 litre container or Plastic drum (X class)</p> <p><b>Loading Date (DD/MM/YY):</b></p>	<div> <p><b>Stowage and Segregation: Category A</b></p> <p><b>Quantity (ton) or Volume of Waste (litre):</b></p> </div>
<p><b>Transit Storage (please select):</b></p> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STS, Songkhla  <input type="checkbox"/> ESBC, Chonburi         </div> <p><b>Waste Generator:</b></p>	

Chevron Emergency Contact (ฉุกเฉินเชvron) : Bangkok (กรุงเทพฯ) 0-2546-5222, Songkhla (สงขลา) 0-7430-3333

# PPE Preparation for Mercury Related Project



## Protective Clothing

A chemical suit (Tyvek Coverall) suitable for mercury handling must be worn when stipulated by the Work permit or Work Plan. These are specifically designed without pockets and without access to avoid transferring mercury contamination to the body or underclothing. When wearing coveralls, it is essential that the pant legs overlap boots.

Heat stress is a significant concern while wearing this type of suit.



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# PPE Preparation for Mercury Related Project



## Boots

High top rubber or plastic boots must be worn to extend above the ankles so pant legs can overlap the boot tops to ensure mercury cannot enter the inside of the boots and prevent contamination of the socks.



## Gloves

Correctly selected rubber gloves must be worn. Gloves must not be re-used once removed unless washed and decontaminated to avoid mercury on the hand. Care must always be exercised to prevent the hands from contaminating other parts of the body, especially the face, eyes and hair. Clean flushing water at a decontamination station/skid must be used for cleaning the nose, face, hands, gloves, etc. and then allowed to air dry.



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# PPE Preparation for Mercury Related Project



## Eye Protection

A face shield, goggles or full face respirator shall be worn whenever there is a possibility to be splashed with mercury or mercury contaminated materials.



## Respirators

Correctly selected mercury canister respirators must be worn when stipulated by the work procedure or work permit, for work with a possible mercury exposure.

Inspect respirators properly before each use.



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## Respiratory Selection Guide



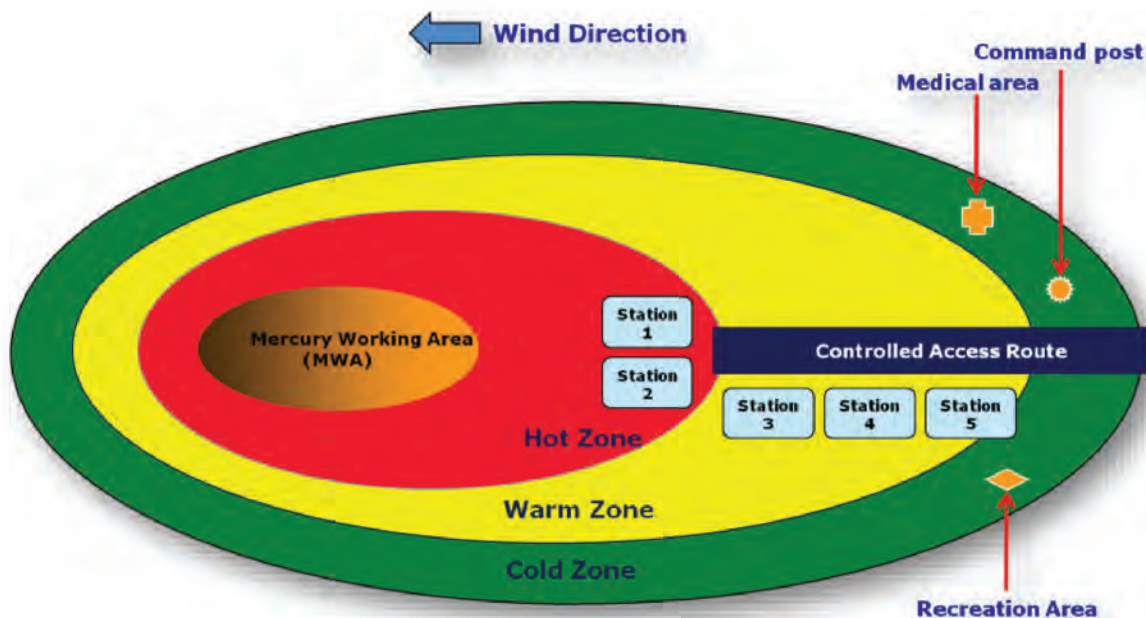
Respiratory Type	Protection Factor	Selection Criteria for each Toxic Gases			Oxygen % vol. in air	% LEL
		Benzene (PPM)	Mercury (mg/m <sup>3</sup> )	H <sub>2</sub> S (PPM)		
• Half Mask with Cartridges	10	<10	<0.25	>5.0 * Escape Set	19.5-23.5 %	<10
• Full-Face Mask with Cartridges	50	10≤B<50	0.25≤H<1.25	>5.0 * Escape Set	19.5-23.5 %	<10
• Full-Face Mask with Air Supplied or SCBA	1000	50≤B<500	1.25≤H<10.0	>5.0 * Escape Set	19.5-23.5 %	<10
No entry allow (IDLH) – Escape only		500 (IDLH)	10 (IDLH)	100 (IDLH)		

Benzene (PEL) = 1.0 PPM, Mercury (TLV) = 0.025 mg/m<sup>3</sup>, Hydrogen Sulfide (H<sub>2</sub>S) = 5.0 PPM

\* No cartridges for H<sub>2</sub>S protection, escape set required to leave the area if H<sub>2</sub>S level exceeding 5.0 PPM

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# Decontamination Zoning



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## Mercury (Hg) Exposure Improvement Processes to Achieve Zero Case of HOS Groups.



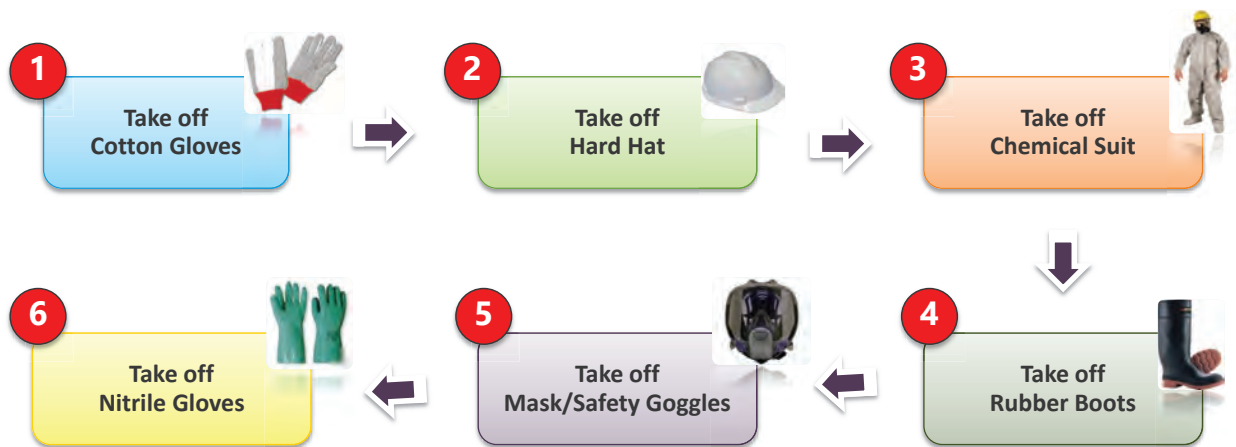
		Practices	PPE
HOT LINE	<div>Station 1</div> <div>Station 2</div>	Clean rubber boots	Full face with airline Tyvek Coveralls Rubber gloves Rubber boots
CONTAMINATION CONTROL LINE	<div>Station 3</div> <div>Station 4</div> <div>Station 5</div>	Take off Tyvek Take off rubber gloves Take off mask Take shower	Half mask with Hg cartridge Coveralls Rubber gloves Rubber boots Safety glasses & Hard hat
	<div>HOT ZONE (MWA)</div> <div>WARM ZONE</div> <div>COLD ZONE</div>	Change cloth PPE preparation Supplied air station Medical support Drinking water Resting area	Coveralls Safety glasses Ear plugs Safety shoes

MWA = Mercury Working Area

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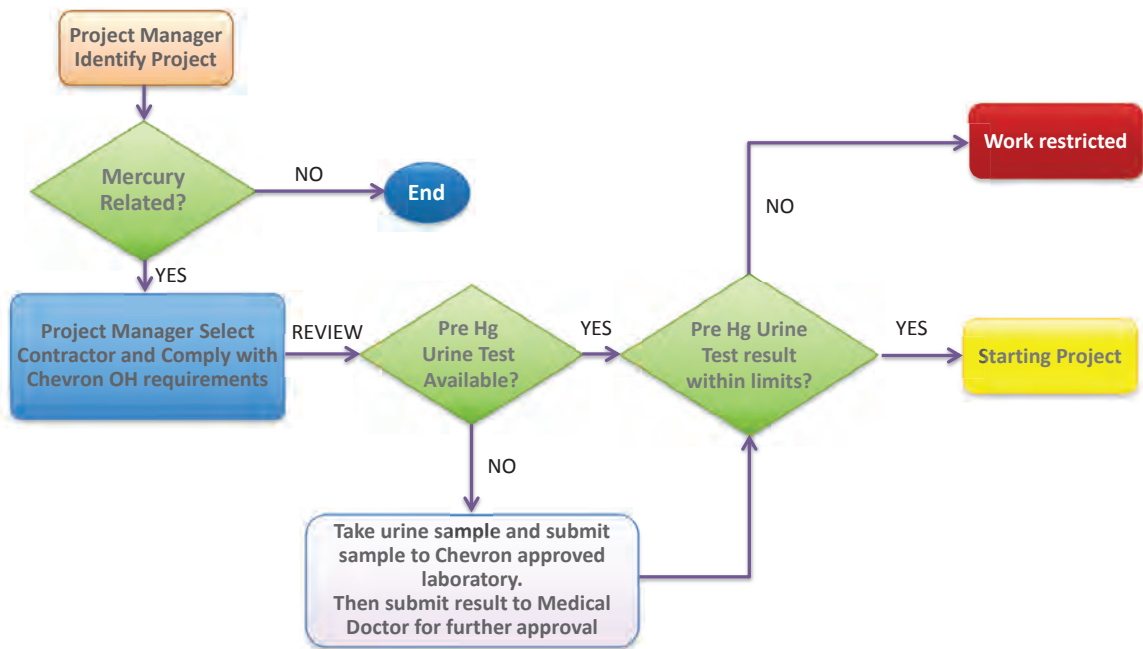
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# PPE – Take Out Steps (develop from over exposure lesson learn)



## Q&A





ภาคผนวก 22

รายงานการตรวจวัดระดับแสง เสียง ความร้อน ในพื้นที่ปฏิบัติงาน  
(*Light Noise Heat Monitoring*)



**Environmental Quality Monitoring Report**  
**Petroleum Production Project in North Pailin Field**  
**Chevron Thailand Exploration and Production, Ltd.**  
**April 25-27, 2024**



**SGS (Thailand) Limited**

100 Nanglinchee Rd., Yannawa, Bangkok 10120  
Tel: +66 (0) 2678 1813 Website: www.sgs.com



**Section 1**

**Introduction**

**Section 2**

**Heat Stress in Workplace**

**Section 3**

**Light Intensity in Workplace**

**Section 4**

**Noise Level in Workplace**

**Section 5**

**Indoor Air Quality**

**Section 6**

**Face Velocity of Chemical Hood**

**Appendix A**

**Test Report**

**Appendix B**

**Certificates of Compliance**

**Appendix C**

**Certificate of Instruments Calibration**

**Appendix D**

**Reference Standards**

**Section 1**

**Introduction**



**Section 1**

**Introduction**

**1.1 Introduction**

Chevron Thailand Exploration and Production, Ltd., locating at 5<sup>th</sup> Floor, Tower 3, SCB Park Plaza, 19 Rachadapisek Road, Chatuchak, Bangkok 10900, has assigned SGS (Thailand) Limited to monitor workplace environmental quality, indoor air quality and face velocity of chemical hood of the petroleum production project in North Pailin field on April 25-27, 2024. The detail of all performance is explained in Section 2 to Section 6 as follows.

**1.2 Objectives**

- To monitor the workplace environmental quality including Heat Stress, Light Intensity and Workplace Noise Level (Leq-5 min) and create the noise contour map of each area of the petroleum production project in North Pailin field.
- To monitor the indoor air quality including Temperature, Relative Humidity, Carbondioxide, Particulate Matter (PM-10) and Air Movement in workplaces of the petroleum production project in North Pailin field.
- To measure face velocity of chemical hoods of the petroleum production project in North Pailin field.
- To compare the monitoring results with the relevant government standards and prepare the report.

**1.3 Scopes of Work**

The monitoring of workplace environmental quality, indoor air quality and face velocity of chemical hood of the petroleum production project in North Pailin field, Chevron Thailand Exploration and Production, Ltd., was conducted on April 25-27, 2024. The details include:

- Heat Stress: There was a total of 12 measuring points at NPCPP
- Light Intensity (Daytime): There were 21 measuring points and 7 measuring areas at NPLQ and 27 measuring points and 1 measuring area at NPCPP. The total number was 48 measuring points and 8 measuring areas.
- Workplace Noise Level (Leq-5 min): There was a total of 144 measuring points consisted of 1 measuring points at NPLQ and 143 measuring points at NPCPP as well as creating noise contour map of each area.



- Indoor Air Quality: Monitoring parameters included Temperature, Relative Humidity, Carbon dioxide, Particulate Matter (PM-10) and Air Movement. There was a total of 19 measuring points consisted of 12 measuring points at NPLQ and 7 measuring points at NPCPP. In addition, there was 1 outdoor measuring point for reference.
- Face Velocity of chemical hoods: There were a total of 2 stations at NPCPP

#### 1.4 Reference Standards

The results from the measurement shall be compared with the following standard;

➤ **Heat Stress** compared with Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016).

For the Heat Stress, the WBGT temperature must be evaluated in associated with the work load to ensure the suitable working temperature for each type of work. The workload can be divided to 3 types, and the examples of the activities are demonstrated in **Table 1-1**

**Table 1-1 Work Load and Example of Activities**

Work Load	Meaning/ Example of Activities	Standard of Average WBGT*
Light Work	The nature of work that uses less force or energy to metabolize food in the body not exceed 200 kilocalories per hour e.g. book writing work, typing work, recording of data, sewing, sedentary inspection of products, assembly of small pieces of work, control the machine by foot or control the work by standing.	34.0 °C
Moderate Work	The nature of work that uses medium force or energy to metabolize food in the body exceed 200 kilocalories per hour to 350 kilocalories per hour e.g. lifting, towing, pulling, and pushing works or removal of things using medium force; nailing, filing works, truck driving work, tractor driving work.	32.0 °C
Heavy Work	The nature of work that uses greater force or energy to metabolize food in the body exceed 350 kilocalories per hour e.g. work using shovel or other similar activities, digging hoe, wood-sawing work, hard-wood boring work; pounding work with large heavy hammer; lifting work or removing heavy object up the high place or slope.	30.0 °C

**Source:** \* Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016).



➤ **Light Intensity** compared with Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 39D, dated February 21, B.E. 2561 (2018). The measuring results of Light Intensity were compared with the appendix tables in the mentioned standard categorized by the areas and activities of working.

➤ **Workplace Noise Level** compared with Time Weighted Average (TWA) of Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated December 13, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 19D, dated January 26, B.E. 2561 (2018).

For this monitoring, the result will be compared to the TWA for 8 hours which shall not exceed 85 dB(A) as demonstrated in **Table 1-2**.



**Table 1-2 The Standard of Noise Level for Comparison**

The Average of Noise Exposure Level (TWA) Not Exceed (dB(A))	Working Hour of Noise Exposure within a day	
	Hours	Minutes
82	16	-
83	12	42
84	10	5
85	8	-
86	6	21
87	5	2
88	4	-
89	3	11
90	2	31
91	2	-
92	1	35
93	1	16
94	1	-
95	-	48
96	-	38
97	-	30
98	-	24
99	-	19
100	-	15
101	-	12
102	-	9
103	-	7.5
104	-	6
105	-	5
106	-	4
107	-	3
108	-	2.5
109	-	2
110	-	1.5
111	-	1

➤ **Indoor Air Quality** compared with Code of Practice for Indoor Air Quality for Air-Conditioned Building, Singapore Standard SS 554:2016

➤ **Face Velocity of chemical hoods** compared with American National Standards for Laboratory Ventilation, ANSI/AIHA Z9.5-2003.

## Section 2

### Heat Stress in Workplace

## Section 2

### Heat Stress in Workplace

#### 2.1 Methods of Measurements

The measuring method of heat stress in workplace refers to the standard method which is accepted by Thai Regulations, that is Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016). Details of measurement methods are shown in **Table 2-1**.

Heat Stress is the highest temperature of the normal working day that illustrates in Wet Bulb Globe Temperature (WBGT). The WBGT is indicator of heat for environmental in workplace, including the accumulated heat in body and condition of working area during doing work. The formula of the WBGT is shown as below equation.

$$\begin{aligned} \text{WBGT} &= 0.7\text{NWB} + 0.3\text{GT} && (\text{In case measured inside the building or outside of the building without sunlight}) \\ \text{WBGT} &= 0.7\text{NWB} + 0.2\text{GT} + 0.1\text{DB} && (\text{In case measured outside of the building with the sunlight}) \end{aligned}$$

Which

WBGT (Wet Bulb Globe Temperature: WBGT, °C) is the indication of the heat condition in working environment.

NWB (Natural Wet Bulb: NWB, °C) is the temperature from the natural wet bulb and simulating the evaporation of sweat.

GT (Globe Temperature: GT, °C) is the temperature from the globe bulb and is measurement of the thermal radiation.

DB (Dry Bulb: DB, °C) is the temperature from the dry bulb and is measurement of convective heat transfer.

**Table 2-3 Monitoring Results of Heat Stress in Workplace at NPCPP of the Petroleum Production Project in North Pailin Field**

Locations	Type	Measurement Date	Period (hrs.)	Workload	Heat Stress (WBGT, °C)
Cooler Deck					
1. Point 1 (H1)	Outdoor	April 26, 2024	13:40-14:10	Light Work	32.5
2. Point 2 (H2)			13:40-14:10		32.6
3. Point 3 (H3)			13:00-13:30		33.3
4. Point 4 (H4)			13:00-13:30		33.7
5. Point 5 (H5)			11:30-12:00		33.0
6. Point 6 (H6)			11:30-12:00	Moderate Work	34.3
7. Point 7 (H7)			09:00-09:30		33.7
8. Point 8 (H8)			09:00-09:30		31.4
9. Point 9 (H9)			10:00-10:30		32.9
10. Point 10 (H10)			10:00-10:30		34.6
Main Deck					
11. Point 11 (H11)	Outdoor	April 26, 2024	14:20-14:50	Light Work	29.9
12. Point 12 (H12)			14:20-14:50		29.2
Standard <sup>1/</sup>	Light Work				34
	Moderate Work				32
	Heavy Work				30

**Remarks :**

- Sampling and Analytical Method was followed the Standard Method of National Institute for Occupational Safety and Health (NIOSH)
- Work load category is determined by averaging metabolic rates for tasks as follows:
  - 1) Light work <=200 kcal/hour
  - 2) Moderate work >=200-350 kcal/hour
  - 3) Heavy work >=350 kcal/hour
- Red number means the measuring result(s) did not comply with the standard.

**Source :** <sup>1/</sup> Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016).

**Table 2-1 Heat Stress in Workplace Measurement Method**

Parameters	Unit	Instrument/Measurement Methods
Heat Stress - WBGT	°C	Certified Thermometer / Electronic Method

#### 2.2 Heat Stress in Workplace Monitoring Result

The monitoring result of heat stress in workplace at NPCPP of the petroleum production project in North Pailin field was conducted on April 26, 2024 with a total of 12 measuring points was summarized in **Table 2-2**.

**Table 2-2 Summary Result of Heat Stress in Workplace Monitoring in the Petroleum Production Project in North Pailin Field on April 26, 2024**

Locations	Measuring Points (Points)	Results (Points)	
		Complied	Not Complied
NPCPP	12	9	3
<b>Total</b>	<b>12</b>	<b>9 (75.0 %)</b>	<b>3 (25.0 %)</b>

The monitoring results, measuring pictures and layouts were shown in **Table 2-3, Picture 2-1** and **Figure 2-1**, respectively. The heat stress monitoring result was found in the range of 29.2-34.6 °C. The activities at measuring points were machine controlling and inspection which can be compared to the light workload, and crane driving which can be compared to the moderate work load.

When comparing the results with the standards for working with light workload (not exceed 34 °C) and moderate workload (not exceed 32 °C), it was found that most results of measuring points complied with the standard.



Point 1 (H1)



Point 2 (H2)



Point 3 (H3)



Point 4 (H4)



Point 5 (H5)



Point 6 (H6)



Point 7 (H7)



Point 8 (H8)

**Picture 2-1 Heat Stress in Workplace Monitoring at NPCPP of the Petroleum Production Project in North Pailin Field**



Point 9 (H9)



Point 10 (H10)

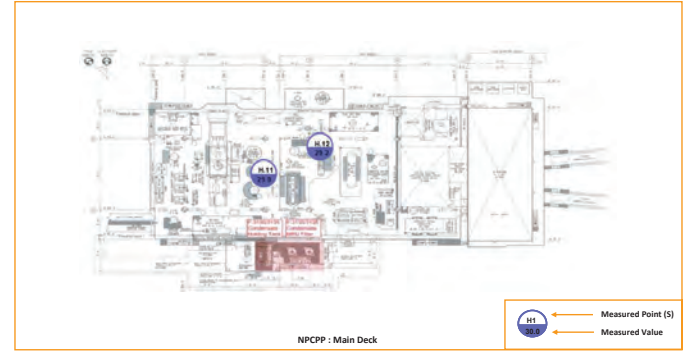


Point 11 (H11)



Point 12 (H12)

Picture 2-1 (cont'd)



Picture 2-1 (Cont'd)

### 2.3 Summary Result of Heat Stress in Workplace Monitoring and Recommendations

The monitoring of heat stress in workplace at NPCPP of the petroleum production project in North Pailin field, Chevron Thailand Exploration and Production, Ltd. was conducted on May 26, 2024 were found that most results complied with the standard by 75.0 percent of the total measuring points.

In case of heat stress values in workplaces that do not comply with the standard; There are recommendations as follows:

- 1) Adjust the appropriate work and break periods.
- 2) Arrange the appropriate clothing and personal protective equipment for working activities.
- 3) Provide water drinking and electrolyte beverages for risk employees.
- 4) Install heat warning signs in any working area having a heat value exceeding the standard.

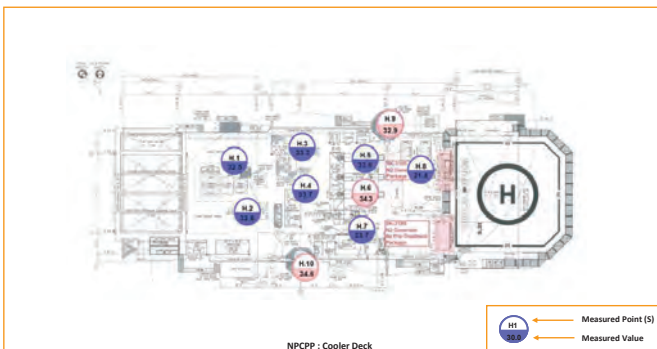


Figure 2-1 Layout of Heat Stress Measuring Points in the Workplace at NPCPP of the Petroleum Production Project in North Pailin Field



### 3.2 Light Intensity in Workplace Monitoring Result

The monitoring results of light intensity in workplace during daytime at NPLQ and NPCPP of the petroleum production project in North Pailin field conducted on April 25 and 27, 2024 with a total of 48 measuring points and 8 measuring areas were summarized as Table 3-2.

Table 3-2 Summary Result of Light Intensity in Workplace Monitoring of the Petroleum Production Project in North Pailin Field on April 25 and 27, 2024

Locations	Measuring Points/Areas	Results (Points/Areas)	
		Complied	Not Complied
1. NPLQ			
- Spot Measurement	21	21	0
- Area Measurement	7	7	0
2. NPCPP			
- Spot Measurement	27	27	0
- Area Measurement	1	1	0
Total	56	56 (100%)	0 (0%)

#### 3.2.1 NPLQ

The monitoring result of light intensity at NPLQ during daytime on April 25, 2024 with 21 measuring points and 7 measuring areas was presented in Table 3-3. Measuring pictures and layouts were shown as Picture 3-1 and Figure 3-1, respectively. The details of activities in monitoring areas as follows:

- **Roof Level**
  - Gymnasium: the monitoring conducted at Exercise.
- **Level 3**
  - Radio/ Clerk Office: the monitoring conducted at Computer work.
  - OIM Office: the monitoring conducted at Computer work and Conference room.
  - Laundry Room: the monitoring conducted at Washing machine, Drying machine and Folding.
  - Medic Room: the monitoring conducted at Computer work.

3-2



- **Level 2**
  - COG Room: the monitoring conducted at Computer work.
  - Public Office: the monitoring conducted at Computer work.
  - Recreation Room: the monitoring conducted at Recreation/ Watching TV.
  - MSM Office: the monitoring conducted at Computer work and Conference room.
- **Level 1**
  - Camboss Office: the monitoring conducted at Computer work and Food Storage.
  - Galley: the monitoring conducted at Cooking and Preparing ingredients.
  - Mess Room: the monitoring conducted at Canteen.
  - Change Room: the monitoring conducted at Locker area.
  - Clean Toilet Room: the monitoring conducted at Toilet.
  - CST Office: the monitoring conducted at Computer work.

According to the monitoring results at NPLQ of all 21 measuring points and 7 measuring areas, there were all results having sufficient light for working.

#### 3.2.2 NPCPP

The monitoring result of light intensity at NPCPP during daytime on April 25 and 27, 2024 with 27 measuring points and 1 measuring area was presented in Table 3-4. Measuring pictures and layouts were shown as Picture 3-2 and Figure 3-2, respectively. The details of activities in monitoring areas as follows:

- **Main Deck**
  - Laboratory Room: the monitoring conducted at Computer work, Hood, Weighing and Chemical Analysis.
  - Control Room: the monitoring conducted at Computer work/ Monitor and Document work.
  - Maintenance Shop: the monitoring conducted at Computer work, Repairing Equipment and Storage area.

According to the monitoring results at NPCPP of all 27 measuring points and 1 measuring area, there were all results having sufficient light for working.

3-3

## Section 3

### Light Intensity in Workplace



## Section 3

### Light Intensity in Workplace

#### 3.1 Method of Measurement

The amount of light that fall on the specified surface area is called Light Intensity and the unit is "Lux or Foot Candle" by using "Lux Meter" to measure. For measurement, the sensor will be placed in the horizontal plane to surface and in the condition as well as actual operating. In case the job is operated at night time, light intensity has to be measured at night time as well. According to Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 39D, dated February 21, B.E. 2561 (2018), there are 2 methods of measurement which are Spot Measurement and Area Measurement. The Spot Measurement is applied to measure intensity of light falling on surface of a working area in a real working condition; whereas, the Area Measurement is applied to measure intensity of light representing in term of overall of general working areas, such as walkway. The method of this monitoring can be summarized as Table 3-1.

Table 3-1 Light Intensity in Workplace Measurement Method

Parameter	Unit	Instrument/Measurement Method
Light Intensity	Lux	Lux Meter / Electronic Method



Table 3-3 Monitoring Results of Light Intensity in Workplace (Daytime) at NPLQ  
of the Petroleum Production Project in North Pailin Field

Measurement Location	Activities/ Type of Work	Light Intensity (LUX)	Standard Value <sup>1/</sup> (LUX)
Roof Level			
• Gymnasium			
1. Point 1 (L1)	Exercise	406	200-300
2. Point 2 (L2)		555	
3. Point 3 (L3)		499	
Level 3			
• Radio/Clerk Office			
4. Point 4 (L4)	Computer work	570	400-500
• OIM Office			
5. Point 5 (Area measurement)	Meeting	371	300
5.1 Average value (L5.1)		330	150
5.2 Minimum value (L5.2)		530	400-500
6. Point 6 (L6)	Computer work	530	400-500
• Laundry Room			
7. Point 7 (L7)	Washing machine	416	200-300
8. Point 8 (L8)	Drying machine	362	
9. Point 9 (L9)	Folding	445	
• Medic Room			
10. Point 10 (L10)	Computer work	557	400-500
Level 2			
• Game Room			
11. Point 11 (L11)	Computer work	492	400-500
• Public Office			
12. Point 12 (L12)	Computer work	421	400-500
13. Point 13 (L13)		422	
14. Point 14 (L14)		488	
15. Point 15 (L15)		425	
Level 2 (Cont'd)			
• Recreation Room			
16. Point 16 (Area measurement)	Recreation/ Watching TV	402	50
16.1 Average value (L16.1)		101	25
16.2 Minimum value (L16.2)			
• MSM Office			
17. Point 17 (Area measurement)	Meeting	345	300
17.1 Average value (L17.1)		303	150
17.2 Minimum value (L17.2)		484	400-500
18. Point 18 (L18)	Computer work	484	400-500

Source : <sup>1/</sup> Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 390, dated February 21, B.E. 2561 (2018)

3-4



Table 3-3 (Cont'd)

Measurement Location	Activities/ Type of Work	Light Intensity (LUX)	Standard Value <sup>1/</sup> (LUX)
Level 1			
• Campboss Office			
19. Point 19 (L19)	Computer work	420	400-500
20. Point 20 (Area measurement)			
20.1 Average value (L20.1)	Food Storage	396	100
20.2 Minimum value (L20.2)		203	50
• Galley			
21. Point 21 (L21)	Cooking	418	300-400
22. Point 22 (L22)	Preparing ingredients	470	
23. Point 23 (L23)		352	
• Mess Room			
24. Point 24 (Area measurement)	Canteen		
24.1 Average value (L24.1)		336	300
24.2 Minimum value (L24.2)		230	150
• Change Room			
25. Point 25 (Area measurement)	Locker area		
25.1 Average value (L25.1)		380	100
25.2 Minimum value (L25.2)		57	50
• Clean Toilet Room			
26. Point 26 (Area measurement)	Toilet		
26.1 Average value (L26.1)		497	100
26.2 Minimum value (L26.2)		304	50
• CST Office			
27. Point 27 (L27)	Computer work	435	400-500
28. Point 28 (L28)		488	

Source : <sup>1/</sup> Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 390, dated February 21, B.E. 2561 (2018)

3-5



Table 3-4 Monitoring Results of Light Intensity in Workplace (Daytime) at NPCPP  
of the Petroleum Production Project in North Pailin Field

Measurement Location	Activities/ Type of Work	Light Intensity (LUX)	Standard Value <sup>1/</sup> (LUX)
Main Deck			
● Laboratory Room			
1. Point 1 (L1)	Computer work	471	400-500
2. Point 2 (L2)	Hood 1	410	
3. Point 3 (L3)	Weighing	590	
4. Point 4 (L4)	Chemical Analysis	647	400-500
5. Point 5 (L5)	Hood 2	522	
● Control Room			
6. Point 6 (L6)	Computer work	682	400-500
7. Point 7 (L7)	Document work	725	
8. Point 8 (L8)	Computer work	418	
9. Point 9 (L9)		414	
10. Point 10 (L10)		466	
11. Point 11 (L11)		427	
12. Point 12 (L12)		481	
13. Point 13 (L13)		591	
14. Point 14 (L14)		683	
15. Point 15 (L15)		648	
16. Point 16 (L16)		564	
● Maintenance Shop			
17. Point 17 (L17)	Computer work	433	400-500
18. Point 18 (L18)	Repairing equipment	418	300-400
19. Point 19 (L19)		469	
20. Point 20 (L20)	Computer work	410	400-500
21. Point 21 (L21)		412	
22. Point 22 (L22)		406	
23. Point 23 (L23)		495	
24. Point 24 (Area measurement)			
24.1 Average value (L24.1)	Storage area	243	100
24.2 Minimum value (L24.2)		135	50
25. Point 25 (L25)	Computer work	516	400-500
26. Point 26 (L26)		412	
27. Point 27 (L27)		522	
28. Point 28 (L28)		488	

Source : <sup>1/</sup> Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 390, dated February 21, B.E. 2561 (2018)

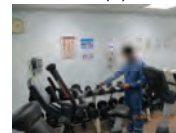
3-6



Point 1 (L1)



Point 2 (L2)



Point 3 (L3)



Point 4 (L4)



Point 5 (L5)



Point 6 (L6)



Point 7 (L7)



Point 8 (L8)

Picture 3-1 Light Intensity in Workplace Monitoring (Daytime) at NPLQ  
of the Petroleum Production Project in North Pailin Field

3-7



Point 9 (L9)



Point 10 (L10)



Point 11 (L11)



Point 12 (L12)



Point 13 (L13)



Point 14 (L14)

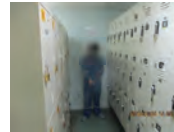


Point 15 (L15)



Point 16 (L16)

Picture 3-1 (Cont'd)



Point 25 (L25)



Point 26 (L26)



Point 27 (L27)



Point 28 (L28)

Picture 3-1 (Cont'd)



Point 17 (L17)



Point 18 (L18)



Point 19 (L19)



Point 20 (L20)



Point 21 (L21)



Point 22 (L22)

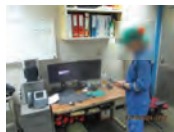


Point 23 (L23)



Point 24 (L24)

Picture 3-1 (Cont'd)



Point 1 (L1)



Point 2 (L2)



Point 3 (L3)



Point 4 (L4)



Point 5 (L5)



Point 6 (L6)



Point 7 (L7)



Point 8 (L8)

Picture 3-2 Light Intensity in Workplace Monitoring (Daytime) at NPCPP  
of the Petroleum Production Project in North Pailin Field



Point 9 (L9)



Point 10 (L10)



Point 11 (L11)



Point 12 (L12)



Point 13 (L13)



Point 14 (L14)



Point 15 (L15)



Point 16 (L16)

Picture 3-2 (Cont'd)

3-12



Point 25 (L25)



Point 26 (L26)



Point 27 (L27)



Point 28 (L28)

Picture 3-2 (Cont'd)

3-14



Point 17 (L17)



Point 18 (L18)



Point 19 (L19)



Point 20 (L20)



Point 21 (L21)



Point 22 (L22)



Point 23 (L23)



Point 24 (L24)

Picture 3-2 (Cont'd)

3-13

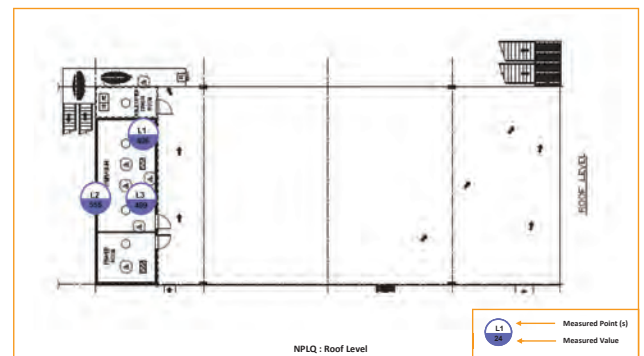


Figure 3-1 Layout of Light Intensity Measuring Points in the Workplace (Daytime) at NPLQ of the Petroleum Production Project in North Pailin Field

3-15

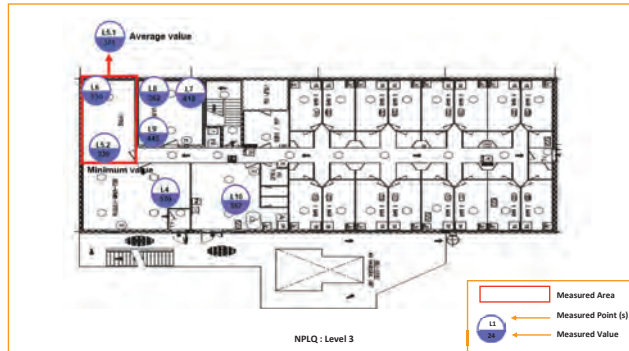


Figure 3-1 (Cont'd)



Figure 3-1 (Cont'd)

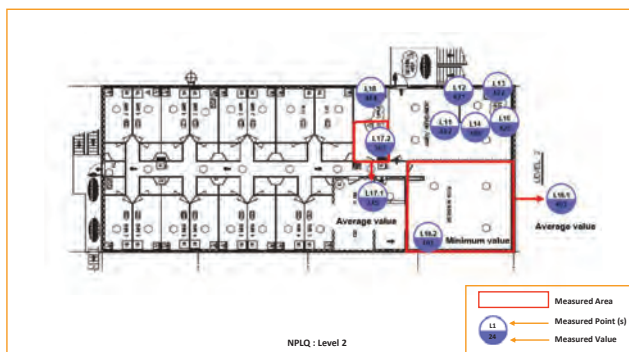


Figure 3-1 (Cont'd)

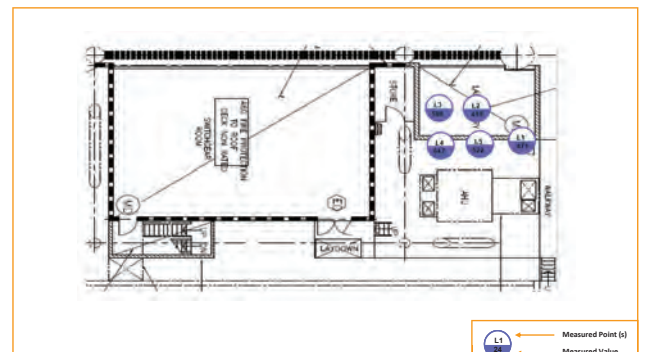


Figure 3-2 Layout of Light Intensity Measuring Points in the Workplace (Daytime) at NPCPP of the Petroleum Production Project in North Palili Field



### 3.3 Summary Result of Light Intensity in Workplace Monitoring and Recommendations

The monitoring of light intensity in workplace at NPLQ and NPCPP of the petroleum production project in North Pailin field, Chevron Thailand Exploration and Production, Ltd. was conducted on April 25 and 27, 2024 and all results complied with the standard.

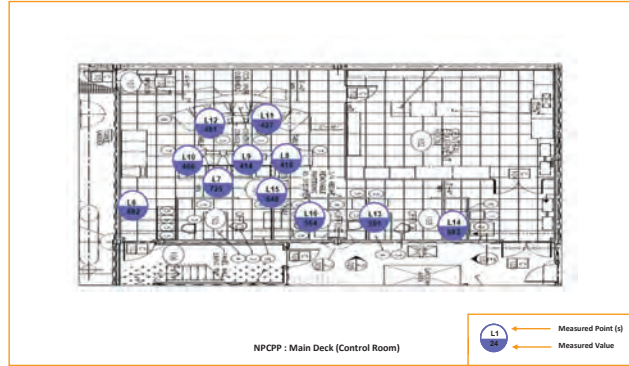


Figure 3-2 (Cont'd)

3-20

3-22

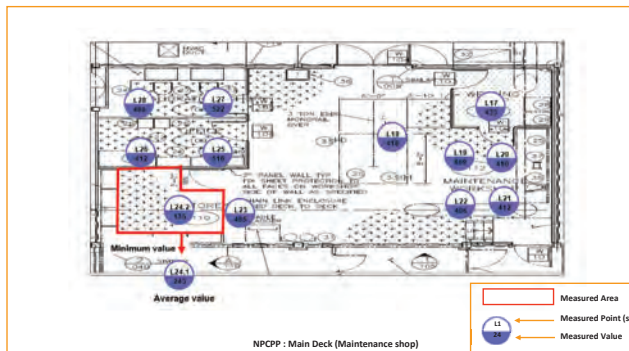


Figure 3-2 (Cont'd)

3-21

## Section 4

### Noise Level in Workplace

## Section 4

### Noise Level in Workplace

#### 4.1 Method of Measurement

Workplace Noise Level in dB(A) unit indicates the injurious effects of noise on human hearing, which is measured by using a Sound Level Meter. The microphone of the sound level meter has to be set at least 1.2-1.5 meters above the ground level in an open area without any obstacles that could reflect or obstruct the sound from the sources, but also within 1.5 meters radius for measuring in building and within 3.5 meters radius for measuring outside the building. Record the measured data on the layout map, then collect the data to generate the noise contour map with overlay technic by using the SoundPLAN version 7.3. The measurement method of workplace Noise Level is shown in **Table 4-1**.

Table 4-1 Workplace Noise Level Measurement Method

Parameter	Unit	Instrument/Measurement Method
Workplace Noise Level - Leq-5 min	dB(A)	Sound Level Meter



#### 4.2 Workplace Noise Level Monitoring Result

The monitoring results of workplace noise level (Leq-5 min) at NPLQ and NPCPP of the petroleum production project in North Pailin field conducted on April 26, 2024 with a total of 144 measuring points were summarized in **Table 4-2**. The details were demonstrated as below.

Table 4-2 Summary Results of Workplace Noise Level Monitoring of the Petroleum Production Project in North Pailin Field on April 26, 2024

Locations	Measuring Points (Points)	Results (Points)	
		Complied	Not Complied
1. NPLQ	1	1	0
2. NPCPP	143	90	53
Total	144	91 (63.2%)	53 (36.8%)

The noise level (Leq-5 min) monitoring results, pictures and layouts were shown in **Table 4-3**, **Picture 4-1 to Picture 4-2** and **Figure 4-1 to Figure 4-2**, respectively. The noise contour mapping result of each area also was shown as **Figure 4-3**. The monitoring results of each area can be summarized as follows:

##### 4.2.1 NPLQ

- Level 1: the result of 1 measuring point was 60.8 dB(A)

##### 4.2.2 NPCPP

- Cooler Deck: the results of 39 measuring points were in the range of 74.1-91.7 dB(A)
- Main Deck: the results of 43 measuring points were in the range of 70.3-98.0 dB(A)
- Main Deck (Upper): the results of 11 measuring points were in the range of 81.5-95.2 dB(A)
- Mezzanine Deck: the results of 18 measuring points were in the range of 77.6-87.5 dB(A)
- Cellar Deck: the results of 32 measuring points were in the range of 73.0-86.2 dB(A)

It is due to the measurement of workplace noise level (Leq-5 min) that does not have the standard to compare particularly, the measuring results need to compare to the Time Weighted Average (TWA) for noise exposure for 8 working hours which is specified that the noise exposure shall not exceed 85 dB(A). As the measuring results, there were 91 measuring points complying with the standard.



Table 4-3 Monitoring Results of Workplace Noise Level at NPLQ and NPCPP of the Petroleum Production Project in North Pailin Field on April 26, 2024

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>NPLQ</b>	
Level 1	
1. CST Office (N1)	60.8
<b>NPCPP</b>	
<b>Cooler Deck</b>	
1. Point 1 (N1)	74.5
2. Point 2 (N2)	75.9
3. Point 3 (N3)	77.7
4. Point 4 (N4)	80.7
5. Point 5 (N5)	79.8
6. Point 6 (N6)	87.6
7. Point 7 (N7)	83.1
8. Point 8 (N8)	80.1
9. Point 9 (N9)	76.3
10. Point 10 (N10)	74.1
11. Point 11 (N11)	78.9
12. Point 12 (N12)	89.5
13. Point 13 (N13)	91.7
14. Point 14 (N14)	90.7
15. Point 15 (N15)	79.3
16. Point 16 (N16)	81.3
17. Point 17 (N17)	85.1
18. Point 18 (N18)	86.2
19. Point 19 (N19)	84.9
20. Point 20 (N20)	81.2
21. Point 21 (N21)	80.8
22. Point 22 (N22)	89.7
23. Point 23 (N23)	86.1
24. Point 24 (N24)	84.7
25. Point 25 (N25)	82.0
26. Point 26 (N26)	81.5
27. Point 27 (N27)	81.3
28. Point 28 (N28)	87.3
29. Point 29 (N29)	88.3
30. Point 30 (N30)	82.5
31. Point 31 (N31)	84.2
32. Point 32 (N32)	88.6
33. Point 33 (N33)	88.5
Standard for 8 working hours a day <sup>1/</sup>	85

Remark: - Red number means the measuring result(s) did not comply with the standard.

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>NPCPP (Cont'd)</b>	
<b>Cooler Deck (Cont'd)</b>	
34. Point 34 (N34)	85.7
35. Point 35 (N35)	82.1
36. Point 36 (N36)	85.3
37. Point 37 (N37)	88.0
38. Point 38 (N38)	90.5
39. Point 39 (N39)	89.3
<b>Main Deck</b>	
1. Point 1 (N1)	71.0
2. Point 2 (N2)	71.6
3. Point 3 (N3)	70.3
4. Point 4 (N4)	72.0
5. Point 5 (N5)	83.0
6. Point 6 (N6)	86.4
7. Point 7 (N7)	87.2
8. Point 8 (N8)	86.9
9. Point 9 (N9)	87.3
10. Point 10 (N10)	82.0
11. Point 11 (N11)	70.3
12. Point 12 (N12)	72.4
13. Point 13 (N13)	83.2
14. Point 14 (N14)	79.6
15. Point 15 (N15)	84.4
16. Point 16 (N16)	89.8
17. Point 17 (N17)	88.2
18. Point 18 (N18)	88.0
19. Point 19 (N19)	82.5
20. Point 20 (N20)	79.5
21. Point 21 (N21)	81.7
22. Point 22 (N22)	86.3
23. Point 23 (N23)	92.8
24. Point 24 (N24)	91.8
25. Point 25 (N25)	88.8
26. Point 26 (N26)	84.6
27. Point 27 (N27)	81.4
28. Point 28 (N28)	87.2
29. Point 29 (N29)	89.7
30. Point 30 (N30)	94.2
31. Point 31 (N31)	98.0
Standard for 8 working hours a day <sup>1/</sup>	85

Remark: - Red number means the measuring result(s) did not comply with the standard.

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>NPCPP (Cont'd)</b>	
<b>Main Deck (Cont'd)</b>	
32. Point 32 (N32)	90.9
33. Point 33 (N33)	83.5
34. Point 34 (N34)	90.3
35. Point 35 (N35)	93.2
36. Point 36 (N36)	96.3
37. Point 37 (N37)	92.3
38. Point 38 (N38)	86.8
39. Point 39 (N39)	74.0
40. Point 40 (N40)	90.5
41. Point 41 (N41)	89.0
42. Point 42 (N42)	90.9
43. Point 43 (N43)	86.7
<b>Main Deck (Upper)</b>	
1. Point 1 (N1)	92.8
2. Point 2 (N2)	95.2
3. Point 3 (N3)	95.1
4. Point 4 (N4)	87.6
5. Point 5 (N5)	88.8
6. Point 6 (N6)	87.5
7. Point 7 (N7)	87.7
8. Point 8 (N8)	83.5
9. Point 9 (N9)	81.5
10. Point 10 (N10)	84.2
11. Point 11 (N11)	84.8
<b>Mezzanine Deck</b>	
1. Point 1 (N1)	83.9
2. Point 2 (N2)	83.2
3. Point 3 (N3)	83.1
4. Point 4 (N4)	80.2
5. Point 5 (N5)	77.6
6. Point 6 (N6)	81.7
7. Point 7 (N7)	79.3
8. Point 8 (N8)	78.4
9. Point 9 (N9)	79.3
10. Point 10 (N10)	84.1
11. Point 11 (N11)	84.4
12. Point 12 (N12)	87.4
13. Point 13 (N13)	87.5
14. Point 14 (N14)	86.3
<b>Standard for 8 working hours a day<sup>1/</sup></b>	
	85

Remark: - Red number means the measuring result(s) did not comply with the standard.

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

4-5



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>NPCPP (Cont'd)</b>	
<b>Mezzanine Deck (Cont'd)</b>	
15. Point 15 (N15)	81.9
16. Point 16 (N16)	79.6
17. Point 17 (N17)	77.7
18. Point 18 (N18)	79.7
<b>Cellar Deck</b>	
1. Point 1 (N1)	78.3
2. Point 2 (N2)	81.0
3. Point 3 (N3)	81.5
4. Point 4 (N4)	80.8
5. Point 5 (N5)	86.2
6. Point 6 (N6)	82.8
7. Point 7 (N7)	81.6
8. Point 8 (N8)	78.4
9. Point 9 (N9)	81.5
10. Point 10 (N10)	77.0
11. Point 11 (N11)	75.7
12. Point 12 (N12)	78.5
13. Point 13 (N13)	74.3
14. Point 14 (N14)	74.8
15. Point 15 (N15)	76.0
16. Point 16 (N16)	75.1
17. Point 17 (N17)	74.3
18. Point 18 (N18)	75.4
19. Point 19 (N19)	73.0
20. Point 20 (N20)	74.8
21. Point 21 (N21)	76.5
22. Point 22 (N22)	76.8
23. Point 23 (N23)	79.2
24. Point 24 (N24)	79.6
25. Point 25 (N25)	80.0
26. Point 26 (N26)	76.3
27. Point 27 (N27)	77.4
28. Point 28 (N28)	78.1
29. Point 29 (N29)	76.9
30. Point 30 (N30)	75.9
31. Point 31 (N31)	73.5
32. Point 32 (N32)	75.3
<b>Standard for 8 working hours a day<sup>1/</sup></b>	
	85

Remark: - Red number means the measuring result(s) did not comply with the standard.

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

4-6



1. CST Office (N1)

Level 1

Picture 4-1 Workplace Noise Level Monitoring at Cooler Deck at NPLQ of the Petroleum Production Project in North Pailin Field



Point 4 (N4)



Point 7 (N7)



Point 9 (N9)



Point 18 (N18)



Point 26 (N26)



Point 30 (N30)

Cooler Deck

Picture 4-2 Workplace Noise Level Monitoring at NPCPP of the Petroleum Production Project in North Pailin Field

4-7



Point 2 (N2)



Point 9 (N9)



Point 11 (N11)



Point 15 (N15)



Point 18 (N18)



Point 30 (N30)

Main Deck



Point 3 (N3)



Point 4 (N4)



Point 7 (N7)



Point 8 (N8)

Main Deck (Upper)

Picture 4-2 (Cont'd)

4-8



Point 7 (N7)



Point 12 (N12)



Point 3 (N3)



Point 15 (N15)



Point 10 (N10)



Point 16 (N16)



Point 9 (N9)



Point 22 (N22)

Mazzanine Deck

Cellar Deck

Picture 4-2 (Cont'd)

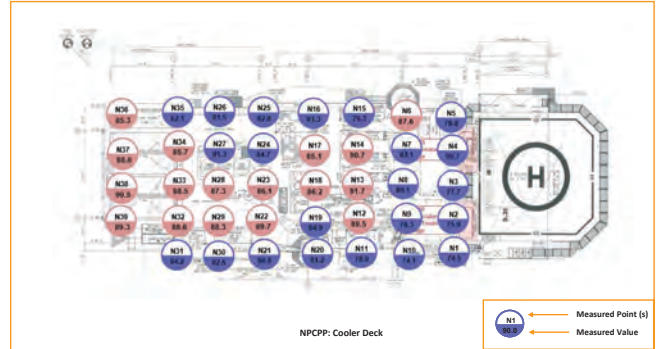


Figure 4-2 Layout of Workplace Noise Level Measuring Points at NPCPP of the Petroleum Production Project in North Pailin Field

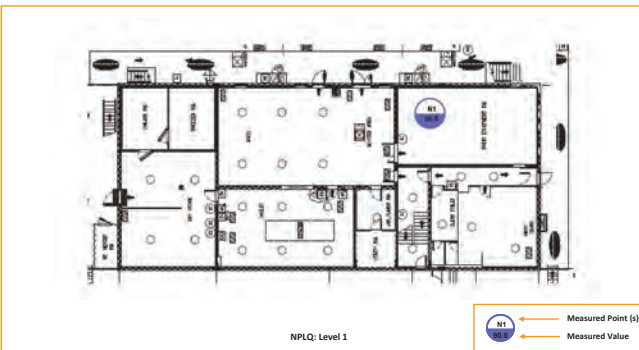


Figure 4-1 Layout of Workplace Noise Level Measuring Points at NPLQ of the Petroleum Production Project in North Pailin Field

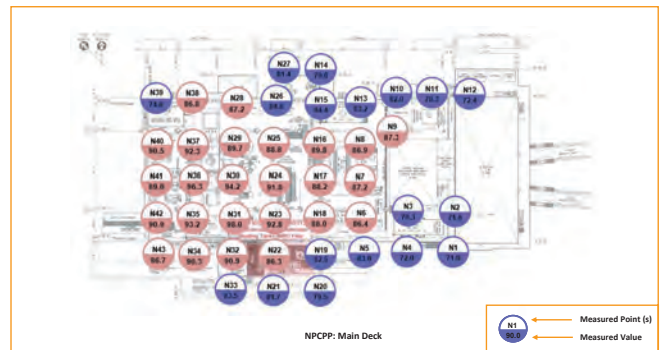


Figure 4-2 (Cont'd)

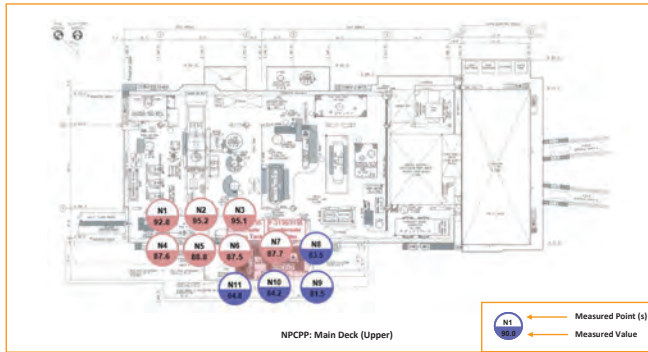


Figure 4-2 (Cont'd)

4-13

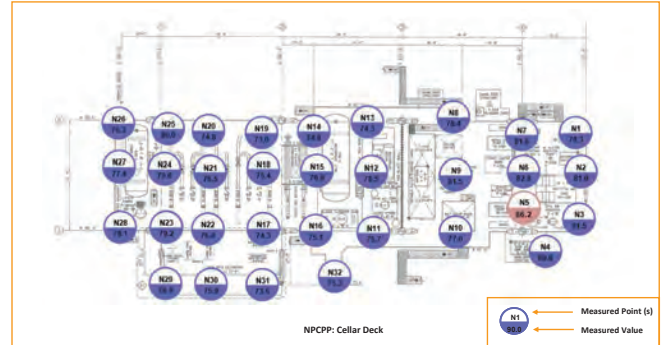


Figure 4-2 (Cont'd)

4-15

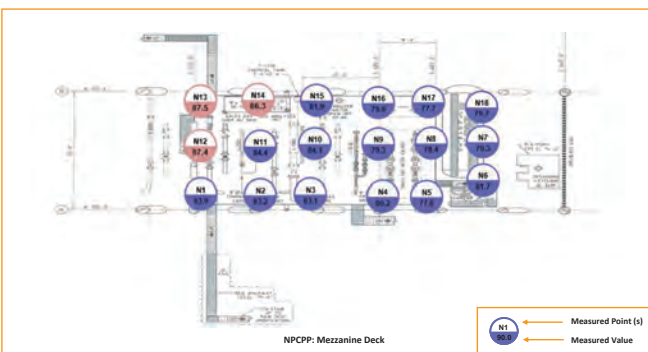


Figure 4-2 (Cont'd)

4-14

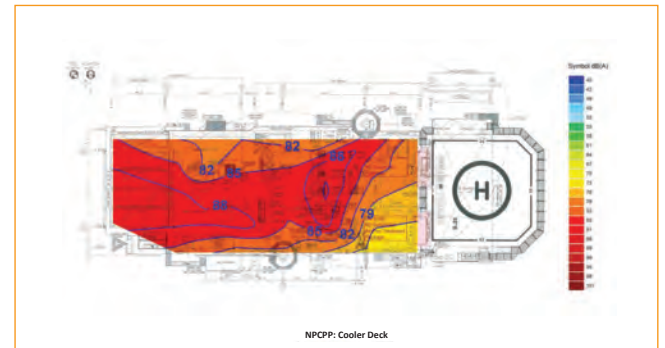
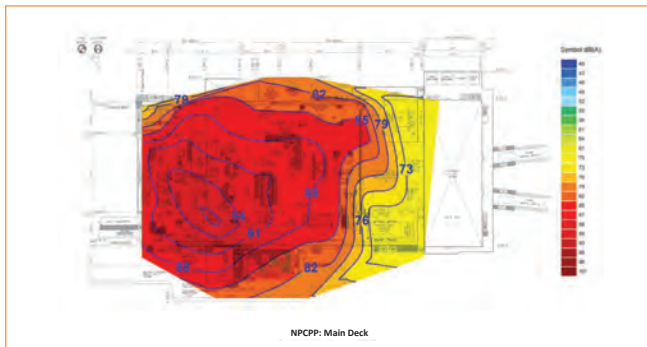


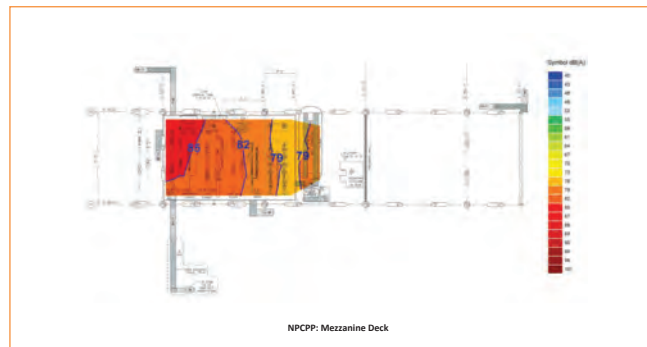
Figure 4-3 Noise Contour Map at NPCPP of the Petroleum Production Project in North Pailin Field

4-16



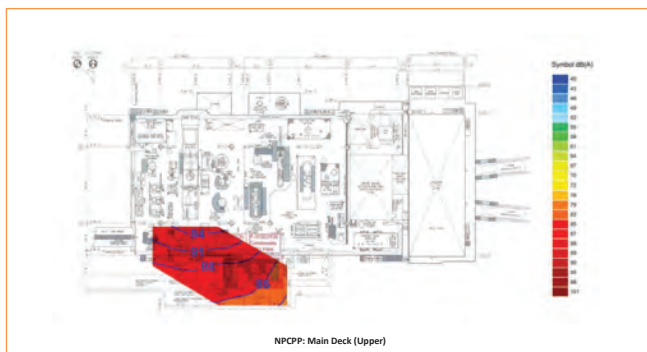
NPCPP: Main Deck

Figure 4-3 (Cont'd)



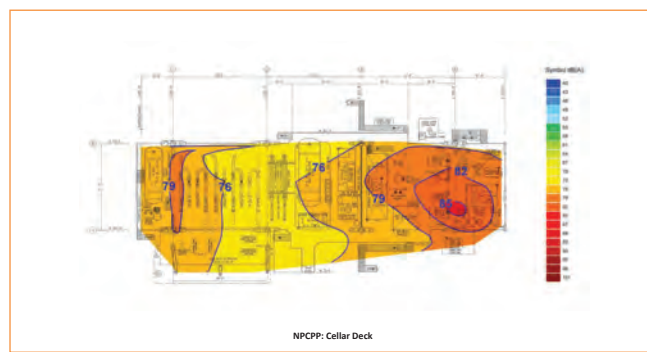
NPCPP: Mezzanine Deck

Figure 4-3 (Cont'd)



NPCPP: Main Deck (Upper)

Figure 4-3 (Cont'd)



NPCPP: Cellar Deck

Figure 4-3 (Cont'd)



#### 4.3 Summary Result of Workplace Noise Level Monitoring and Recommendation

The monitoring of workplace noise level (Leq-5 min) at NPLQ and NPCPP of the petroleum production project in North Pailin field, Chevron Thailand Exploration and Production, Ltd. was conducted on April 26, 2024 and results complied with the standard by 63.2 percent of the total measuring point.

In case of noise level values in workplace do not comply with the standard, there are recommendations as follows:

- 1) Regularly inspect device and machine for efficient operation.
- 2) Provide the personal protection equipment such as ear plug / ear muffs for employees when they need to work with the high level of noise in the area (exceeding 85 dB(A)).
- 3) Install a noise warning sign in those areas.
- 4) Provide the hearing conservation program and annual hearing test for risk employees working in the noisy area exceeding 85 dB(A)).

## Section 5

### Indoor Air Quality



## Section 5

### Indoor Air Quality

#### 5.1 Method of Measurement

The measurement methods of Indoor Air Quality refer to the standard method accepting by Singapore Official that is Code of Practice for Indoor Air Quality for Air-Conditioned Building, Singapore Standard SS 554:2016 as shown in Table 5-1.

##### ➤ Temperature

Temperature is important factor that affect on thermal comfort for occupants of building. Satisfaction of thermal comfort also depends on activity and clothing. ASHRAE Standard 55-1992 give meaning of the thermal comfort that is condition of mind which expresses satisfaction with the temperature level which is at least 80% acceptability limits and temperature should be in range of 23-25 °C

##### ➤ Relative Humidity

Relative Humidity is less than 25%RH, that affects to discomfort, dry skin and mucus membranes and electrostatic. Moreover, it also affects to computer operation. Bacteria and yeast&mold will increase when the humidity is higher. The humidity value for thermal comfort in the building should be less than 70%RH for Thailand where is tropical zone.

##### ➤ Carbon Dioxide (CO<sub>2</sub>)

Carbon Dioxide is less color and odor gas and approximately concentration of CO<sub>2</sub> is 330-350 ppm in ambient air. The sources of CO<sub>2</sub> in office building are from human respiration. Other sources of CO<sub>2</sub> are cooking and fermentation. The variation CO<sub>2</sub> concentration depends on place, building area and people in that building. The CO<sub>2</sub> for thermal comfort should be less than 700 ppm. There are various effects of high concentration of CO<sub>2</sub> (more than 700 ppm) on human such as headache, tired and problems of respiratory system.



##### ➤ Particulate matter less than 10 microns (PM-10)

There are variations of particles in the ambient air. The extremely small particles can not be seen with the naked eye and enter the lungs. There are 2 sources of particulate matter in the building including the outdoor source of particulate matter can be enter the building through the opened window, opened doors and air condition system. Meanwhile, the indoor source of particulate matter may be from document, book, dirty floor and clothes. It affects to human health with high concentration of PM-10, for example, coughing, sneezing, bronchitis and asthma.

##### ➤ Air Movement

Air Movement is replacement of air by ventilation that may affect to thermal comfort. Low pressure in the vent causes less air movement and less ventilation in each area. In addition, proper adjusting air condition system is importance when increasing of worker and official equipments such as copy machine, computer and printer.

Table 5-1 Indoor Air Quality Measurement Methods

Parameter	Unit	Instrument/Measurement Methods
1. Temperature	°C	Real-time Portable Meter/ Thermistor Sensor
2. Relative Humidity	%RH	Real-time Portable Meter/ Thin-film Capacitive Sensor
3. Carbon Dioxide	ppm	Real-time Portable Meter/ Dual-wavelength NDIR (Non-Dispersive Infrared Sensor)
4. Particulate Matter less than 10 microns	µg/m <sup>3</sup>	Real-time Portable Meter/ Optical Light Scattering
5. Air Movement	m/s	Real-time Portable Meter/ Hot Wire



## 5.2 Indoor Air Quality Monitoring Results

The monitoring of indoor air quality at NPLQ and NPCPP of the petroleum production project in North Pailin field was conducted on April 27, 2024 with a total of 19 measuring points. Moreover, there was 1 outdoor measuring point for reference. The summary result was shown in Table 5-2.

Table 5-2 Summary Result of Indoor Air Quality Monitoring of the Petroleum Production Project in North Pailin Field on April 27, 2024

Locations	Measuring Points (Points)	Results (Points)	
		Complied	Not Complied
1. NPLQ	12	7	5
2. NPCPP	7	0	7
Total	19	7 (38.8 %)	12 (63.2 %)

The monitoring results, measuring pictures and layouts are shown in Table 5-3, Picture 5-1 and Figure 5-1, respectively. The results of each measuring point were found that the values of every parameter were complied with the standard except

- Temperature : 12 measuring points were not complied with the standard that should be in range of 23-25 °C.



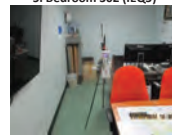
1. Radio/Clerk Office (IEQ1)



3. Laundry Room (IEQ3)



5. Bedroom 302 (IEQ5)



7. MSM Office (IEQ7)



2. OIM Office (IEQ2)



4. Medic Room (IEQ4)



6. Bedroom 204 (IEQ6)



8. Public Office (IEQ8)

Picture 5-1 Indoor Air Quality Monitoring of the Petroleum Production Project in North Pailin Field

5-3

5-5



Table 5-3 Monitoring Results of Indoor Air Quality of the Petroleum Production Project in North Pailin Field on April 27, 2024

Stations	Time (hrs.)	Results				
		Temperature (°C)	Relative Humidity (%RH)	Carbon Dioxide (ppm)	PM-10 (µg/m³)	Air Movement (m/s)
NPLQ						
• Level 3						
1. Radio/Clerk Office (IEQ1)	11:28-11:33	25.2	64.4	41	2.26	0.12
2. OIM Office (IEQ2)	11:20-11:25	24.9	66.0	44	3.15	0.08
3. Laundry Room (IEQ3)	11:35-11:40	25.3	65.3	35	17.1	0.15
4. Medic Room (IEQ4)	11:00-11:05	24.9	66.1	93	3.58	0.10
5. Bedroom 302 (IEQ5)	11:10-11:05	24.8	66.2	38	7.54	0.08
6. Outdoor	13:35-13:40	33.3	67.4	-	-	-
• Level 2						
7. Bedroom 204 (IEQ6)	10:50-10:55	24.8	66.9	64	10.98	0.06
8. MSM Office (IEQ7)	10:40-10:45	24.9	65.1	221	4.01	0.12
9. Public Office (IEQ8)	10:33-10:38	24.9	66.5	90	3.55	0.07
10. Game Room (IEQ9)	10:23-10:28	24.7	63.9	63	1.72	0.13
• Level 1						
11. Mess Room (IEQ10)	09:30-09:35	25.4	63.8	16	2.81	0.12
12. Camp boss Office (IEQ11)	09:40-09:45	25.4	64.4	52	3.86	0.14
• Roof Level						
13. Gymnasium Room (IEQ12)	11:45-11:50	25.6	59.2	12	3.64	0.06
NPCPP						
• Main Deck						
14. Control Room (IEQ13)	09:50-09:55	26.7	56.5	28	2.81	0.16
15. Maintenance Shop (IEQ14)	10:00-10:05	26.8	55.7	72	2.72	0.08
16. Maintenance Office (SUPR.) (IEQ15)	10:06-10:11	26.1	57.2	106	3.69	0.06
17. Maintenance Office (Tech) (IEQ16)	10:15-10:20	25.8	57.7	40	4.16	0.10
18. HESS Office (RC SUPR.) (IEQ17)	13:15-13:20	26.2	51.3	129	4.08	0.10
19. Store Office (IEQ18)	13:25-13:30	25.9	53.2	98	3.47	0.04
20. Laboratory (IEQ19)	11:55-12:00	26.6	48.4	98	5.60	0.10
Standard*		23-25	<70 (Existing buildings)	700 above outdoor	50	<0.30

Remarks:

- All parameters for indoor air quality were measured by real-time equipments.
- Outdoor station was not compared with the standard.
- Carbon dioxide result is calculated from actual result minus outdoor result on the survey date.
- Red number means the measuring result (s) did not comply with the standard.

Source: \* Code of Practice for Indoor Air Quality for Air-Conditioned Building, Singapore Standard S5 554:2016.

5-4



9. Game Room (IEQ9)



11. Camp boss Office (IEQ11)



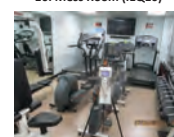
13. Control Room (IEQ13)



15. Maintenance Office (SUPR.) (IEQ15)



10. Mess Room (IEQ10)



12. Gymnasium Room (IEQ12)



14. Maintenance Shop (IEQ14)



16. Maintenance Office (Tech) (IEQ16)

Picture 5-1 (Cont'd)

5-6



17. HESS Office (RC SUPR.) (IEQ17)



18. Store Office (IEQ18)

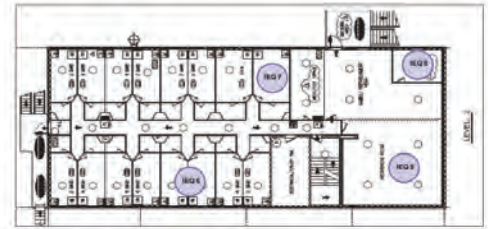


19. Laboratory (IEQ19)



20. Outdoor

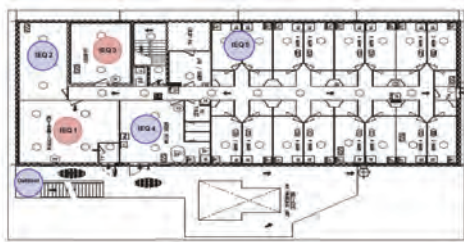
Picture 5-1 (Cont'd)



NPLQ : Level 2



Figure 5-1 (Cont'd)



NPLQ : Level 3



Figure 5-1 Indoor Air Quality Monitoring of the Petroleum Production Project in North Pailin Field



Figure 5-1 (Cont'd)

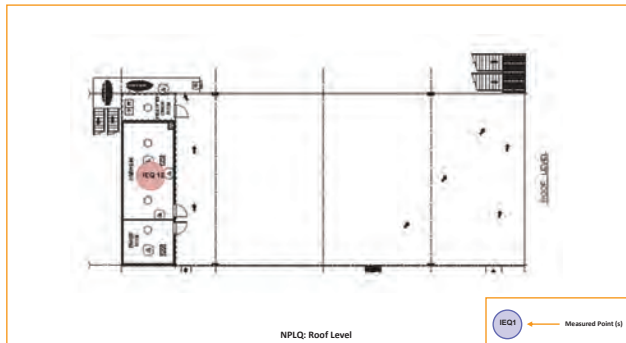


Figure 5-1 (Cont'd)

5-11

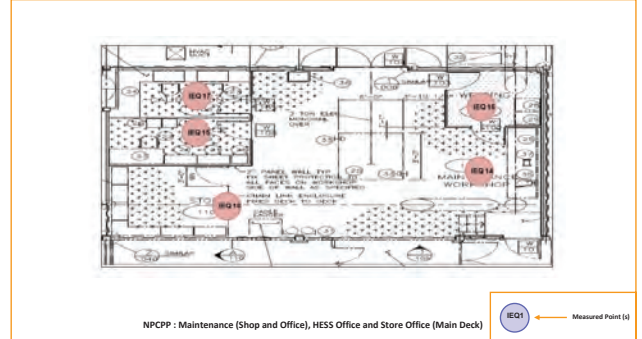


Figure 5-1 (Cont'd)

5-13

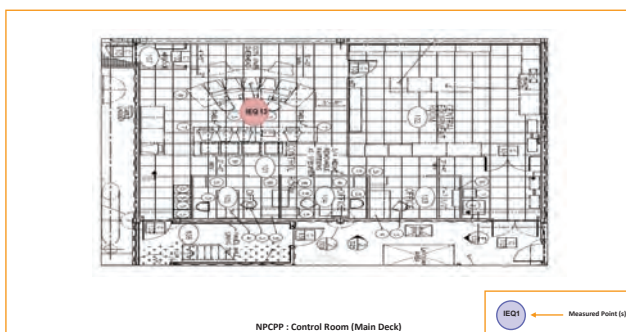


Figure 5-1 (Cont'd)

5-12

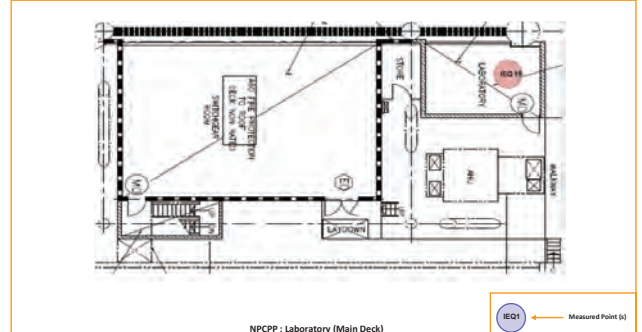


Figure 5-1 (Cont'd)

5-14



### 5.3 Summary Result of Indoor Air Quality Monitoring Results and Recommendation

The monitoring of indoor air quality at NPLQ and NPCPP of the petroleum production project in North Pailin field, Chevron Thailand Exploration and Production, Ltd. was conducted on April 27, 2024 and results complied with the standard by 38.8 percent of the total measuring point.

The parameters that didn't comply with the standard were Temperature. Thus, the proper condition should be arranged as follows:

- 1) Inspect whether the air condition system is operating system efficiently.
- 2) Inspect whether air conditioned rooms are sealed i.e. windows and doors are not left open.



## Section 6

### Face Velocity of Chemical Hoods

#### 6.1 Method of Measurement

The measurement method of Face Velocity for chemical hoods refers to ANSI/ASHRAE 29.5-2003 : Method of Testing Performance of Laboratory Fume Hoods by American National Standards Institute and American Society of Heating, Refrigerating and Air-Conditioning Engineers of America. The method details are shown in **Table 6-1**.

##### ➤ Face Velocity of Chemical hoods

Chemical hood is ventilation system with sash that is safety device for operator. Face velocity depends on sash opening. When sash is opened at low level position, the face velocity will increase. While sash is opened at high level position, that cause face velocity decrease. Efficiency of Hood system should be normal accordance with design. Therefore, the face velocity measurement of chemical hoods can indicate the operation system performance.

**Table 6-1 Face Velocity Measurement Method for Chemical Hoods**

Parameter	Unit	Measurement Method
Average Face Velocity	fpm	Real-time portable meter, hot wire



#### 6.2 Face Velocity Measurement Result

The result of Face velocity measurement at NPCPP of the petroleum production project in North Pailin field for 2 stations conducted on April 27, 2024 can be summarized as **Table 6-2**, and the layout of face velocity measurement are shown as **Figure 6-1**. Besides, the details of measuring result and pictures were demonstrated as below:

**Table 6-2 Summary Result of Average Face Velocity of Hood at NPCPP of the Petroleum Production Project in North Pailin Field on April 27, 2024**

Locations	Unit	Standard*	Average Face Velocity	Results
<b>Hood 1</b>				
- 50% Sash Opening (Maximum Limit Position)	fpm	80-100	140 <sup>1/2</sup>	Complied
- 100% Sash Opening	fpm	80-100	98	Complied
<b>Hood 2</b>				
- 50% Sash Opening (Maximum Limit Position)	fpm	80-100	123 <sup>1/2</sup>	Complied
- 100% Sash Opening	fpm	80-100	72	Not Complied

**Remark :** - The performance of hood should be also considered with standard of design and operation.

<sup>1/2</sup> 100-150 fpm is an acceptable range with similar hood performance as 80-100 fpm, but it consumes more energy to operate.

<sup>2/2</sup> More than 150 fpm of excessive air velocity may cause turbulence at the front of the hood.

**Source :** \* American National Standards for Laboratory Ventilation, ANSI/AIHA 29.5-2003

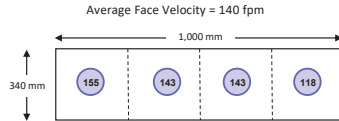
## Section 6

### Face Velocity of Chemical Hood

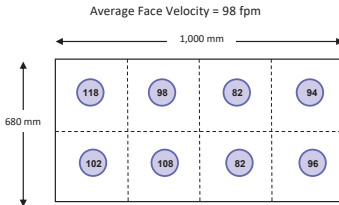


#### Hood 1

Hood Size: 1,000 mm X 680 mm  
- 50% Sash Opening

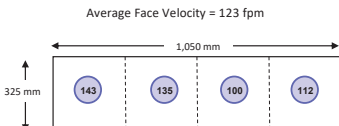


- 100% Sash Opening

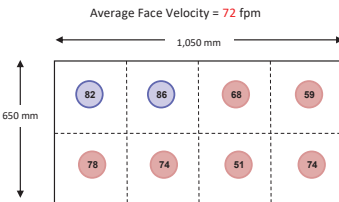


#### Hood 2

Hood Size: 1,000 mm X 650 mm  
- 50% Sash Opening



- 100% Sash Opening



6-3



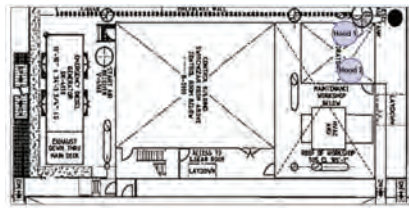
### 6.3 Summary Result of Face Velocity Measurement Result and Recommendations

The face velocity measurement results at NPCPP of the petroleum production project in North Pailin field conducted on April 27, 2024 were found that the face velocity of Hood 1, Hood 2 at 50% sash opening (Maximum Limit Position) and Hood 1 at 100% Sash Opening were complied with the standard of ANSI/AIHA Z9.5-2003. Moreover, the hood performance is good when face velocity of hood value is more than 100 fpm while it makes turbulent and consumes more energy. However, the importance is that face velocity of hood performance should be maintained as designated criteria.

In addition, not only should the hood performance be inspected and maintained but safety practices are also considered as follows:

- 1) Inspect fresh air diffusion devices which should be far away from hoods about 1.5 m.
- 2) Do not use chemical hood as chemical storage. The chemical should be kept in safety cabinet accordance with types of chemical.
- 3) All doors and windows should be fully closed when hoods are in use.
- 4) Train user for hood safety operation practices.

6-5



NPCPP : Laboratory Room (Main Deck)



Figure 6-1 Layout of Face velocity measuring point at NPCPP of the Petroleum Production Project in North Pailin Field

6-4



**Environmental Quality Monitoring Report**  
**Petroleum Production Project in South Pailin Field**  
**Chevron Thailand Exploration and Production, Ltd**  
**April 29 – May 2, 2024**



**SGS (Thailand) Limited**

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**Section 1**

**Introduction**

**Section 2**

**Heat Stress in Workplace**

**Section 3**

**Light Intensity in Workplace**

**Section 4**

**Noise Level in Workplace**

**Section 5**

**Indoor Air Quality**

**Section 6**

**Face Velocity of Chemical Hood**

**Appendix A**

**Test Report**

**Appendix B**

**Certificates of Compliance**

**Appendix C**

**Certificate of Instruments Calibration**

**Appendix D**

**Reference Standards**



**Section 1**

**Introduction**

**1.1 Introduction**

Chevron Thailand Exploration and Production, Ltd., located at 5<sup>th</sup> Floor, Tower 3, SCB Park Plaza, 19 Rachadapisek Road, Chatuchak, Bangkok 10900, has assigned SGS (Thailand) Limited to monitor the environmental quality in workplace, indoor, and to measure the face velocity of chemical hood of the petroleum production project in South Pailin Field on April 29 -May 2, 2024. The detail of all performance is explained in section 2 to section 6 as follows.

**1.2 Objective**

- To monitor the environmental quality in workplace including Heat Stress, Light Intensity, Workplace Noise Level (Leq-5 min), and create the noise contour map of the petroleum production project in South Pailin Field.
- To monitor the indoor air quality including Temperature, Relative Humidity, Carbon Dioxide, Particulate Matter less than 10 microns (PM-10), and Air Movement of the petroleum production project in South Pailin Field.
- To measure face velocity of chemical hood of the petroleum production project in South Pailin Field.
- To compare the monitoring results with the relevant government standards and prepare the report.

**1.3 Scopes of Work**

The monitoring of workplace environmental quality, indoor air quality, and face velocity of chemical hood of the petroleum production project in South Pailin Field, Chevron Thailand Exploration and Production, Ltd. was conducted on April 29 -May 2, 2024, The details included:

- Heat Stress: There were 9 measuring points at PACPP
- Light Intensity (daytime): There were a total of 54 measuring points and 9 measuring areas at PALQ and 12 measuring points at PACPP. The total number was 66 measuring points and 9 measuring areas.
- Workplace Noise Level (Leq-5 min): There were a total of 245 measuring points at PACPP as well as creating a noise contour map in each area, and 3 measuring areas at PACPP 1 measuring areas at PALQ



- Indoor Air Quality: Monitoring parameters included Temperature, Relative Humidity, Carbon dioxide, Particulate Matter (PM-10), and Air Movement. There were 2 measuring points at PACPP and 14 measuring points at PALQ. The total number was 16 measuring points. In addition, there was 1 outdoor measuring point for reference.
- Face Velocity of chemical hoods: There were 2 hoods at PACPP

#### 1.4 Reference Standards

The results from the measurement shall be compared with the following standard;

➤ **Heat Stress** compared with Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016).

For the Heat Stress, the WBGT temperature must be evaluated in associated with the work load to ensure the suitable working temperature for each type of work. The work load can be divided to 3 types, and the examples of the activities are demonstrated in **Table 1-1**

Table 1-1 Work Load and Example of Activities

Work Load	Meaning/ Example of Activities	Standard of Average WBGT*
Light Work	The nature of work that uses less force or energy to metabolize food in the body not exceed 200 kilocalories per hour e.g. book writing work, typing work, recording of data, sewing, sedentary inspection of products, assembly of small pieces of work, control the machine by foot or control the work by standing.	34.0 °C
Moderate Work	The nature of work that uses medium force or energy to metabolize food in the body exceed 200 kilocalories per hour to 350 kilocalories per hour e.g. lifting, towing, pulling, and pushing works or removal of things using medium force; nailing, filling works, truck driving work, tractor driving work.	32.0 °C
Heavy Work	The nature of work that uses greater force or energy to metabolize food in the body exceed 350 kilocalories per hour e.g. work using shovel or other similar activities, digging hoe, wood-sawing work, hard-wood boring work; pounding work with large heavy hammer; lifting work or removing heavy object up the high place or slope.	30.0 °C

Source : \* Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016).

1-2



➤ **Light Intensity** compared with Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 39D, dated February 21, B.E. 2561 (2018). The measuring results of Light Intensity were compared with the appendix tables in the mentioned standard categorized by the areas and activities of working.

➤ **Workplace Noise Level** compared with Time Weighted Average (TWA) of Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated December 13, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 19D, dated January 26, B.E. 2561 (2018).

For this monitoring, the result will be compared to the TWA for 8 hours which shall not exceed 85 dB(A) as demonstrated in **Table 1-2**.

1-3



Table 1-2 The Standard of Noise Level for Comparison

The Average of Noise Exposure Level (TWA) Not Exceed (dB(A))	Working Hour of Noise Exposure within a day	
	Hours	Minutes
82	16	-
83	12	42
84	10	5
85	8	-
86	6	21
87	5	2
88	4	-
89	3	11
90	2	31
91	2	-
92	1	35
93	1	16
94	1	-
95	-	48
96	-	38
97	-	30
98	-	24
99	-	19
100	-	15
101	-	12
102	-	9
103	-	7.5
104	-	6
105	-	5
106	-	4
107	-	3
108	-	2.5
109	-	2
110	-	1.5
111	-	1

➤ **Indoor Air Quality** compared with Code of Practice for Indoor Air Quality for Air-Conditioned Building, Singapore Standard SS 554:2016.

➤ **Face Velocity of Chemical Hoods** compared with American National Standards for Laboratory Ventilation, ANSI/AIHA Z9.5-2003.

1-4

## Section 2

### Heat Stress in Workplace

## Section 2

### Heat Stress in Workplace

#### 2.1 Method of Measurement

The measurement methods of Heat Stress in workplace are referred to the standard method which is accepted by Thai Regulations, that is Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016) as shown in **Table 2-1**.

Heat Stress is the highest temperature of the normal working day that illustrates in Wet Bulb Globe Temperature (WBGT). The WBGT is indicator of heat for environmental in workplace including the acculated heat in body and condition of working area during doing work. The formula of the WBGT is shown as below equation.

$$\begin{aligned} \text{WBGT} &= 0.7\text{NWB} + 0.3\text{GT} && (\text{In case measured inside the building or outside of the building without sunlight}) \\ \text{WBGT} &= 0.7\text{NWB} + 0.2\text{GT} + 0.1\text{DB} && (\text{In case measured outside of the building with the sunlight}) \end{aligned}$$

Which

WBGT (Wet Bulb Globe Temperature: WBGT, °C) is the indication of the heat condition in working environment.

NWB (Natural Wet Bulb: NWB, °C) is the temperature from the natural wet bulb and simulating the evaporation of sweat.

GT (Globe Temperature: GT, °C) is the temperature from the globe bulb and is measurement of the thermal radiation.

DB (Dry Bulb: DB, °C) is the temperature from the dry bulb and is measurement of convective heat transfer.

**Table 2-1 Heat Stress Measurement Method**

Parameters	Unit	Instrument/Measurement Method
Heat Stress - WBGT	°C	Certified Thermometer / Electronic Method

SGS (Thailand) Limited | 100 Nanglinchee Road, Chongnonsee Yannawa Bangkok 10120  
t (66-2) 678.18.13 f (66-2) 678.06.22 www.sgs.co.th

**Table 2-3 Results of Heat Stress Monitoring in the workplace**

Locations	Type	Measurement Date	Period	Work Load	Heat Stress (WBGT, °C)
PACPP					
Main Deck					
1. Point 1 (H1)	Indoor	April 30, 2024	13:00-13:30	Light Work	29.0
2. Point 2 (H2)	Indoor		11:30-12:00	Light Work	29.0
3. Point 3 (H3)	Indoor		10:29-10:59	Light Work	29.9
Cooler Deck					
4. Point 4 (H4)	Outdoor	April 30, 2024	09:00-09:30	Light Work	32.2
5. Point 5 (H5)	Outdoor		09:40-10:10	Light Work	32.8
6. Point 6 (H6)	Outdoor		09:00-09:30	Light Work	35.5
7. Point 7 (H7)	Outdoor		09:40-10:10	Moderate work	29.9
8. Point 8 (H8)	Outdoor		10:30-11:00	Moderate work	29.9
PALQ					
Upper Deck					
9. Point 9 (H9)	Outdoor	April 30, 2024	13:00-13:30	Moderate work	31.7
Standard <sup>1/</sup>	Light Work				≤ 34
	Moderate Work				≤ 32
	Heavy Work				≤ 30

**Remarks :**

- Sampling and Analytical Method was followed the Standard Method of National Institute for Occupational Safety and Health (NIOSH)
- Work load category is determined by averaging metabolic rates for tasks as follows:
  - 1) Light work : ≤200 kcal/hour
  - 2) Moderate work : >200-350 kcal/hour
  - 3) Heavy work : >350 kcal/hour

**Source :** <sup>1/</sup> Ministerial Regulation on the Prescribing of Standard for Administration and Management of Occupational Safety, Health and Environment in relation to Heat, Light and Noise, B.E. 2559, published in the Royal Government Gazette, Vol.133 Part 91A, dated October 17, B.E. 2559 (2016)

2-3

#### 2.2 Heat Stress Monitoring Results

The monitoring result of heat stress in workplace at PACPP of the petroleum production project in South Pailin field conducted on April 30, 2024 with a total of 9 measuring points was summarized in **Table 2-2**.

**Table 2-2 Summary Results of Heat Stress Monitoring in the workplace on April 30, 2024**

Location	Measuring Points	Results (Points)	
		Complied	Not Complied
1. PACPP	8	7	1
2. PALQ	1	1	0
<b>Total</b>	<b>9</b>	<b>8 (89.0%)</b>	<b>1 (11.0%)</b>

The monitoring results, measuring pictures and layouts were shown in **Table 2-3, Picture 2-1** and **Figure 2-1**, respectively. The heat stress monitoring result was found in the range of 29.0-35.5 °C. The activities at measuring points were machine controlling and inspection which can be compared to the light work load and moderate work.

When compared with the standards for light work load which shall not be more than 34°C, and moderate work which shall not be more than 32°C, it was found that all measuring points were complied with the standard.



Point 1 (H1)



Point 2 (H2)



Point 3 (H3)



Point 4 (H4)



Point 5 (H5)



Point 6 (H6)



Point 7 (H7)



Point 8 (H8)

**Picture 2-1 Heat Stress in Workplace Monitoring at PACPP**



**Point 9 (H9)**

**Picture 2-2 Heat Stress in Workplace Monitoring at PALQ**

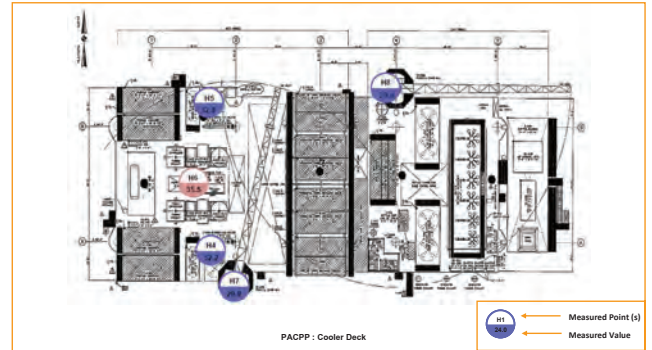


Figure 2-1 (Cont'd)

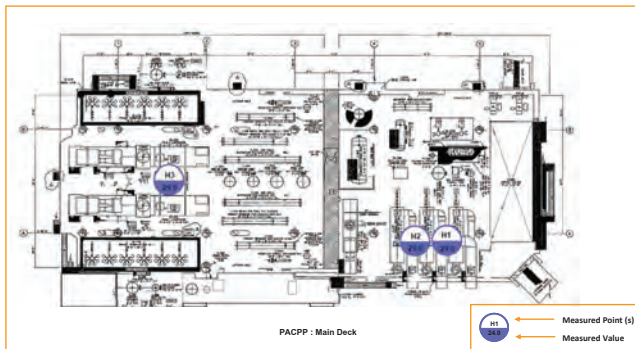


Figure 2-1 Layout of Heat Stress Measuring Points in the Workplace at PACPP

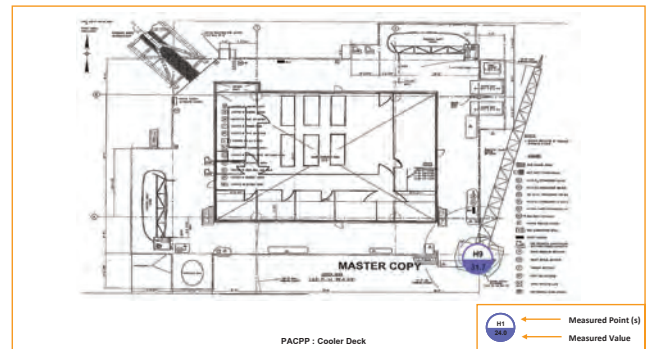


Figure 2-1 (Cont'd)



## Section 3

### Light Intensity in Workplace

#### 2.3 Summary Results of Heat Stress Monitoring and Recommendation

The monitoring of heat stress in workplace at PACPP of the Petroleum Production Project in South Pailin Field, Chevron Thailand Exploration and Production, Ltd. was conducted on April 30, 2024. It was found that most results complied with the standard by 89 percent of the total measuring point.

In case of heat stress values in workplaces that do not comply with the standard; there are recommendations as follows:

- 1) Adjust the appropriate work and break periods.
- 2) Arrange the appropriate clothing and personal protective equipment for working activities.
- 3) Provide water drinking and electrolyte beverages for risk employees.
- 4) Install heat warning signs in any working area having a heat value exceeding the standard.

#### 3.1 Method of Measurement

The amount of light that fall on the specified surface area is so called Light Intensity and the unit is "Lux or Foot Candle" by using "Lux Meter" to measure. For measurement, the sensor will be placed in the horizontal plane to surface and in the condition as well as actual operating. In case the job is operated at night time, light intensity has to be measured at night time as well. According to Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 39D, dated February 21, B.E. 2561 (2018), there are 2 methods of measurement which are Spot Measurement and Area Measurement. The Spot Measurement is applied to measure intensity of light falling on surface of a working area in a real working condition; whereas, the Area Measurement is applied to measure intensity of light representing in term of overall of general working areas, such as walkway. The method of this monitoring can be summarized as **Table 3-1**.

**Table 3-1 Light Intensity Measurement Method**

Parameter	Unit	Instrument/Measurement Method
Light Intensity	Lux	Lux Meter / Electronic Method



#### 3.2 Light Intensity Monitoring Results

The monitoring results of light intensity (daytime) in workplace at PALQ and PACPP of the petroleum production project in South Pailin field were conducted on April 29, 2024. The summary results were shown in **Table 3-2**

**Table 3-2 Summary Result of Light Intensity in Workplace Monitoring on April 29, 2024**

Location	Measuring Points/Areas	Results (Points/Areas)	
		Complied	Not Complied
1. PALQ			
- Spot Measurement	54	54	0
- Area Measurement	9	9	0
2. PACPP			
- Area Measurement	11	11	1
<b>Total</b>	<b>75</b>	<b>74 (98.7%)</b>	<b>1 (1.3%)</b>

##### 3.3.1 PALQ

The monitoring result of light intensity at PALQ during daytime on April 29, 2024 with 54 measuring points and 9 measuring points was presented in **Table 3-3**. Measuring pictures and layouts were shown as **Picture 3-1** and **Figure 3-1**, respectively. The details of activities in monitoring areas as follows:

##### Cellar deck

- Mechanical Shop: the monitoring conducted at Computer work, Conference room, and Maintenance.
- FE Shop: the monitoring conducted at Computer work.
- COG Shop: the monitoring conducted at Computer work.

##### Mezzanine Deck

- MOT & RT Shop: the monitoring conducted at Computer work and Repairing equipment.
- Safety Office: the monitoring conducted at Computer work.
- Laundry Room: the monitoring conducted at Washing machine, Drying machine, and Folding.
- Locker Room: the monitoring conducted at Locker area.
- Store Room: the monitoring conducted at Computer work and Storage area.

## Section 3

### Light Intensity in Workplace



#### Upper Deck

- Meeting Room: the monitoring conducted at Monitor control and Conference room.
- OIM Room: the monitoring conducted at Computer work.
- Maintenance Superintendent Room: the monitoring conducted at Computer work.
- Production Superintendent Room: the monitoring conducted at Computer work.
- Assistant to OIM Room: the monitoring conducted at Computer work.
- Galley Room: the monitoring conducted at Cooking/ Preparing ingredients.
- Campboss Room: the monitoring conducted at Computer work and Food Storage.
- Mess Room: the monitoring conducted at Canteen.

#### 2<sup>nd</sup> Floor

- Medic Room: the monitoring conducted at Computer work and Recuperating room.

#### 4<sup>th</sup> Floor

- Radio Room: the monitoring conducted at Computer work.
- Reading Room: the monitoring conducted at Document work.
- Theatre Room: the monitoring conducted at Watching movies/ Recreation.

#### Exercise Room

- Exercise Room: the monitoring conducted at Exercise.

According to the monitoring results of all 54 measuring points and 9 measuring areas, it was found that all results having sufficient light for working.

### 3.3.2 PACPP

The monitoring result of light intensity at PACPP during daytime on April 29, 2024 with 12 measuring points was presented in **Table 3-4**. Measuring pictures and layouts were shown as **Picture 3-2** and **Figure 3-2**, respectively. The details of activities in monitoring areas as follows:

#### Main Deck

- Control Room: the monitoring conducted at Computer work/ Monitor and Control panel.

#### Cellar Deck

- Laboratory: the monitoring conducted at Computer work, Weigh, and Hood.

According to the monitoring results at PACPP of all 12 measuring points, it was found that most results having sufficient light for working.

3-3



Table 3-3 Monitoring Results of Light Intensity in Workplace at NPLQ

Measurement Location	Activities/ Type of Work	Light Intensity (LUX)	Standard Value <sup>1/</sup>
Cellar Deck			
Mechanical & IE Shop			
1. Point 1 (L1)	Computer work	456	400-500
2. Point 2 (L2)		405	
3. Point 3 (L3)		542	
4. Point 4 (L4)		680	
5. Point 5 (L5)		528	
6. Point 6 (L6)		674	
7. Point 7 (L7)		450	
8. Point 8 (L8)		652	
9. Point 9 (L9)		460	
10. Point 10 (L10)		611	
11. Point 11 (L11)		401	
12. Point 12 (L12)		905	
13. Point 13 (Area measurement)	Meeting	790	300
13.1 Average value (L13.1)		524	150
13.2 Minimum value (L13.2)		706	300-400
14. Point 14 (L14)	Maintenance	706	300-400
FE Shop			
15. Point 15 (L15)	Computer work	759	400-500
16. Point 16 (L16)		605	
17. Point 17 (L17)		464	
18. Point 18 (L18)		532	
19. Point 19 (L19)		564	
20. Point 20 (L20)		614	
21. Point 21 (L21)		426	
22. Point 22 (L22)		419	
23. Point 23 (L23)		410	
COG Room			
24. Point 24 (L24)	Computer work	587	400-500
25. Point 25 (L25)		425	
26. Point 26 (L26)		670	
Mezzanine Deck			
MOT & RT Shop			
27. Point 27 (L27)	Computer work	531	400-500
28. Point 28 (L28)		516	
29. Point 29 (L29)		446	

Source : <sup>1/</sup> Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 390, dated February 21, B.E. 2561 (2018)

3-4



Table 3-3 (Cont'd)

Measurement Location	Activities/ Type of Work	Light Intensity (LUX)	Standard Value <sup>1/</sup>
Mezzanine Deck			
MOT & RT Shop			
30. Point 30 (L30)	Computer work	806	400-500
31. Point 31 (L31)		544	
32. Point 32 (L32)		987	
Safety Office			
33. Point 33 (L33)	Computer work	777	400-500
34. Point 34 (L34)		753	
Laundry Room			
35. Point 35 (L35)	Meeting	582	200-300
36. Point 36 (L36)	Meeting	381	
37. Point 37 (L37)	Meeting	408	
Locker Room			
38. Point 38 (Area measurement)	Locker area		
38.1 Average value (L38.1)		673	100
38.2 Minimum value (L38.2)		633	50
Store Room			
39. Point 39 (L39)	Computer work	433	400-500
40. Point 40 (Area measurement)	Storage area		
40.1 Average value (L40.1)		160	100
40.2 Minimum value (L40.2)		102	50
Upper Deck			
Meeting Room			
41. Point 41 (L41)	Monitor control	432	400-500
42. Point 42 (Area measurement)	Meeting		
42.1 Average value (L42.1)		1,005	300
42.2 Minimum value (L42.2)		584	150
OIM Room			
43. Point 43 (L43)	Computer work	422	400-500
Maintenance Superintendent Room			
44. Point 44 (L44)	Computer work	524	400-500
Production Superintendent Room			
45. Point 45 (L45)	Computer work	423	400-500
Assistant to OIM Room			
46. Point 46 (L46)	Computer work	434	400-500

Source : <sup>1/</sup> Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 390, dated February 21, B.E. 2561 (2018)

3-5



Table 3-3 (Cont'd)

Measurement Location	Activities/ Type of Work	Light Intensity (LUX)	Standard Value <sup>1/</sup>
Galley Room			
47. Point 47 (L47)	Cooking/ Preparing Ingredients	456	300-400
48. Point 48 (L48)		732	
49. Point 49 (L49)		791	
50. Point 50 (L50)		515	
51. Point 51 (L51)		478	
Campboss Room			
52. Point 52 (L52)	Computer work	531	400-500
53. Point 53 (Area measurement)	Food Storage	328	100
53.1 Average value (L53.1)		212	50
53.2 Minimum value (L53.2)			
Mess Room			
54. Point 54 (Area measurement)	Canteen	815	300
54.1 Average value (L54.1)		665	150
54.2 Minimum value (L54.2)			
2 <sup>nd</sup> Floor			
Medical Room			
55. Point 55 (L55)	Computer work	983	400-500
56. Point 56 (Area measurement)	Recuperating	830	50
56.1 Average value (L56.1)		686	25
56.2 Minimum value (L56.2)			
4 <sup>th</sup> Floor			
Radio Room			
57. Point 57 (L57)	Computer work	722	400-500
58. Point 58 (L57)		594	
Reading Room			
59. Point 59 (L59)	Computer work	634	400-500
60. Point 60 (L60)		693	
61. Point 61 (L61)		466	
Theatre Room			
62. Point 62 (Area measurement)	Watching movies/ Recreation	472	50
62.1 Average value (L62.1)		425	25
62.2 Minimum value (L62.2)			
Roof Deck			
Gymnasium Room			
63. Point 63 (Area measurement)	Exercise	536	100
63.1 Average value (L63.1)		409	50
63.2 Minimum value (L63.2)			

Source : <sup>1/</sup> Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 390, dated February 21, B.E. 2561 (2018)

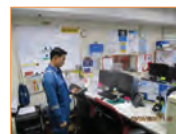
3-6



Table 3-4 Monitoring Results of Light Intensity in Workplace at PACPP

Measurement Location	Activities/ Type of Work	Light Intensity (LUX)	Standard Value <sup>1/</sup>	
Main Deck				
Control Room				
1. Point 1 (L1)	Computer work	414	400-500	
2. Point 2 (L2)	Control panel	517		
3. Point 3 (L3)	Computer work/ Monitor	476		
4. Point 4 (L4)		632		
5. Point 5 (L5)	Computer work	563		
6. Point 6 (L6)		597		
7. Point 7 (L7)	Computer work/ Monitor	410		
Cellar Deck				
Laboratory Room				
8. Point 8 (L8)	Weigh	617	400-500	
9. Point 9 (L9)	Hood	557		
10. Point 10 (L10)		575		
11. Point 11 (L11)	Preparing Samples	315		
12. Point 12 (L12)	Computer work	590	400-500	

Remark: - Red number means the measuring result(s) did not comply with the standard.  
Source: 1/ Notification of the Department of Labor Protection and Welfare, Subject "Light Intensity Standard" dated November 27, B.E. 2560 (2017), published in the Royal Government Gazette, Vol.135 Part 390, dated February 21, B.E. 2561 (2018)



Point 9 (L9)



Point 10 (L10)



Point 11 (L11)



Point 12 (L12)



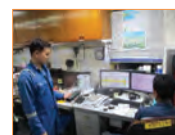
Point 13 (L13)



Point 14 (L14)



Point 15 (L15)

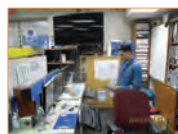


Point 16 (L16)

Picture 3-1 (Cont'd)



Point 1 (L1)



Point 2 (L2)



Point 3 (L3)



Point 4 (L4)



Point 5 (L5)



Point 6 (L6)



Point 7 (L7)



Point 8 (L8)

Picture 3-1 Light Intensity in Workplace Monitoring at PALQ



Point 17 (L17)



Point 18 (L18)



Point 19 (L19)



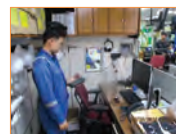
Point 20 (L20)



Point 21 (L21)



Point 22 (L22)



Point 23 (L23)



Point 24 (L24)

Picture 3-1 (Cont'd)



Point 25 (L25)



Point 26 (L26)



Point 27 (L27)



Point 28 (L28)



Point 29 (L29)



Point 30 (L30)



Point 31 (L31)

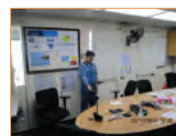


Point 32 (L32)

Picture 3-1 (Cont'd)



Point 41 (L41)



Point 42 (L42)



Point 43 (L43)



Point 44 (L44)



Point 45 (L45)



Point 46 (L46)



Point 47 (L47)



Point 48 (L48)

Picture 3-1 (Cont'd)



Point 33 (L33)



Point 34 (L34)



Point 35 (L35)



Point 36 (L36)



Point 37 (L37)



Point 38 (L38)



Point 39 (L39)



Point 40 (L40)

Picture 3-1 (Cont'd)



Point 49 (L49)



Point 50 (L50)



Point 51 (L51)



Point 52 (L52)



Point 53 (L53)



Point 54 (L54)



Point 55 (L55)



Point 56 (L56)

Picture 3-1 (Cont'd)



Point 57 (L57)



Point 58 (L58)



Point 59 (L59)



Point 60 (L60)



Point 61 (L61)



Point 62 (L62)



Point 63 (L63)

Picture 3-1 (Cont'd)

3-15



Point 9 (L9)



Point 10 (L10)



Point 11 (L11)



Point 12 (L12)

Picture 3-2 (Cont'd)

3-17



Point 1 (L1)



Point 2 (L2)



Point 3 (L3)



Point 4 (L4)



Point 5 (L5)



Point 6 (L6)



Point 7 (L7)



Point 8 (L8)

Picture 3-2 Light Intensity in Workplace Monitoring at PACPP

3-16

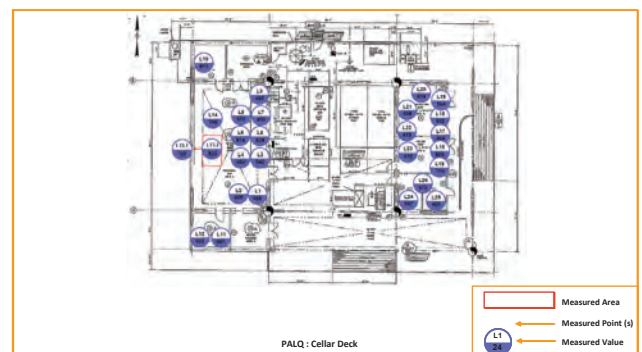


Figure 3-1 Layout of Light Intensity Measuring Points in the Workplace at PALQ

3-18

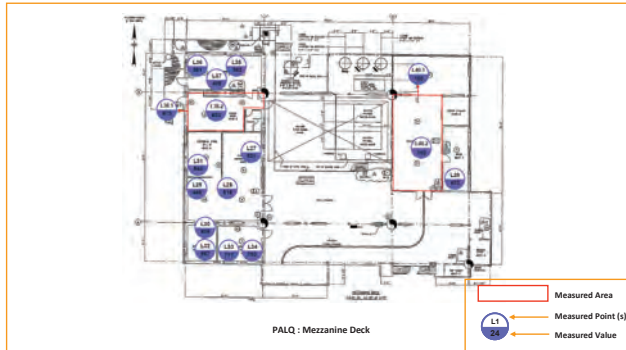


Figure 3-1 (Cont'd)

3-19

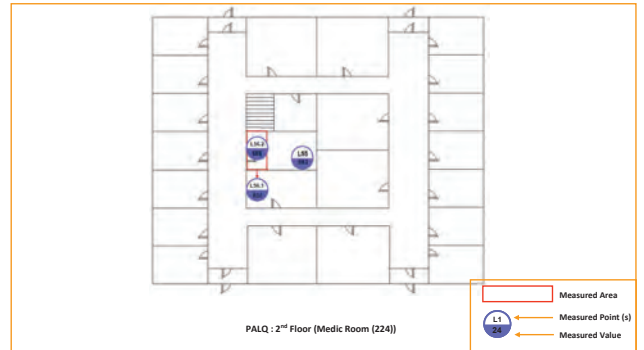


Figure 3-1 (Cont'd)

3-21

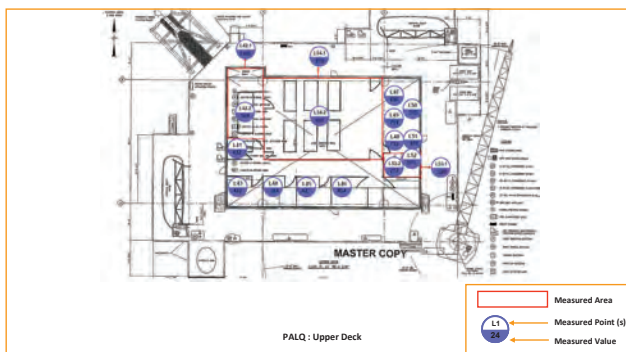


Figure 3-1 (Cont'd)

3-20

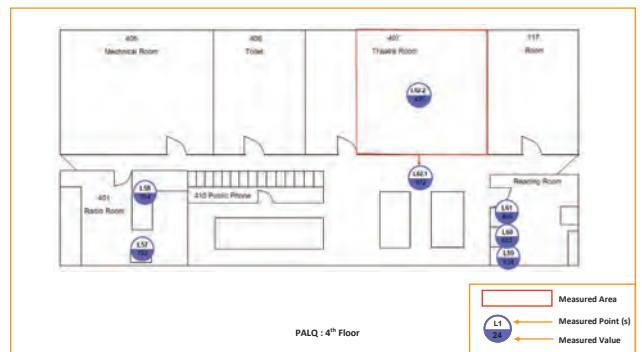


Figure 3-1 (Cont'd)

3-22

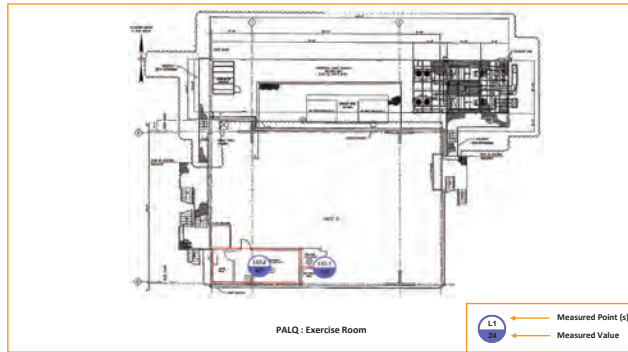


Figure 3-1 (Cont'd)

3-23

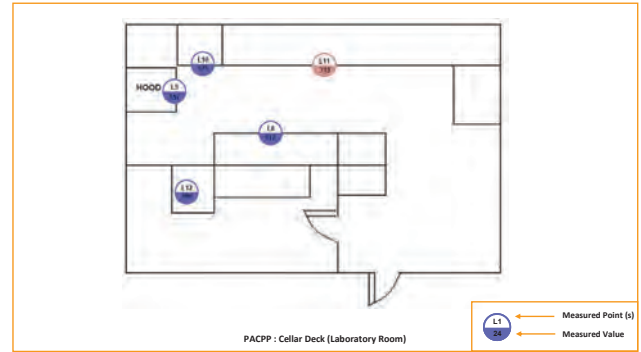


Figure 3-2 (Cont'd)

3-25

### 3.3 Summary Results of Light Intensity Monitoring and Recommendation

The monitoring of light intensity in workplace at PALQ and PACPP of the Petroleum Production Project in South Pailin Field, Chevron Thailand Exploration and Production, Ltd. was conducted on April 29, 2024, and results complied with the standard by 98.7 percent of the total measuring point.

In case light intensity values in workplaces do not comply with the standard, there are recommendations as follows:

- 1) Change new devices of light sources when they are used for a long time or damaged.
- 2) Regularly check and clean the devices of light sources.

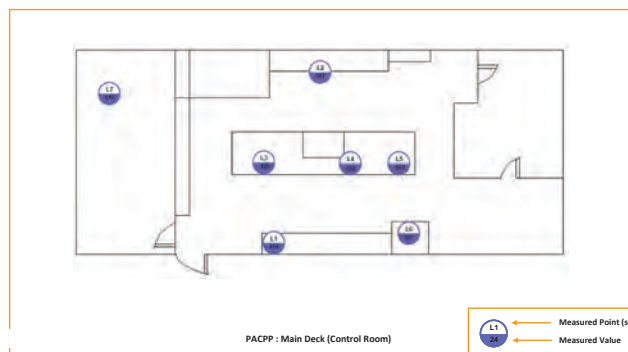


Figure 3-2 Layout of Light Intensity Monitoring at PACPP

3-24

## Section 4

### Noise Level in Workplace



#### 4.2 Workplace Noise Level Monitoring Results

The monitoring results of workplace noise level at PACPP and PALQ of the Petroleum Production Project in South Pailin Field were conducted on April 30-May 2, 2024. The summary results were shown in **Table 4-2**.

**Table 4-2 Summary Results of workplace noise level Monitoring on April 30-May 2, 2024**

Location	Measuring Points	Results (Points)	
		Complied	Not Complied
1. PACPP	248	113	135
2. PALQ	1	1	0
<b>Total</b>	<b>249</b>	<b>114 (45.8%)</b>	<b>135 (54.2%)</b>

The noise level (Leq-5 min) monitoring results at PACPP (248 measuring points) and PALQ (1 measuring point) on April 30-May 2, 2024 are shown in **Table 4-3** and **Table 4-4**. Pictures and layouts of measuring points are shown in **Picture 4-1** to **Picture 4-5** and **Figure 4-1**, respectively. The noise contour maps are shown in **Figure 4-2**. The monitoring results of each area can be summarized as follows:

- **PACPP**
  - Cooler Deck : the results of 43 measuring points were in the range of 69.4-94.7 dB(A)
  - Main Deck : the results of 58 measuring points were in the range of 67.4-101.4 dB(A)
  - Mezzanine Deck : the results of 6 measuring points were in the range of 84.5-92.5 dB(A)
  - Cellar Deck : the results of 73 measuring points were in the range of 71.5-94.8 dB(A)
  - Sub Cellar Deck : the results of 65 measuring points were in the range of 79.4-94.3 dB(A)
  - CCR (Front of UPS 15A) Turn on : the results was 64.8 dB(A)
  - CCR (Front of UPS 15A): Turn off : the results was 59.7 dB(A)
  - Front of UPS 15B Turn on : the results was 67.8 dB(A)
- **PALQ**
  - Laundry: the results was 77.7 dB(A)

It is due to the measurement of workplace noise level (Leq-5 min) that does not have the standard to compare particularly, the measuring results need to compare to the Time Weighted Average (TWA) for noise exposure for 8 working hours which is specified that the noise exposure shall not exceed 85 dB(A). As the measuring results, there were 114 measuring points did not exceed the standard.

4-2



## Section 4

### Noise Level in Workplace

#### 4.1 Method of Measurement

Workplace Noise Level in dB(A) unit indicates the injurious effects of noise on human hearing, which is measured by using a Sound Level Meter. The microphone of the sound level meter has to be set at least 1.2-1.5 meters above the ground level in an open area without any obstacles that could reflect or obstruct the sound from the sources, but also within 1.5 meters radius for measuring in building and within 3.5 meters radius for measuring outside the building. Record the measured data on the layout map, then collect the data to generate the noise contour map with overlay technic by using the SoundPLAN version 7.3. The measurement method of workplace Noise Level is shown in **Table 4-1**.

**Table 4-1 Workplace Noise Level Measurement Method**

Parameter	Unit	Instrument/Measurement Method
<b>Workplace Noise Level</b>		
- Leq-5 min	dB(A)	Sound Level Meter



**Table 4-3 Monitoring Results of Workplace Noise Level at PACPP**

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>Cooler Deck</b>	
1. Point 1 (N1)	77.5
2. Point 2 (N2)	82.8
3. Point 3 (N3)	69.4
4. Point 4 (N4)	77.0
5. Point 5 (N5)	82.3
6. Point 6 (N6)	83.5
7. Point 7 (N7)	79.0
8. Point 8 (N8)	82.8
9. Point 9 (N9)	81.0
10. Point 10 (N10)	81.8
11. Point 11 (N11)	80.2
12. Point 12 (N12)	82.9
13. Point 13 (N13)	86.6
14. Point 14 (N14)	85.2
15. Point 15 (N15)	81.5
16. Point 16 (N16)	91.6
17. Point 17 (N17)	91.5
18. Point 18 (N18)	91.8
19. Point 19 (N19)	92.3
20. Point 20 (N20)	92.3
21. Point 21 (N21)	91.1
22. Point 22 (N22)	94.4
23. Point 23 (N23)	94.2
24. Point 24 (N24)	94.7
25. Point 25 (N25)	92.0
26. Point 26 (N26)	90.6
27. Point 27 (N27)	93.1
28. Point 28 (N28)	90.4
29. Point 29 (N29)	90.3
30. Point 30 (N30)	88.9
31. Point 31 (N31)	89.8
32. Point 32 (N32)	88.5
33. Point 33 (N33)	87.8
34. Point 34 (N34)	88.8
35. Point 35 (N35)	88.1
<b>Standard for 8 working hours a day<sup>1/</sup></b>	<b>85</b>

**Source:** <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

**Remark:** - Red number means the measuring result(s) did not comply with the standard.



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>Cooler Deck (Cont'd)</b>	
36. Point 36 (N36)	88.5
37. Point 37 (N37)	88.7
38. Point 38 (N38)	88.3
39. Point 39 (N39)	87.0
40. Point 40 (N40)	87.3
41. Point 41 (N41)	84.3
42. Point 42 (N42)	88.1
43. Point 43 (N43)	91.7
<b>Main Deck</b>	
1. Point 1 (N1)	79.8
2. Point 2 (N2)	91.5
3. Point 3 (N3)	93.4
4. Point 4 (N4)	91.0
5. Point 5 (N5)	83.0
6. Point 6 (N6)	81.1
7. Point 7 (N7)	83.4
8. Point 8 (N8)	85.8
9. Point 9 (N9)	95.7
10. Point 10 (N10)	99.1
11. Point 11 (N11)	96.1
12. Point 12 (N12)	82.4
13. Point 13 (N13)	83.0
14. Point 14 (N14)	85.3
15. Point 15 (N15)	101.4
16. Point 16 (N16)	100.1
17. Point 17 (N17)	97.8
18. Point 18 (N18)	88.6
19. Point 19 (N19)	85.5
20. Point 20 (N20)	87.0
21. Point 21 (N21)	95.3
22. Point 22 (N22)	100.5
23. Point 23 (N23)	101.1
24. Point 24 (N24)	100.8
25. Point 25 (N25)	93.2
26. Point 26 (N26)	86.8
27. Point 27 (N27)	89.0
Standard for 8 working hours a day <sup>1/</sup>	85

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

Remark: - Red number means the measuring result(s) did not comply with the standard.



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>Main Deck (Cont'd)</b>	
28. Point 28 (N28)	97.1
29. Point 29 (N29)	98.2
30. Point 30 (N30)	100.1
31. Point 31 (N31)	92.1
32. Point 32 (N32)	88.9
33. Point 33 (N33)	87.4
34. Point 34 (N34)	90.1
35. Point 35 (N35)	93.2
36. Point 36 (N36)	93.6
37. Point 37 (N37)	93.0
38. Point 38 (N38)	87.6
39. Point 39 (N39)	86.7
40. Point 40 (N40)	92.4
41. Point 41 (N41)	93.6
42. Point 42 (N42)	93.9
43. Point 43 (N43)	91.9
44. Point 44 (N44)	95.4
45. Point 45 (N45)	99.5
46. Point 46 (N46)	95.6
47. Point 47 (N47)	92.6
48. Point 48 (N48)	86.6
49. Point 49 (N49)	85.3
50. Point 50 (N50)	91.8
51. Point 51 (N51)	95.2
52. Point 52 (N52)	95.8
53. Point 53 (N53)	97.2
54. Point 54 (N54)	81.3
55. Point 55 (N55)	68.2
56. Point 56 (N56)	67.4
57. Point 57 (N57)	69.4
58. Point 57 (N57)	76.1
<b>Mezzanine Deck</b>	
1. Point 1 (N1)	85.0
2. Point 2 (N2)	86.9
3. Point 3 (N3)	84.5
4. Point 4 (N4)	90.3
5. Point 5 (N5)	91.9
6. Point 6 (N6)	92.5
Standard for 8 working hours a day <sup>1/</sup>	85

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

Remark: - Red number means the measuring result(s) did not comply with the standard.



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>Cellar Deck</b>	
1. Point 1 (N1)	78.8
2. Point 2 (N2)	86.8
3. Point 3 (N3)	87.2
4. Point 4 (N4)	91.5
5. Point 5 (N5)	88.3
6. Point 6 (N6)	80.5
7. Point 7 (N7)	84.0
8. Point 8 (N8)	91.9
9. Point 9 (N9)	92.9
10. Point 10 (N10)	91.3
11. Point 11 (N11)	91.1
12. Point 12 (N12)	80.8
13. Point 13 (N13)	83.5
14. Point 14 (N14)	89.8
15. Point 15 (N15)	91.7
16. Point 16 (N16)	93.3
17. Point 17 (N17)	91.6
18. Point 18 (N18)	86.3
19. Point 19 (N19)	82.3
20. Point 20 (N20)	90.5
21. Point 21 (N21)	90.3
22. Point 22 (N22)	88.6
23. Point 23 (N23)	84.6
24. Point 24 (N24)	77.3
25. Point 25 (N25)	84.8
26. Point 26 (N26)	87.6
27. Point 27 (N27)	85.2
28. Point 28 (N28)	76.5
29. Point 29 (N29)	76.3
30. Point 30 (N30)	81.8
31. Point 31 (N31)	86.3
32. Point 32 (N32)	83.5
33. Point 33 (N33)	83.0
34. Point 34 (N34)	81.4
35. Point 35 (N35)	83.4
36. Point 36 (N36)	84.3
37. Point 37 (N37)	83.0
Standard for 8 working hours a day <sup>1/</sup>	85

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

Remark: - Red number means the measuring result(s) did not comply with the standard.



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
<b>Cellar Deck (Cont'd)</b>	
38. Point 38 (N38)	82.2
39. Point 39 (N39)	80.0
40. Point 40 (N40)	81.9
41. Point 41 (N41)	82.5
42. Point 42 (N42)	84.4
43. Point 43 (N43)	85.5
44. Point 44 (N44)	86.4
45. Point 45 (N45)	84.3
46. Point 46 (N46)	86.0
47. Point 47 (N47)	89.8
48. Point 48 (N48)	88.2
49. Point 49 (N49)	85.5
50. Point 50 (N50)	82.8
51. Point 51 (N51)	80.3
52. Point 52 (N52)	80.8
53. Point 53 (N53)	83.1
54. Point 54 (N54)	85.0
55. Point 55 (N55)	84.9
56. Point 56 (N56)	84.0
57. Point 57 (N57)	81.5
58. Point 58 (N58)	80.6
59. Point 59 (N59)	84.8
60. Point 60 (N60)	84.6
61. Point 61 (N61)	83.8
62. Point 62 (N62)	81.5
63. Point 63 (N63)	78.2
64. Point 64 (N64)	73.3
65. Point 65 (N65)	73.5
66. Point 66 (N66)	80.9
67. Point 67 (N67)	80.1
68. Point 68 (N68)	78.3
69. Point 69 (N69)	77.9
70. Point 70 (N70)	77.4
71. Point 71 (N71)	79.0
72. Point 72 (N72)	80.6
73. Point 73 (N73)	83.1
Standard for 8 working hours a day <sup>1/</sup>	85

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

Remark: - Red number means the measuring result(s) did not comply with the standard.



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
Sub Cellar Deck	
1. Point 1 (N1)	82.5
2. Point 2 (N2)	85.1
3. Point 3 (N3)	86.2
4. Point 4 (N4)	86.0
5. Point 5 (N5)	87.2
6. Point 6 (N6)	80.3
7. Point 7 (N7)	80.2
8. Point 8 (N8)	86.2
9. Point 9 (N9)	86.9
10. Point 10 (N10)	85.7
11. Point 11 (N11)	85.3
12. Point 12 (N12)	82.8
13. Point 13 (N13)	84.1
14. Point 14 (N14)	85.3
15. Point 15 (N15)	85.9
16. Point 16 (N16)	85.7
17. Point 17 (N17)	85.2
18. Point 18 (N18)	80.2
19. Point 19 (N19)	80.6
20. Point 20 (N20)	84.3
21. Point 21 (N21)	83.5
22. Point 22 (N22)	84.8
23. Point 23 (N23)	84.3
24. Point 24 (N24)	83.0
25. Point 25 (N25)	82.2
26. Point 26 (N26)	83.8
27. Point 27 (N27)	83.8
28. Point 28 (N28)	82.9
29. Point 29 (N29)	81.8
30. Point 30 (N30)	80.8
31. Point 31 (N31)	81.5
32. Point 32 (N32)	82.0
33. Point 33 (N33)	84.0
34. Point 34 (N34)	83.6
35. Point 35 (N35)	83.5
Standard for 8 working hours a day <sup>1/</sup>	85

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

Remark: - Red number means the measuring result(s) did not comply with the standard.

4-8



Table 4-3 (Cont'd)

Measurement Location	Noise Level [dB(A)] Leq-5 min
Sub Cellar Deck (Cont'd)	
36. Point 36 (N36)	85.5
37. Point 37 (N37)	85.0
38. Point 38 (N38)	83.2
39. Point 39 (N39)	83.1
40. Point 40 (N40)	81.2
41. Point 41 (N41)	82.7
42. Point 42 (N42)	83.6
43. Point 43 (N43)	86.9
44. Point 44 (N44)	87.5
45. Point 45 (N45)	93.9
46. Point 46 (N46)	91.2
47. Point 47 (N47)	90.7
48. Point 48 (N48)	85.2
49. Point 49 (N49)	82.4
50. Point 50 (N50)	53.4
51. Point 51 (N51)	84.0
52. Point 52 (N52)	91.8
53. Point 53 (N53)	93.1
54. Point 54 (N54)	96.9
55. Point 55 (N55)	93.7
56. Point 56 (N56)	93.5
57. Point 57 (N57)	94.5
58. Point 58 (N58)	86.9
59. Point 59 (N59)	83.1
60. Point 60 (N60)	82.6
61. Point 61 (N61)	85.4
62. Point 62 (N62)	93.6
63. Point 63 (N63)	95.0
64. Point 64 (N64)	91.0
65. Point 65 (N65)	82.0
Standard for 8 working hours a day <sup>1/</sup>	85

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

Remark: - Red number means the measuring result(s) did not comply with the standard.

4-9



Table 4-4 Monitoring Results of Workplace Noise Level

Measurement Location	Measurement Date	Period (hrs.)	Noise Level [dB(A)] Leq-5 min
PACPP			
1. CCR (Front of UPS 15A): Turn on	April 30, 2024	15:37-15:42	64.8
2. CCR (Front of UPS 15A): Turn off	April 30, 2024	16:00-16:05	59.7
3. Front of UPS 15B: Turn on	May 2, 2024	10:20-10:25	67.8
PALQ			
4. Laundry	April 30, 2024	19:55-20:00	77.7
Standard <sup>1/</sup>			85*

Source: <sup>1/</sup> Notification of the Department of Labour Protection and Welfare, Subject "The allowable standard for exposure noise level in worker's daily work hours" dated January 26, B.E. 2561 (2018).

4-10



Point 10 (N10)



Point 19 (N19)



Point 27 (N27)



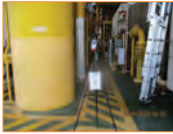
Point 37 (N37)



Point 22 (N22)

Picture 4-1 Workplace Noise Level Monitoring at Cooler Deck of PACPP

4-11



Point 2 (N2)



Point 15 (N15)



Point 47 (N47)



Point 5 (N5)



Point 9 (N9)



Point 42 (N42)



Point 44 (N44)

Picture 4-2 Workplace Noise Level Monitoring at Main Deck of PACPP



Point 3 (N3)



Point 21 (N21)



Point 43 (N43)



Point 46 (N46)



Point 51 (N51)



Point 55 (N55)



Point 56 (N56)

Picture 4-5 Workplace Noise Level Monitoring at Sub Cellular Deck of PACPP



Point 5 (N5)



Point 3 (N3)



Point 4 (N4)

Picture 4-3 Workplace Noise Level Monitoring at Mezzanine Deck of PACPP



Point 17 (N17)



Point 25 (N25)



Point 35 (N35)



Point 56 (N56)

Picture 4-4 Workplace Noise Level Monitoring at Cellular Deck of PACPP

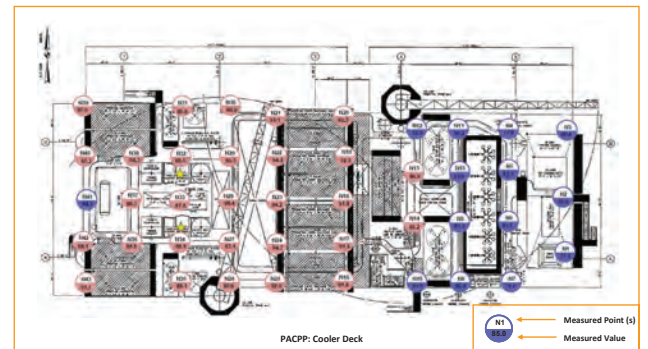
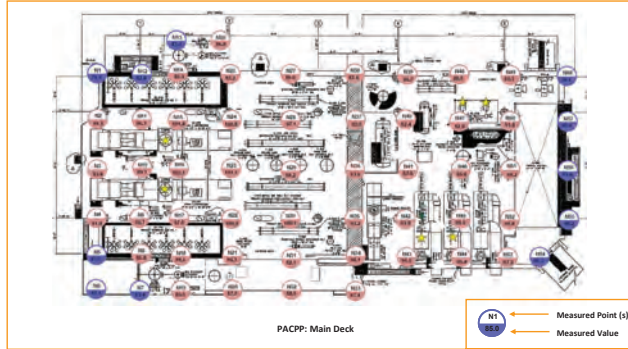


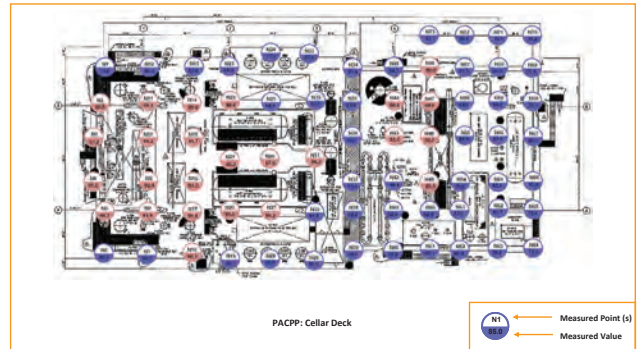
Figure 4-1 Layout of Workplace Noise Level Measuring Points at PACPP



PACPP: Main Deck

Figure 4-1 (Cont'd)

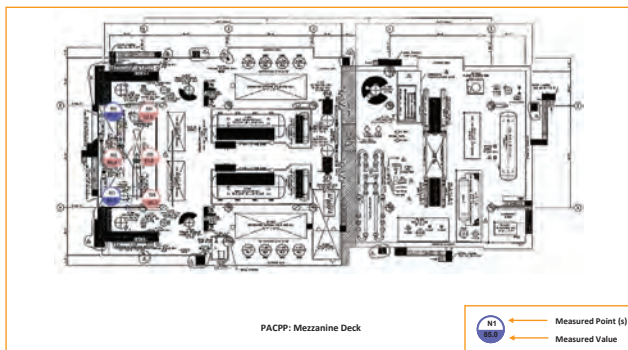
4-16



PACPP: Cellar Deck

Figure 4-1 (Cont'd)

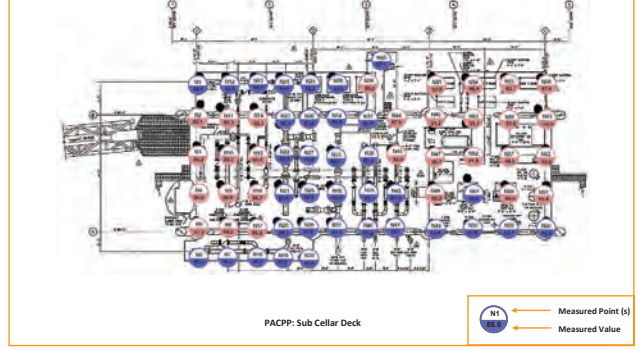
4-18



PACPP: Mezzanine Deck

Figure 4-1 (Cont'd)

4-17



PACPP: Sub Cellar Deck

Figure 4-1 (Cont'd)

4-19

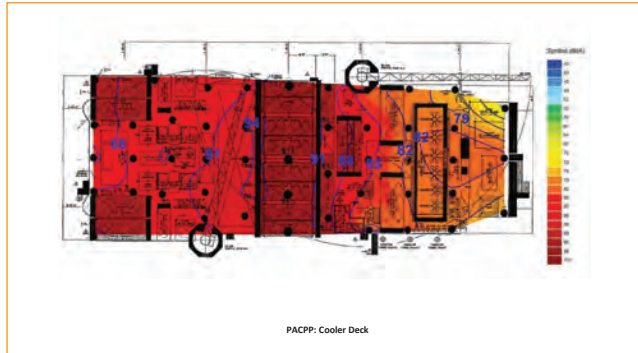


Figure 4-2 Noise Contour Map at PACPP

4-20

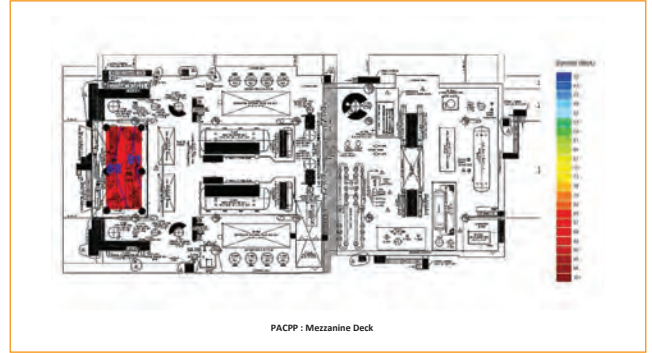


Figure 4-2 (Cont'd)

4-22

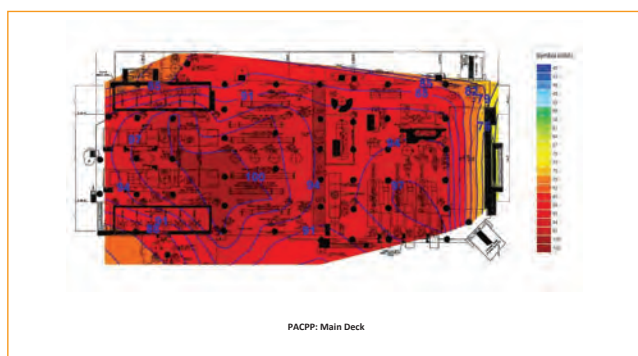


Figure 4-2 (Cont'd)

4-21

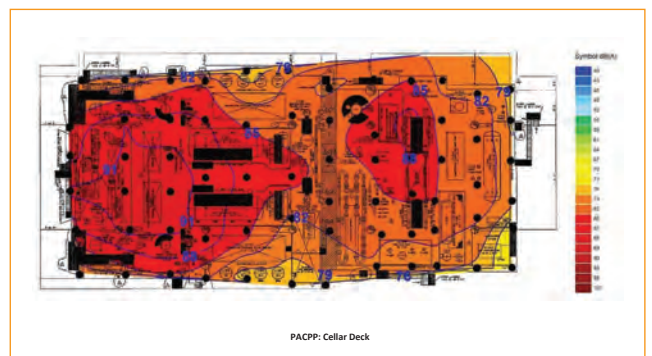
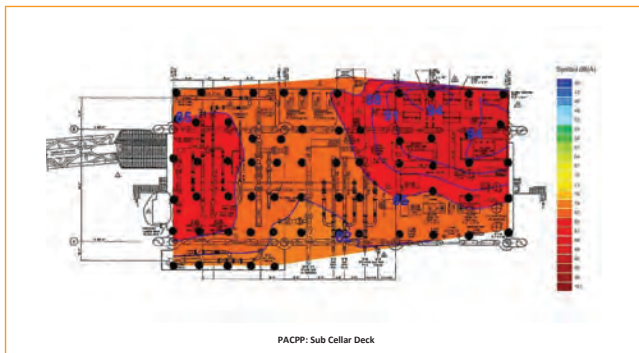


Figure 4-2 (Cont'd)

4-23



PACPP: Sub Cellar Deck

Figure 4-2 (Cont'd)

## Section 5

### Indoor Air Quality



#### 4.3 Summary Results of Workplace Noise Level Monitoring and Recommendation

The monitoring of workplace noise level (Leq-5 min) at PACPP of the Petroleum Production Project in South Pailin Field, Chevron Thailand Exploration and Production, Ltd. was conducted on April 30-May 2, 2024, and results complied with the standard by 45.8 percent of the total measuring point.

In case of noise level values in workplace do not comply with the standard, there are recommendations as follows:

- 1) Regularly inspect device and machine for efficient operation.
- 2) Provide the personal protection equipment such as ear plug / ear muffs for employees when they need to work with the high level of noise in the area (exceeding 85 dB(A)).
- 3) Install a noise warning sign in those areas.
- 4) Provide the hearing conservation program and annual hearing test for risk employees working in the noisy area exceeding 85 dB(A)).



## Section 5

### Indoor Air Quality

#### 5.1 Method of Measurement

The measurement methods of Indoor Air Quality are referred to the standard method accepted by Singapore Official that is Code of Practice for Indoor Air Quality for Air-Conditioned Building, Singapore Standard SS 554:2016 as shown in Table 5-1.

##### ➤ Temperature

Temperature is an important factor that affects thermal comfort for occupants of the building. Satisfaction of thermal comfort also depends on activity and clothing. ASHRAE Standard 54-1992 give meaning of thermal comfort that is the condition of mind which expresses satisfaction with the temperature level which is at least 80% acceptability limits and temperature should be in the range of 23.0-25.0 °C

##### ➤ Relative Humidity

Relative Humidity is less than 25%RH, which affects discomfort, dry skin and mucus membranes, and electrostatic. Moreover, it also affects computer operation. Bacteria and yeast&mold will increase when the humidity is higher. The humidity value for thermal comfort in the building should be less than 70%RH.

##### ➤ Carbon Dioxide (CO<sub>2</sub>)

Carbon Dioxide is a colorless and odor gas and the approximate concentration of CO<sub>2</sub> is 330-350 ppm in ambient air. The source of CO<sub>2</sub> in an office building is from human respiration. Furthermore, other sources of CO<sub>2</sub> are cooking and fermentation. The variation CO<sub>2</sub> concentration depends on the place, building area, and people in that building. The CO<sub>2</sub> for thermal comfort should be less than 700 ppm. There are various effects of high concentrations of CO<sub>2</sub> (more than 700 ppm) on humans such as headache, tired, and problems of the respiratory system.



➤ Particulate matter less than 10 microns (PM-10)

There are variations of particles in the ambient air. The extremely small particles can not be seen with the naked eye and enter the lungs. There are 2 sources of particulate matter in the building including the outdoor source of particulate matter that can enter the building through the opened window, opened doors, and air condition system. Meanwhile, the indoor source of particulate matter may be from documents, books, dirty floors, and clothes. It affects human health with a high concentration of PM-10, for example, coughing, sneezing, bronchitis, and asthma.

➤ Air Movement

Air Movement is the replacement of air by ventilation that may affect to thermal comfort. Low pressure in the vent causes less air movement and less ventilation in each area. In addition, properly adjusting air conditioning system is important when increasing of number of worker and official equipment such as copy machines, computers, and printers.

Table 5-1 Indoor Air Quality Measurement Methods

Parameter	Unit	Instrument/Measurement Methods
1. Temperature	°C	Real-time Portable Meter/ Thermistor Sensor
2. Relative Humidity	%RH	Real-time Portable Meter/ Thin-film Capacitive Sensor
3. Carbon Dioxide	ppm	Real-time Portable Meter/ Dual-wavelength NDIR (Non-Dispersive Infrared Sensor)
4. Particulate Matter less than 10 microns	µg/m <sup>3</sup>	Real-time Portable Meter/ Optical Light Scattering
5. Air Movement	m/s	Real-time Portable Meter/ Hot Wire

5-2



5.2 Indoor Air Quality Monitoring Results

The monitoring of indoor air quality of the Petroleum Production Project in South Pailin Field was conducted on May 1, 2024, with a total of 16 measuring points. There were 2 measuring points at PACPP and 14 measuring points at PALQ. Moreover, there was 1 outdoor measuring point for reference. The summary results are shown in Table 5-2.

Table 5-2 Summary Result of Indoor Air Quality Monitoring on May 1, 2024

Location	Measuring Points	Results (Point)	
		Complied	Not Complied
1. PACPP	2	1	1
2. PALQ	14	14	0
Total	16	15 (93.8%)	1 (6.3%)

The monitoring results, measuring pictures, and layouts are shown in Table 5-3, Picture 5-1, and Figure 5-1, respectively. The results of each measuring point found that most parameters were complied with the standard except;

- Temperature: 1 measuring point at PACPP were not complied with the standard that should be in the range of 23-25 °C.

5-3



Table 5-3 Monitoring Results of Indoor Air Quality at South Pailin

Stations	Time (hrs.)	Results				
		Temperature (°C)	Relative Humidity (%RH)	Carbon Dioxide (ppm)	PM-10 (µg/m³)	Air Movement (m/s)
PACPP						
1. Control Room (IEQ1)	11.20-11.25	24.7	53.5	59	5.26	0.13
2. Laboratory Room (IEQ2)	11.30-11.35	26.2	60.1	69	13.83	0.11
PALQ						
3. Mechanical Shop (IEQ3)	11.05-11.10	24.0	56.2	656	13.20	0.03
4. FE Office (IEQ4)	10.32-10.37	24.7	64.0	160	20.42	0.18
5. COG Room (IEQ5)	10.40-10.45	24.9	63.5	159	16.17	0.18
6. Safety Office (IEQ6)	10.12-10.17	24.5	61.1	98	11.59	0.07
7. MOT & RC Shop (IEQ7)	10.18-10.23	24.5	64.1	127	10.19	0.29
8. Laundry Room (IEQ8)	10.26-10.31	25.0	69.2	136	19.63	0.10
9. Store Room (IEQ9)	10.05-10.10	24.8	69.4	125	19.83	0.18
10. Meeting Room (IEQ10)	09.51-09.56	24.4	69.8	117	8.80	0.10
11. Canteen (IEQ11)	09.58-10.03	24.4	69.3	113	17.40	0.09
12. Production Superintendent (IEQ12)	09.44-09.49	23.7	69.3	165	9.33	0.28
13. OIM (IEQ13)	09.35-09.40	24.8	62.0	241	9.22	0.11
14. Medical Room (IEQ14)	09.10-09.15	23.0	69.7	141	9.12	0.04
15. Radio Room (IEQ15)	09.20-09.25	23.5	68.8	157	13.06	0.28
16. Gymnasium Room (IEQ16)	09.27-09.32	25.0	59.2	131	8.08	0.04
Outdoor						
17. Outdoor	11.47-11.52	32.5	72.3	59	-	-
Standard *		23-25	<70 (Existing buildings)	700 above outdoor	50	<0.30

Source: \* Code of Practice for Indoor Air Quality for Air-Conditioned Building, Singapore Standard S5 554:2016.

- Remarks:
- All parameters for indoor air quality were measured by real-time equipments.
  - Outdoor station was not compared with the standard.
  - Carbon dioxide result is calculated from actual result minus outdoor result on the survey date.
  - Red number means the measuring result (s) did not comply with the standard.

5-4



Control Room (IEQ1)



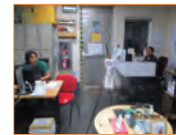
Laboratory Room (IEQ2)



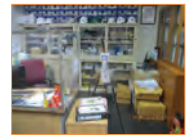
Mechanical Shop (IEQ3)



FE Office (IEQ4)



COG Room (IEQ5)



Safety Office (IEQ6)



MOT & RC Shop (IEQ7)



Laundry Room (IEQ8)

Picture 5-1 Indoor Air Quality Monitoring at South Pailin

5-5



Store Room (IEQ9)



Meeting Room (IEQ10)



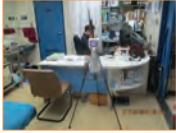
Canteen (IEQ11)



Production Superintendent (IEQ12)



OIM (IEQ13)



Medical Room (IEQ14)



Radio Room (IEQ15)



Gymnasium Room (IEQ16)



Outdoor

Picture 5-1 (Cont'd)

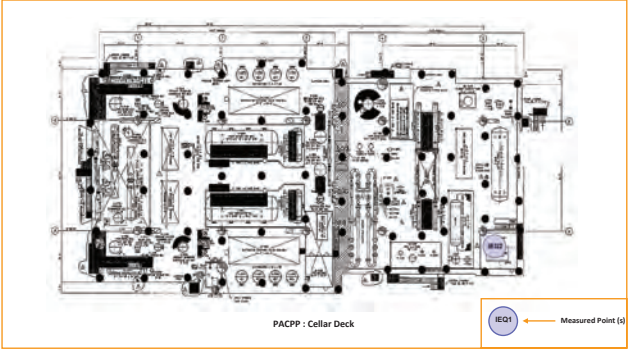


Figure 5-1 (Cont'd)

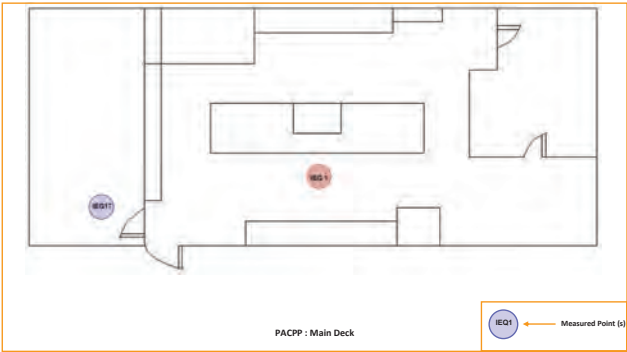


Figure 5-1 Layout of Indoor Air Measuring Points at South Pailin Field

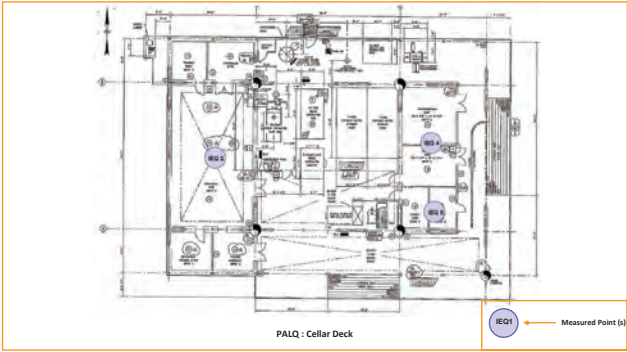


Figure 5-1 (Cont'd)

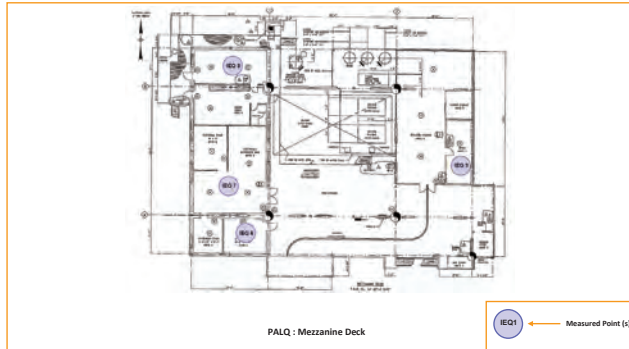


Figure S-1 (Cont' d)

5-10

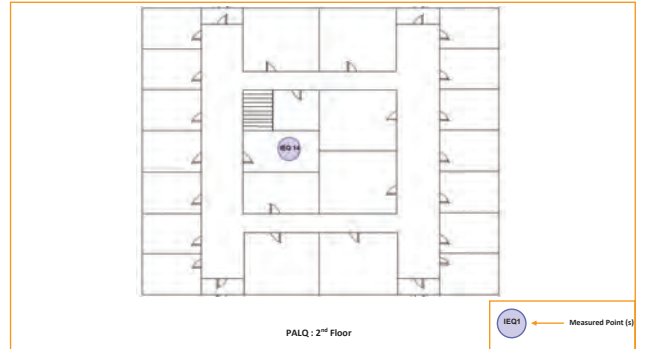


Figure S-1 (Cont' d)

5-12

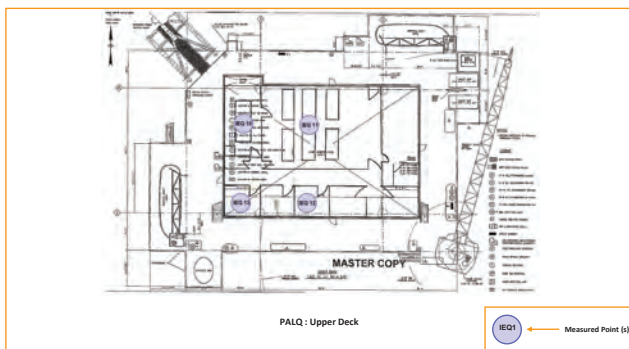


Figure S-1 (Cont' d)

5-11

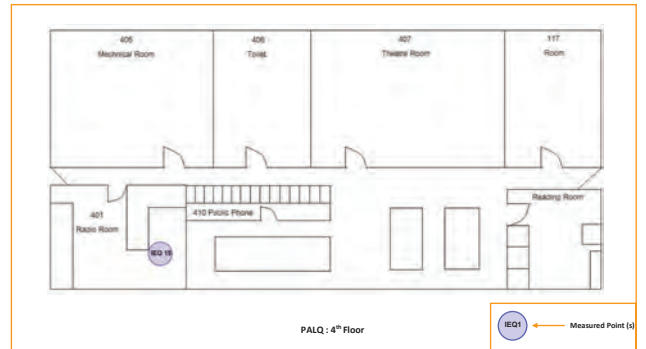


Figure S-1 (Cont' d)

5-13

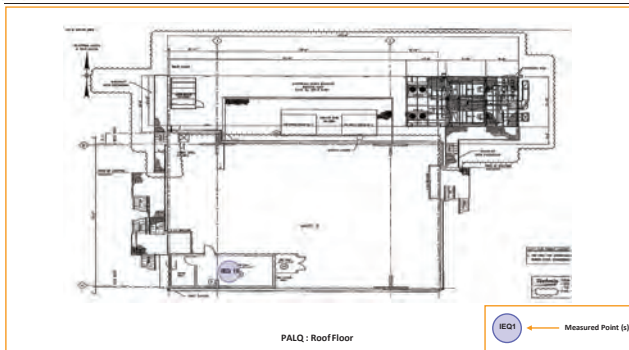


Figure 5-1 (Cont' d)



### 5.3 Summary of Indoor Air Quality Monitoring Results and Recommendation

The monitoring of indoor air quality at PACPP and PALQ of the Petroleum Production Project in South Pailin Field, Chevron Thailand Exploration and Production, Ltd was conducted on May 1, 2024. The measuring points showed results of most parameters comply with the standard.

The parameters that didn't comply with the standard were Temperature. Thus, the proper condition should be arranged as follows:

- 1) Inspect whether the air condition system is operating system efficiently.
- 2) Inspect whether air conditioned rooms are sealed i.e. windows and doors are not left open.
- 3) Increase ventilation in the problem areas.
- 4) Inspect whether the areas which have ever been redesigned/ renovated or not. This can cause changing of air movement as before redesign/renovation.

## Section 6

### Face Velocity of Chemical Hood



## Section 6

### Face Velocity of Chemical Hood

#### 6.1 Method of Measurement

The measurement method of Face Velocity for chemical hoods is refer to ANSI/ASHRAE 110-1995 : Method of Testing Performance of Laboratory Fume Hoods by American National Standards Institute and American Society of Heating, Refrigerating and Air-Conditioning Engineers of America. The method details are shown in Table 6-1.

##### ➤ Face Velocity of Chemical hood

Chemical hood is ventilation system with sash that is safety device for operator. Face velocity depends on sash opening. When sash is opened at low level position, the face velocity increase while sash is opened at high level position that cause face velocity decrease. Efficiency of Hood system should be normal accordance with design. Therefore, the face velocity measurement of chemical hoods can show performance of hood operation.

Table 6-1 Face Velocity Measurement Method for Chemical Hood

Parameter	Unit	Measurement Method
Average Face Velocity	fpm	Real-time portable meter, hot wire



## 6.2 Face Velocity Measurement Results

The Monitoring result of Face velocity measurement was conducted on May 1, 2024. There were 2 measuring point at Laboratory of Cellar Deck in South Pailin. The results can be summarized in Table 6-2 and the layout of face velocity measurement are shown as Figure 6-1. Besides, the details of measuring results and pictures were demonstrated as below.

Table 6-2 Summary Result of Average Face Velocity of Hood on May 1, 2024

Stations	Unit	Standard*	Average Face Velocity
<b>Cellar Deck (Laboratory)</b>			
<b>Hood #1</b>			
1. 50% Sash Opening (Maximum Limit Position)	fpm	80-100	138 <sup>1/</sup>
2. 100% Sash Opening	fpm	80-100	65
<b>Hood #2</b>			
1. 100% Sash Opening	fpm	80-100	289 <sup>2/</sup>

Source : \* American National Standards for Laboratory Ventilation, ANSI/AIHA Z9.5-2003

Remarks : - The performance of hood should be also considered with standard of design and operation  
<sup>1/</sup> 100-150 fpm is an acceptable range with similar hood performance as 80-100 fpm, but it consumes more energy to operate.  
<sup>2/</sup> More than 150 fpm of excessive air velocity may cause turbulence at the front of the hood.

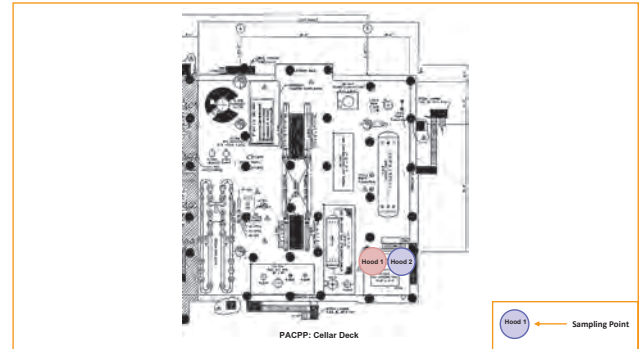


Figure 6-1 Layout of Face velocity measuring point at South Pailin Field

6-4

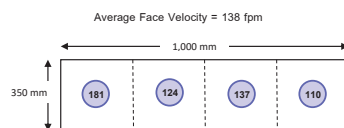
6-2



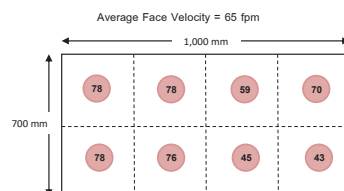
The results and picture of face velocity measurement are as follows:

### Hood #1

- 50% Sash Opening

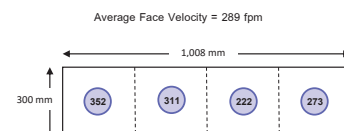


- 100% Sash Opening



### Hood #2

- 100% Sash Opening



6-3



## 6.3 Summary of Face Velocity Measurement Results and Recommendation

The face velocity measurement results of 2 hoods at Laboratory of Cellar Deck in PACPP of Petroleum Production Project in South Pailin Field, Chevron Thailand Exploration and Production, Ltd. was conducted on May 1, 2024 were found that face velocity at 50% sash opening of Hood # 1 and 100% sash opening of Hood # 2 the position that allows maximum for opening complied with the standard of ANSI/AIHA Z9.5-2003. However, controlling of hood in good performance as designated standard is important; for example, if a face velocity value of hood is more than 100 fpm, it is better for efficiency of air sucking while it also makes turbulence and consumes more energy.

In addition, not only the hood performance should be inspected and maintained but also safety practices as follows:

- 1) Inspect fresh air diffusion devices which should be far away from hoods about 1.5 m.
- 2) Do not use chemical hood as chemical storage. The chemical should be kept in safety cabinet accordance with types of chemical.
- 3) All doors and windows should be fully closed when hoods are in use.
- 4) Train user for hood safety operation practices.

6-5

ภาคผนวก 23

สรุปผลตรวจสุขภาพของพนักงาน  
(Medical Report)



# Chevron Thailand Exploration and Production, Ltd.

## Health & Medical Report

Name : Dr.Surchet Phisitkul  
Location : Thailand  
Report for : 2024

### 1.Occupational Health Program

#### 1.1 Medical Surveillance Program

Programs	Number of Samples / Locations				Total	Results (Normal / Abnormal)
	BELQ	NPLQ	PALQ	BFSO		
Mercury Surveillance (20 ug/gCr)	51	53	115	17	236	(236 / 0)
Vision Test for crane operator	52	14	26	-	92	(92 / 2*)
Respiratory Fit Test	38	18	35	-	91	(91 / 0)
Hearing Test	4	5	5	-	14	(14 / 0)

Remarks:

- \*The vision test with abnormal results were cases persued with further visual re-test with ophthalmologist and eyesight correction, for example, by cutting a new eye-glasses.
- There is no samples for vision test, respiratory fit test and hearing test at BFSO due to workforces on BFSO were contractors (HOS-Hire of Service).

#### 1.2 Potable water

Program	Number of samples / Location / Date of Sample Collection								Total Samples	Result (Normal / Abnormal)
	BELQ		NPLQ		PALQ		BFSO			
	28 May	11 Nov	28 May	11 Nov	28 May	11 Nov	28 May	11 Nov		
Drinking water analysis	1	1	1	2	2*	1	1	1	10	(10 / 2*)

Remarks:

- \*The pH of drinking water at PALQ was between 9.0 and 9.5, after Mechanic technician adjusted the pH level at water maker, the pH was betwenn 7.8 and 8.5 within the drinking water quality standards of Thailand.

- End -

ภาคผนวก 24

รายงานการตรวจวัดทางสุขศาสตร์อุตสาหกรรม  
(Occupational Hygiene Monitoring)

รายงานผลการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย

ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตรายของแหล่งผลิตโพลินีเอท

ชื่อสถานประกอบกิจการ .... บริษัท เซฟรอนประเทศไทยสำรวจและผลิต จำกัด.....เลขนิติบุคคล.....ประเภทกิจการ.....สำรวจและผลิตน้ำมันและก๊าซธรรมชาติ...  
ตั้งอยู่เลขที่...19 อาคาร 3... หมู่ที่.....ถนน.....รัชดาภิเษก.....แขวง/ตำบล.....จตุจักร.....เขต/อำเภอ.....จตุจักร.....จังหวัด.....กรุงเทพมหานคร...  
รหัสไปรษณีย์...10900.....โทรศัพท์...0-2545-5555.....ได้ตรวจวัดและวิเคราะห์ความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย โดย

- ดำเนินการเอง
- นิติบุคคลที่ได้รับใบอนุญาตตามมาตรา 11 แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ.2554

ชื่อนิติบุคคลผู้ให้บริการ .....เลขาเขียนินิติบุคคล.....

ขอแจ้งรายงานผลการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย ซึ่งมีรายละเอียดดังนี้

ชื่อสาร	วันที่เก็บตัวอย่าง	จุดที่เก็บตัวอย่าง	จำนวนลูกจ้างที่สัมผัสหรือเกี่ยวข้องกับสารเคมีอันตราย	ชื่อเครื่องมือและวัสดุอุปกรณ์ที่ใช้เก็บตัวอย่าง	อัตราดูดอากาศ (L/min)	ระยะเวลาที่เก็บตัวอย่าง (ชั่วโมง)	วันที่วิเคราะห์	ชื่อเครื่องมือวิเคราะห์	ระดับความเข้มข้นที่วิเคราะห์ได้ ***	ขีดจำกัดความเข้มข้น (TLV <sub>s</sub> ) (8 ชั่วโมงการทำงาน) ***	การประเมินผล (เกิน/ไม่เกิน)
Noise	28 เมษายน 2567	Crane Operator	2	Noise dosimeter	-	12	28 เมษายน 2567	-	82.7	85 dBA	ไม่เกิน
Benzene	8 กรกฎาคม 2567	MOT (Maintenance and Operation Team)	7	Personal air sampling pump/ Charcoal tube	0.2	8	17 กรกฎาคม 2567	Gas Chromatography, FID	<0.002	1 ppm	ไม่เกิน

ชื่อสาร	วันที่เก็บตัวอย่าง	จุดที่เก็บตัวอย่าง	จำนวนลูกจ้างที่สัมผัสหรือเกี่ยวข้องกับสารเคมีอันตราย	ชื่อเครื่องมือและวัสดุอุปกรณ์ที่ใช้เก็บตัวอย่าง	อัตราการดูดอากาศ (L/min)	ระยะเวลาที่เก็บตัวอย่าง (ชั่วโมง)	วันที่วิเคราะห์	ชื่อเครื่องมือวิเคราะห์	ระดับความเข้มข้นที่วิเคราะห์ได้ ***	ขีดจำกัดความเข้มข้น (TLV <sub>s</sub> ) (8 ชั่วโมงการทำงาน) ***	การประเมินผล (เกิน/ไม่เกิน)
Total Hydrocarbons	8 กรกฎาคม 2567	MOT (Maintenance and Operation Team)	7	Personal air sampling pump/ Charcoal tube	0.2	8	17 กรกฎาคม 2567	8 กรรณาคม 2567	<0.02	300 ppm	ไม่เกิน
Mercury	8 กรกฎาคม 2567	MOT (Maintenance and Operation Team)	7	Personal air sampling pump/ Charcoal tube	0.2	8	17 กรกฎาคม 2567	8 กรรณาคม 2567	<0.0001	0.025 mg/m <sup>3</sup>	ไม่เกิน
Mercury	18 สิงหาคม 2567	Production Operator	5	Personal air sampling pump/ Hopcalite tube	0.1	8	2 กันยายน 2567	Gas Chromatography, FID	<0.0001	0.025 mg/m <sup>3</sup>	ไม่เกิน
Nickel	6 ตุลาคม 2567	Welder	2	Personal air sampling pump/ MCE cassette	2	8	16 ตุลาคม 2567	Inductively Coupled Plasma Optical Emission	<0.0001	1 mg/m <sup>3</sup>	ไม่เกิน

ชื่อสาร	วันที่เก็บตัวอย่าง	จุดที่เก็บตัวอย่าง	จำนวนลูกจ้างที่สัมผัสหรือเกี่ยวข้องกับสารเคมีอันตราย	ชื่อเครื่องมือและวัสดุอุปกรณ์ที่ใช้เก็บตัวอย่าง	อัตราดูดอากาศ (L/min)	ระยะเวลาที่เก็บตัวอย่าง (ชั่วโมง)	วันที่วิเคราะห์	ชื่อเครื่องมือวิเคราะห์	ระดับความเข้มข้นที่วิเคราะห์ได้ ***	ขีดจำกัดความเข้มข้น (TLV <sub>s</sub> ) (8 ชั่วโมงการทำงาน) ***	การประเมินผล (เกิน/ไม่เกิน)
								spectroscopy			
Cadmium	6 ตุลาคม 2567	Welder	2	Personal air sampling pump/ MCE cassette	2	8	16 ตุลาคม 2567	Inductively Coupled Plasma Optical Emission spectroscopy	<0.0001	0.005 mg/m <sup>3</sup>	ไม่เกิน
Zinc oxide fume	6 ตุลาคม 2567	Welder	2	Personal air sampling pump/ MCE cassette	2	8	16 ตุลาคม 2567	Inductively Coupled Plasma Optical Emission spectroscopy	<0.0001	5 mg/m <sup>3</sup>	ไม่เกิน

**หมายเหตุ**      ๑. นายจ้างดำเนินการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายเอง ให้แนบเอกสารหรือหลักฐานแสดงคุณสมบัติของผู้ดำเนินการตรวจวัดสารเคมีอันตราย และผู้ดำเนินการตรวจวิเคราะห์สารเคมีอันตรายทางห้องปฏิบัติการประจำสถานประกอบการมาพร้อมเอกสาร (สอ ๓) นี้

๒. นิติบุคคลที่ได้รับใบอนุญาตตามมาตรา ๑๑ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ เป็นผู้ดำเนินการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย ให้แบบสำเนาใบอนุญาตเป็นผู้ให้บริการตรวจวัดและวิเคราะห์ฯ มาพร้อมเอกสาร (สอ.๓) นี้

๓. เครื่องหมาย \* หมายถึง หน่วย ลิตร/นาที่

เครื่องหมาย \*\* หมายถึง นาทีหรือชั่วโมง

เครื่องหมาย \*\*\* หมายถึง  $\text{mg}/\text{m}^3$  หรือ  $\mu\text{g}/\text{m}^3$  หรือ  $\text{f}/\text{cm}^3$  หรือ  $\text{mppcf}$  หรือ  $\text{ppm}$  หรือ  $\text{ppb}$

$\text{mg}/\text{m}^3$  = มิลลิกรัมต่ออากาศหนึ่งลูกบาศก์เมตร

$\mu\text{g}/\text{m}^3$  = ไมโครกรัมต่ออากาศหนึ่งลูกบาศก์เมตร

$\text{f}/\text{cm}^3$  = จำนวนเส้นใยต่ออากาศหนึ่งลูกบาศก์เซนติเมตร

$\text{mppcf}$  = จำนวนล้านอนุภาคต่อปริมาตรของอากาศหนึ่งลูกบาศก์ฟุต

$\text{ppm}$  = ส่วนในล้านส่วนโดยปริมาตร

$\text{ppb}$  = ส่วนในพันล้านส่วนโดยปริมาตร

รายงานผลการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย

ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตรายของแหล่งผลิตไฟฟ้าในใต้

ชื่อสถานประกอบกิจการ .... บริษัท เซฟรอนประเทศไทยสำรวจและผลิต จำกัด.....เลขนิติบุคคล.....ประเภทกิจการ.....สำรวจและผลิตน้ำมันและก๊าซธรรมชาติ... ตั้งอยู่เลขที่...19 อาคาร 3... หมู่ที่.....ถนน.....รัชดาภิเษก.....แขวง/ตำบล.....จตุจักร.....เขต/อำเภอ.....จตุจักร.....จังหวัด...กรุงเทพมหานคร... รหัสไปรษณีย์...10900...โทรศัพท์...0-2545-5555....ได้ตรวจวัดและวิเคราะห์ความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย โดย

- ดำเนินการเอง
- นิติบุคคลที่ได้รับใบอนุญาตตามมาตรา 11 แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ.2554  
ชื่อนิติบุคคลผู้ให้บริการ .....เลขทะเบียนนิติบุคคล.....

ขอแจ้งรายงานผลการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย ซึ่งมีรายละเอียดดังนี้

ชื่อสาร	วันที่เก็บตัวอย่าง	จุดที่เก็บตัวอย่าง	จำนวนลูกจ้างที่สัมผัสหรือเกี่ยวข้องกับสารเคมีอันตราย	ชื่อเครื่องมือและวัสดุอุปกรณ์ที่ใช้เก็บตัวอย่าง	อัตราดูดอากาศ (L/min)	ระยะเวลาที่เก็บตัวอย่าง (ชั่วโมง)	วันที่วิเคราะห์	ชื่อเครื่องมือวิเคราะห์	ระดับความเข้มข้นที่วิเคราะห์ได้ ***	ขีดจำกัดความเข้มข้น (TLVs) (8 ชั่วโมงการทำงาน) ***	การประเมินผล (เกิน/ไม่เกิน)
Benzene	20 กันยายน 2567	MOT (Maintenance and Operation Team)	10	Personal air sampling pump/ Charcoal tube	0.2	8	25 กันยายน 2567	Gas Chromatography, FID	<0.001	1 ppm	ไม่เกิน
Total Hydrocarbons	20 กันยายน 2567	MOT (Maintenance)	10	Personal air sampling pump/ Charcoal tube	0.2	8	25 กันยายน 2567	Gas Chromatography	<0.6	300 ppm	ไม่เกิน

ชื่อสาร	วันที่เก็บตัวอย่าง	จุดที่เก็บตัวอย่าง	จำนวนลูกจ้างที่สัมผัสหรือเกี่ยวข้องกับสารเคมีอันตราย	ชื่อเครื่องมือและวัสดุอุปกรณ์ที่ใช้เก็บตัวอย่าง	อัตราการดูดอากาศ (L/min)	ระยะเวลาที่เก็บตัวอย่าง (ชั่วโมง)	วันที่วิเคราะห์	ชื่อเครื่องมือวิเคราะห์	ระดับความเข้มข้นที่วิเคราะห์ได้ ***	ขีดจำกัดความเข้มข้น (TLV <sub>s</sub> ) (8 ชั่วโมงการทำงาน) ****	การประเมินผล (เกิน/ไม่เกิน)
								phy, FID			
Mercury	20 กันยายน 2567	MOT (Maintenance and Operation Team)	10	Personal air sampling pump/ Hopcalite tube	0.1	8	25 กันยายน 2567	Gas Chromatography, FID	<0.0001	0.025 mg/m <sup>3</sup>	ไม่เกิน
Mercury	15 สิงหาคม 2567	Production Operator	6	Personal air sampling pump/ Hopcalite tube	0.1	8	27 กันยายน 2567	Gas Chromatography, FID	<0.0001	0.025 mg/m <sup>3</sup>	ไม่เกิน
Nickel	22 มิถุนายน 2567	Welder	2	Personal air sampling pump/ MCE cassette	2	8	30 มิถุนายน 2567	Inductively Coupled Plasma Optical Emission spectroscopy	<0.0001	1 mg/m <sup>3</sup>	ไม่เกิน

ชื่อสาร	วันที่เก็บตัวอย่าง	จุดที่เก็บตัวอย่าง	จำนวนลูกจ้างที่สัมผัสหรือเกี่ยวข้องกับสารเคมีอันตราย	ชื่อเครื่องมือและวัสดุอุปกรณ์ที่ใช้เก็บตัวอย่าง	อัตราดูดอากาศ (L/min)	ระยะเวลาที่เก็บตัวอย่าง (ชั่วโมง)	วันที่วิเคราะห์	ชื่อเครื่องมือวิเคราะห์	ระดับความเข้มข้นที่วิเคราะห์ได้ ***	ขีดจำกัดความเข้มข้น (TLV <sub>s</sub> ) (8 ชั่วโมงการทำงาน) ***	การประเมินผล (เกิน/ไม่เกิน)
Cadmium	22 มิถุนายน 2567	Welder	2	Personal air sampling pump/ MCE cassette	2	8	30 มิถุนายน 2567	Inductively Coupled Plasma Optical Emission spectroscopy	<0.0001	0.005 mg/m <sup>3</sup>	ไม่เกิน
Zinc oxide fume	22 มิถุนายน 2567	Welder	2	Personal air sampling pump/ MCE cassette	2	8	30 มิถุนายน 2567	Inductively Coupled Plasma Optical Emission spectroscopy	<0.0001	5 mg/m <sup>3</sup>	ไม่เกิน

- หมายเหตุ**      ๑. นายจ้างดำเนินการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายเอง ให้แนบเอกสารหรือหลักฐานแสดงคุณสมบัติของผู้ดำเนินการตรวจวัดสารเคมีอันตราย และผู้ดำเนินการตรวจวิเคราะห์สารเคมีอันตรายทางห้องปฏิบัติการประมาณมาตรา ๑๑ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ เป็นผู้ดำเนินการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย ให้แนบสำเนาใบอนุญาตเป็นผู้ให้บริการตรวจวัดและวิเคราะห์ฯ มาพร้อมเอกสาร (สอ.๓) นี้
๒. นิติบุคคลที่ได้รับใบอนุญาตตามมาตรา ๑๑ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ เป็นผู้ดำเนินการตรวจวัดและวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย \* หมายถึง หน่วย ลิตร/นาที

เครื่องหมาย \*\* หมายถึง นาฬิกาหรือชั่วโมง

เครื่องหมาย \*\*\* หมายถึง  $\text{mg}/\text{m}^3$  หรือ  $\mu\text{g}/\text{m}^3$  หรือ  $\text{f}/\text{cm}^3$  หรือ  $\text{mppcf}$  หรือ  $\text{ppm}$  หรือ  $\text{ppb}$

$\text{mg}/\text{m}^3$  = มิลลิกรัมต่ออากาศหนึ่งลูกบาศก์เมตร

$\mu\text{g}/\text{m}^3$  = ไมโครกรัมต่ออากาศหนึ่งลูกบาศก์เมตร

$\text{f}/\text{cm}^3$  = จำนวนเส้นใยต่ออากาศหนึ่งลูกบาศก์เซนติเมตร

$\text{mppcf}$  = จำนวนเส้นใยต่อปริมาตรของอากาศหนึ่งลูกบาศก์ฟุต

$\text{ppm}$  = ส่วนในล้านส่วนโดยปริมาตร

$\text{ppb}$  = ส่วนในพันล้านส่วนโดยปริมาตร

**ภาคผนวก 25**

***Bridging Document (Chevron & Shelf Drilling)***

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## 1.0 Introduction

### 1.1 Purpose

The purpose of the HES Bridging Document is to document agreements and clarify expectations between Chevron and Shelf Drilling regarding the primacy and implementation of the Chevron Operational Excellence Management System (OEMS) requirements with Shelf Drilling's Safety Management System (SMS) for the contracted scope of work (Table 1).

The HES Bridging Document is also used to demonstrate that interfaces between Chevron's OEMS and Shelf Drilling's SMS have been evaluated and reviewed by all affected parties. It is not intended to replace the HES related Attachment in the contract; rather, it is designed to supplement it.

The implementation of agreements determined within this document allows the management of workforce safety and health, process safety, reliability, and integrity, environmental efficiencies, security and stakeholder needs to ultimately deliver OE performance.

In the event of a conflict between the processes and procedures of Chevron and Shelf Drilling, the default position shall be that procedures which are more stringent take precedence.

These expectations are met by;

- Conducting a gap assessment between applicable Chevron's OEMS requirements and Shelf Drilling's SMS.
- Developing a mitigation plan to address identified gaps.
- Ensuring roles, responsibilities and competencies of key personnel are clearly defined and communicated.
- Defining assurance, verification and validation (V&V) activities to assure safeguards are in place and functioning.
- Ensuring local legislative and industry requirements are met or exceeded.

### 1.2 Scope

The scope of this document covers the contracted services between Chevron and Shelf Drilling as identified in Table 1.

**Table 1: Contracted Services**

Contracted Service Scope	Contract Number
Drilling Unit, Ancillary Equipment and Personnel	Rig "Chao Phraya" – 1235832 Rig "Krathong" – 1235834
Rig Rental Service Supporting Asset Retirement Activities	Rig "Scepter" - 1735026 Rig "Enterprise" – 1779186

**ภาคผนวก 26**

**ตัวอย่างบันทึกการประเมินการปฏิบัติงานของเรือที่ใช้ในโครงการฯ (SUPO)**



# SUPO/INTERMEDIATE INSPECTION

## Marine Safety, Reliability and Efficiency (MSRE) Standardized OE Process – Chevron Marine Standard – Rev 2 – 24 May 2023

### Requirement §2.0 Vessel Assurance

1	Inspection Details	
1001	Vessel Name	Miclyn Energy
1002	Inspection Date	20 June 2024
1003	Port of Inspection	Songkhla Port
1004	Inspectors Name	
1005	Last OVIQ Inspection date	20 August 2023
1006	Date OVPQ Last Updated	10 June 2024
1007	Master's Name	
1008	Scope of Work	Supply vessel, Accommodation vessel
	Vessel Capability Variant Being Inspected	Comments
1009	Dynamic Positioning	NA
1010	Cargo Operations, Crane Operations or Bunkering	Yes
1011	Spread Moorings	NA
1012	Anchor Handling (AHTS) or Towing	NA
1013	Crew Boats (Alucats, Petro-Craft & Surfers)	NA
1014	Pipe Lay	NA
1015	Ship Assist or Escort Tug	NA
1016	Emergency Rescue or Response	NA
1017	SEWOP (Lift Boats)	NA
1018	Barge	NA
1019	ABU	NA
Inspection Instructions		
	<ul style="list-style-type: none"> <li>• Prior to the inspection, an opening meeting is to be called to ensure that the vessel crew understand the purpose of this inspection.</li> <li>• Inspector to use this form to conduct the inspection.</li> <li>• Sections 1 through 7 shall be completed for all vessels.</li> <li>• The vessel capability variant will determine which parts of section 8 are to be completed.</li> <li>• Record all comments and dates as required. All information related to "No" responses above are to be noted in Observations section of inspection form. The inspector shall ensure that any applicable photographic evidence clearly captures the objective a "No" answer.</li> <li>• The inspection shall be conducted in an objective manner.</li> <li>• Capture any evidence as required – this may be done on any external device.</li> <li>• On completion of the inspection, the inspector is to advise the Master and the crew of all observations noted. This is to be done so verbally, do not leave a copy of the completed inspection on board. If required, the Master/Crew may make their own notes.</li> <li>• Once the inspector has access to the internet, follow the link provided on the original commissioning email and complete the inspection along with entering comments and uploading evidence as required.</li> </ul>	

2	General, Certification & Documentation	Yes	No	NA
2001	Does vessel have current certificates applicable for its size and registration?	x		
2002	Does the manning level meet or exceed that required by the local Port and Flag state and/or operations the vessel is engaged in?	x		
2003	Are crew certification originals and valid? Are crew Competency requirements as defined in section 3.2.2 of the Marine Standard met?	x		
2004	All crew have FFD (Fitness for Duty) / medical certificates?	x		
2005	Are project Specific Documents on board and understood including bridging documents?	x		
2006	Verify that the vessel holds ALL in-force BU Marine Notices, Guidelines, and latest Chevron Marine Standard.	x		
2007	Is the vessel equipped with the required navigational charts and publications for the area of operation?	x		
2008	Are the Master and Crew familiar with any local restrictions such as draft, no-go areas and reporting requirements?	x		
2009	Is there evidence of a risk assessment present for working the weather side of an offshore facility and is there evidence of this being communicated to the Designated MSRE Process Authority?	x		
2010	Are the Master and Crew familiar with Incident and NM reporting requirements?	x		
2011	Has the Master been briefed on the work-scope the vessel is being chartered for?	x		
2012	<b>Cabotage / NIMASA Specific Requirements (NMA only)</b>			
2013	Receipt for or carriage of Annual Waiver Certificate aboard for: - 1) Ownership - Required If Vessel Certificate of Registry does not state a Nigerian address. NB. Must hold an 'in-date' Annual Build Waiver.			x
2014	Receipt for or carriage of Annual Waiver Certificate aboard for: - 2) Manning - i.e. A waiver is required if any crew aboard (crewlist) are not Nigerian nationals NB. Vessel must hold an 'in-date' Waiver.			x
2015	Receipt for or carriage of Annual Waiver Certificate aboard for: - 1) Building - i.e., if vessel constructed outside Nigeria, then vessel must hold an 'in-date' Annual Building Waiver.			x
2016	Vessel Owning Company holds a valid NIMASA Registration Certificate & copy is carried aboard the vessel. This is an Annual Cert and is required to be carried aboard the vessel			x
General Comments:				
Bridging document was available and implemented on board.				

3	Inspection Close outs / Standards of Management & Culture	Yes	No	NA
3001	Are Open Deficiencies from the latest OVIQ Inspection Closed? Include a list with the status of all deficiencies.	x		
3002	Are Open Deficiencies from the latest SUPO Inspection Closed? Include a list with the status of all deficiencies.	x		
3003	Are Open Deficiencies from the latest Internal Audit Closed? Include a list with the status of all deficiencies.	x		
3004	Are all Incident and Near Miss Reports Closed out? Include a list of all Incidents and Near Misses recorded within the last 12 months	x		
3005	Is the vessel's OVPQ up to date with the latest certification details?	x		
3006	Is a copy of the most recent Chevron Marine Standard onboard?	x		
General Comments:				

4	Hazard Identification / Standards of Management & Culture – Bridge, Deck, Galley & Hull	Yes	No	NA
4001	Is the gangway adequately secured on board the vessel? Does inboard end of the gangway rests on or is flush with the top of the bulwark, is a bulwark ladder provided? (Gangway shall not rest on ship rails unless it has been reinforced for that purpose) Is the gangway in good condition and certified? Is a life ring with a self-activating light and buoyant safety line attached and available adjacent to the gangway location?	x		
4002	Are walkways clear of tripping hazards?	x		
4003	Are clearances, pinch points, slips, trips and fall hazards highlighted (including guards)?	x		
4004	Is all Bridge Equipment including communication equipment in good working order?	x		
4005	Are handrail and ladders in good condition, clean and free from obstruction?	x		

4006	Are decks nonslip in relevant areas?	x		
4007	Are the stuffing tubes, sealants and bulkhead penetrations in good condition?	x		
4008	Are the Hull / deck openings, freeing ports and windows/port holes in good condition?	x		
4009	Is shell plating and internal structure joints in good condition?	x		
4010	Are the remote operated valves and controls in good condition and functioning?	x		
4011	Does the galley have adequate fire protection devices including the fire blanket?	x		
4012	Are Galley spaces, storerooms, fridges clean, neat and tidy? (Standard of housekeeping)	x		
4013	Are Drinking water facilities in good and hygienic condition?	x		
4014	Are Toilet/WC facilities in a good and hygienic condition?	x		
4015	Are living accommodations in good and hygienic condition? Is the lighting within the accommodation adequate?	x		
4016	Are deck machinery, wires, dogs, cleats, and roller fairleads etc. well-greased?	x		
4017	Are mooring ropes, wires and equipment records of inspection and maintenance available?	x		
4018	Are the WT doors and access hatches on weather decks in good condition?	x		
General Comments:				
4013 – Bottled water supplied on board.				

5	Hazard Identification / Standards of Management & Culture – Engine Spaces	Yes	No	NA
5001	Are walkways clear of tripping hazards?	x		
5002	Are clearances, pinch points, slips, trips and fall hazards highlighted (including guards)?	x		
5003	Is the main propulsive machinery fully operational with no reported defects?	x		
5004	Is the steering gear fully operational?	x		
5005	Specify date of last Emergency Steering test	20 June 2024		
5006	Are the generators fully operational with no reported defects?	x		
5007	Is the machinery and equipment reportedly free of intermittent faults?		x	
5008	Is Machinery Space pipe work in a satisfactory condition and free from temporary repairs?		x	
5009	Is the condition of the electrical wiring throughout the ship in a safe condition?	x		
5010	Is the lighting satisfactory?	x		
5011	Is machinery guarded where appropriate?	x		
5012	Are floor plates clean, properly secured and non-slip?	x		
5013	Are High Pressure Oil pipes secure and protectively sheathed?	x		
5014	Is exhaust pipe lagging satisfactory?	x		
5015	Are the bilges clean and bilge systems in good condition?	x		
5016	Is the emergency escape route well signed / unobstructed?	x		
5017	Are Stern Seals in good condition and free from any leaks?	x		
5018	Test the Emergency Fire Pump for satisfactory operation	x		
5019	Test the Emergency Generator for satisfactory operation	x		
General Comments:				
5007 – Discharge pump for sewage treatment plant was under maintenance.				
5008 – Sea cooling water for port main engine was under renew process. (In progress)				
5018;5019 – Emergency fire pump and emergency generator had tested during attendance. Satisfactory condition.				

6	Safety Management / Crew Involvement / Personal Protective Equipment/PMS	Yes	No	NA
6001	When was the last date Stop Work Authority used and re-enforced by Supervisors? Specify Date:	25/05/2024		
6002	When was the last JSA completed? Specify Date:	20/06/2024		
6003	Are Start Work Checks in Place?	x		
6004	Are proper & adequate Personal Protective Equipment provided (reserves for replacement & visitors)?	x		
6005	Are safety drills regularly carried out and recorded? Is there a drill schedule on board? Provide a copy.	x		
6006	Is LSA in survey and good visual condition? (liferafts, lifebuoys, PFD's, life jackets)	x		
6007	Is FFE in survey and good visual condition? (portable and fixed firefighting equipment)	x		
6008	Are there adequate medical facilities and supplies on board?	x		

6009	Is there a PMS on board? If yes, then provide latest weekly printout indicating all overdue and deferred work orders.	20/06/2024		
6010	If vessel utilizes stand-by or back-down buoys, is a procedure, Risk Assessment, JSA in place?	x		
6011	Are weather parameters including maximum limits for operation defined and known on board for the vessels work scope?	x		
General Comments: 6009 – Vessel used computer base PMS system.				

7	Safe Deck & Personnel Transfer	Yes	No	N/A
7001	Is an effective stern protection system in place?	x		
7002	If AHTS is used for cargo operations, has a Risk Assessment been conducted to mitigate crew & cargo exposure to elements, particularly working stern-to-weather?	x		
7003	Is a 'Safe Deck' Procedure implemented and understood?	x		
7004	Is a vessel specific MOPO implemented and understood?	x		
7005	Is there evidence of personnel transfer at sea? If so, does the vessel have a safe loading/landing zone clearly marked?	x		
7006	Confirm that the Crew & Passengers as applicable have received training in the method/mod of personnel transfer.	x		
7007	Are adequate PFDs for all personnel to be transferred provided?	x		
7008	Is a JSA conducted before any personnel transfer?	x		
7009	If Swing Rope Transfer is utilised, does the vessel have a suitable RA and Procedure	x		
7010	Is weather limit defined for various types of personnel transfer operations (Basket / FROG/Swing Rope)?	x		
General Comments:				

8	Vessel Capability - Dynamic Positioning	Yes	No	NA
8001	Does the vessel have a copy of most recent Annual DP trials details (within 1 year +/- 3 months of anniversary date)?			
8002	Are all Category A recommendations closed?			
8003	Does vessel have any pending Category B or C recommendations?			
8004	Is Activity Specific Operating Guidelines (ASOG) or WSOG (MODU) limit setting agreement in place for current or intended operations?			
8005	Verify that the DPO's are familiar with the ASOG / WSOG			
8006	Verify that DP footprints are regularly recorded and compared against previous footprints and the DP Capability Plots?			
8007	Is the crew familiar with the DP manual, FMEA & Proving Trials?			
8008	Confirm that the vessel operates with OPEN Bus Tie. If not, then inform and seek guidance from the Designated MSRE Process Authority.			
8009	Is there an Electronic Technician or Engineer on board with approved training on the DP system?			
8010	Does the vessel have a Blackout Recovery procedure?			
8011	State date of last Blackout Recovery desktop drill? ( Last drill was conducted on 20/01/2024)			
8012	Are vessel specific DP Field Arrival, Bridge 500m and E/R set up Checklists available and completed?			
8013	Verify that the Field Arrival Trial has been completed? This is to be verified prior to first use of the vessel or at the discretion of the designated MSRE Process Authority.			
8014	Verify the availability of the Independent Joystick			
8015	Verify DP computers and Operating Stations are in good order.			
8016	Verify that the DP controller was reset within the last 30 days			
8017	Verify all Alarm and Warning Lights on the DP console for correct operation and indication			
8018	Verify Heading limits and circle watch limits are not excessive. (3-5 degrees & 3 -5 m)			
8019	Verify all Position Reference Systems are in good working order			
8020	Verify that the DP Printer is operational.			
8021	Verify settings on Gyro are correct – speed and latitude correction set to manual during DP ops?			
8022	Verify all gyros are aligned and that the gyro error has been confirmed within the previous 6 months.			
8023	Verify that the wind sensors functional and providing an online input into the DP system.			
General Comments:				

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8	Vessel Capability - Cargo Operations / Crane Operations / Bunkering	Yes	No	NA
8024	Is the lifting gear used in cargo handling colour coded in accordance with local or BU guidelines for the current year?	x		
8025	Confirm that the vessel only utilizes ratchet type chain binders for securing of cargo?	x		
8026	Are the Master & Crew aware that selective unloading (cherry picking) is not permitted?	x		
8027	Verify if Cargo Handling is as per the OCIMF "Deck Cargo Handling on board Offshore Vessels" Information paper	x		
8028	Are MSDS available for any liquid products back loaded from offshore?	x		
8029	If carried confirm that hoses used for hazardous liquid transfers have a valid test certificate?	x		
8030	If carried, are all hoses fitted with sufficient floatation collars as per GOMO?	x		
8031	Confirm that the vessel has quick dry disconnect fittings (i.e., TODO, Avery Hardall, Klaw fittings) at the manifold for use in hazardous liquid transfers?	x		
8032	Confirm that the vessel has the correct WECO connections and adapters at the manifold.	x		
8033	Do cranes and other lifting equipment on board the vessel have current certification?	x		
8034	Check condition of the crane is in good order. Verify operation to check for seal leakages on crane rams.	x		
8035	Confirm Electronic Fuel monitoring system (EFMS) is in place, is non-by-passable, and operational?	x		
8036	If no EFMS in place, an operational and calibrated totalizer meter in fuel load and discharge system?			x
General Comments:				
8036 – EFMS was fitted on board.				

8	Vessel Capability - Anchoring & Mooring System Design, Review & Safety Reinforcement (Vessels with Spread Moorings)	Yes	No	NA
8037	Are pre-move meetings conducted prior any anchor handling operations (weather, SWA, risk assessment...)?			
8038	Are comprehensive JSA's implemented prior to any mooring activity?			
8039	Minimum anchor and mooring clearances from sub-sea structures are known (set by BU) and accounted in the plan?			
8040	Are special mitigation procedures available when anchor patterns call for crossing pipelines or cables?			
8041	Are Marine Notices relating to offshore Mooring and Anchor handling located on board and contents known to crew?			
8042	Verify if Wire Management plan is in place and date of last maintenance /Inspection/Last NDT or Destructive test			
General Comments:				

8	Vessel Capability - Anchor Handling (AHTS) & Towing Vessels only	Yes	No	NA
8043	In date, test certificates shall be held on board for all Tow Spread equipment in use.			
8044	Tow log and tow spread maintenance program in place.			
8045	Valid Bollard Pull Certificate of less than 5 years old issued /endorsed by an IACS Classification society.			
8046	Winches have a quick release mechanism, and all have a documented functional testing regime.			
8047	Are bridge team members fully familiar with the location and operation of the winch emergency release mechanism, its operation and controls? Instructions are to be clearly posted nearby to the release controls.			
8048	Is Tow and work winch tension meter installed with a method of continuous recording and calibrated?			
8049	All watertight doors, hatch openings and emergency escape entrances are marked 'close at sea' and all seals and locking dogs are in satisfactory condition.			
8050	Confirm that the vessel has and operates with a clear deck policy during towing/anchor handling operations.			
8051	Confirm that the vessel ensures all watertight openings requiring to be closed/sealed during towing/anchor handling operations are done so.			
8052	Are work-wire / tow-wire terminations in good condition, properly terminated, steel ferrules, with swivels and associated jewellery? NB: Aluminium ferrules are not acceptable.			

8053	Check that spooling gear is fitted and in good condition.			
8054	Check the operability of mechanical stoppers. Ensure that the correct size of inserts is available for the intended work-scope.			
8055	Check that the vessel has the correct size of chain handling gypsies (wildcats) fitted, suitable for the proposed scope of work			x
8056	Are there sufficient shackles, split pins and lead plugs on-board for the intended work scope?			
8057	Is there welding and burning equipment available and are crew qualified to use it?			
8058	Check condition of J-Hook and grapnel, type and SWL?			
8059	The master understands the principles and the consequences of 'Girting'			
8060	Vessel 'Gobbing' equipment is certified and MBL/SWL is the same as the tow wire and associated rigging			
8061	Are tow and work wire terminations fitted with snub-nosed, pee-wee, type sockets (long bow spelter sockets not permitted)			
8062	Verify if Wire Management plan is in place and date of last maintenance /Inspection/Last NDT or Destructive test			
8063	List the date of last maintenance /Inspection/Last NDT or Destructive test ( Last MPI check was conducted on 15/03/2024)			
8064	Verify if Tow Assembly Management plan is in place and date of last maintenance /Inspection/Last NDT or Destructive test			
8065	List the date of last maintenance / Inspection / Last NDT or Destructive test of the Tow Assembly			
8066	Is the length of work wire adequate for operating depth?			
8067	Confirm that no towing from hook (if fitted) is allowed			
8068	Confirm tow bars, aft bulwarks, stern rail, stern roller are free of sharp edges / obstructions which could damage a tow wire or prevent it from free movement.			
8069	Confirm that the use of polypropylene ropes for towing is not allowed			
8070	Conduct brake slip test for towing and work winches			
8071	On Terminal Export and Line Handling Tugs only, confirm the vessel is equipped with bow winch and associated equipment to safely tow from the bow.			
General Comments:				

8	Vessel Capability - Crew boats (Alucats, Petro-Craft & Surfers)	Yes	No	NA
8072	Are passenger briefings carried out (safe boarding, disembarkation, and general safety)?			
8073	Are adequate PFDs for all personnel to be transferred provided?			
8074	Are fenders in a satisfactory condition?			
8075	Is there a 30cm gap between the bow fender and boat landing ladder?			
8076	Are searchlight/s available and in working order?			
8077	Is a night vision camera available and in working order?			
8078	Is air conditioning available and in working order?			
8079	Are toilet facilities available and in working order?			
8080	Are noise levels within the passenger cabin at an acceptable level?			
8081	Are Crew boat Pilots aware of any local requirements for safe speed during hours of darkness?			
8082	Are crew boat Pilots aware of the rules for entering 500m Exclusion/Safety Zones?			
General Comments:				

8	Vessel Capability - Pipe Lay	Yes	No	NA
8083	Is there evidence that effective risk assessments are carried out for pipelay operations?			
8084	Is the firing line hazard marking and restricted access managed effectively?			
8085	Are firing line ventilation arrangements sufficient?			

General Comments:
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8	Vessel Capability - Ship Assist/Escort Tug	Yes	No	NA
8086	Is there evidence that effective risk assessments are carried out for ship assist/escort tug operations?			
8087	Is the length of tow line adequate for planned operation?			
8088	Is the MBL of tow line and associated equipment adequate for rated Bollard Pull or expected tensions for the planned operation?			
8089	Do short bow/snub nose type end fittings make up the tow wire terminations?			
8090	Have Tow wires been re-terminated in the last 2 years?			
8091	Are 'snap back' zones and hazards understood by crew?			
8092	The master understands the principles and the consequences of 'Girting'			
8093	Are in date test certificates held on board for all Tow Spread equipment in use?			
8094	Valid Bollard Pull Certificate of less than 5 years old issued /endorsed by an IACS Classification society.			
General Comments:				

8	Vessel Capability - Emergency Rescue & Response Vessel	Yes	No	NA
8095	Is there evidence that effective risk assessments are carried out for ERRV/Stand-By operations			
8096	Are adequate PFDs provided and in satisfactory condition for all personnel to be transferred?			
8097	Are qualified personnel onboard for FRC operations and has a drill been conducted in the preceding 3 months?			
8098	Is the recovery time of a MOB during the last drill in accordance with the performance standards in the Safety Case if applicable?			
8099	Is the Dacon scoop available and has a drill been conducted in the preceding 3 months?			
General Comments:				

8	Vessel Capability - SEWOP (Lift Boats)	Yes	No	NA
8100	Is there documented evidence of NDT of the legs and racks, including lower terminus?			
8101	Is there documented evidence of annual visual inspections of the legs, racks and pinions?			
8102	Is their evidence that the vessel is following the content of any BU Marine Guidance Notes on SEWOP inspection guidelines?			
8103	If non IACS Classed, are the NDT being conducted by an IACS Class approved company?			
8104	If <300 GT, does inspection protocol meet ABS or USCG standards as outlined in Marine Standard and are these inspections being carried out by IACS Class surveyor			
8105	Are intermediate welded sections visible on the leg pinion support brackets?			
8106	Is their visual evidence of any dents or cracks to the leg structure, teeth, pinion tower?			
8107	Confirm the Jacking assemblies/planetaries are in good order			
8108	Are the legs and pinions sufficiently greased?			
8109	Is an Original Equipment Manufacturer jacking system inspection report onboard that meets all of the minimum criteria as per the Chevron Marine Standard Non-Tankers and was it conducted within the last 12 months?			

General Comments:
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8	Vessel Capability - Barge			
8110	Load line and draught marks clearly visible			
8111	Verify Hull condition, must be intact, minor indentations acceptable			
8112	Tow bridle adequate, in good condition and spread fully certified with a functional retrieval winch.			
8113	Manholes fully sealed and watertight			
8114	Tank vents are self-sealing (float type with mesh). Floats to be tested as free			
8115	Verify condition of specific build design access ladder on either side of the barge is in good condition			
8116	Verify - fully functional port, starboard and aft navigation lights with adequate power source (Battery/Solar Power)			
8117	Verify - navigational day shapes, mast and lanyard on board			
8118	Check condition of mooring ropes/wires as acceptable			
8119	Check that the barge's side rubbing band is in good condition without jagged edges and adequate fendering in place as applicable			
8120	Is the barge equipped with a fit for purpose anchor and spread with a dedicated winch and means of emergency release?			
8121	On barges without handrails is the edge highlighted with a contrasting colour to the rest of the deck?			
8122	Is the working deck painted with non-slip paint?			
8123	Check the cleanliness of the deck, (no remnants of previous cargoes)			
8124	Internal Compartments are to be dry and free of hydrocarbons. Do NOT enter any compartment,			
General Comments:				

8	Vessel Capability - ABU Specific Environmental	Yes	No	NA
8125	Does the vessel have asset (WHS / GOR / JANSZ) subsea infrastructure and pipelines included on vessel marine charts?			
8126	Is the vessel working under the Gorgon DomGas operational area?			
8127	If yes, has the vessel been provided with Bombora location data?			
8128	If required, do crane operators meet the training and competency requirements of Unit of Competency – MASUP305A?			
8129	Has the vessel completed pre-arrival reporting in accordance with the Australian Biosecurity Act 2015? i.e. Biosecurity Status Document from Department of Agriculture and Water Resources			
8130	Spill kits adequately stocked, in good condition and available in proximity to where hazardous materials /chemicals are being stored/used?			
8131	If the vessel will be discharging via the Oily Water Separator - Is the OWS IMO compliant and maintenance is up to date.			
8132	If the vessel be discharging via the Sewage Treatment Plant- Is the STP IMO compliant and maintenance is up to date.			
8133	If the vessel will be discharging food waste via a macerator- Is the macerator certified and maintenance of the macerator up to date?			
8134	Is IAPP certification in place and IAPP record book and PMS maintenance for Engines and Incinerators up to date?			
8135	Does the vessel have a Waste / Garbage Management Plan and is it within its review date?			
8136	Are lidded bins provided in open areas of the vessel where waste has a risk of being blown to the ocean (e.g. general waste, loose plastic)?			
8137	Are Waste receptacles labelled to identify waste stream, securely stored and contained?			
8138	Are hazardous wastes stored in designated waste storage areas with secondary containment for liquid waste?"			
8139	Vessel light spill reduced at night including lights 'off' when not required.			
8140	Internal and external lighting managed to reduce light spill and include, where practicable: • Manage bridge lighting			

	<ul style="list-style-type: none"> <li>• Close curtains and blinds at night</li> <li>• Remove unnecessary lighting</li> <li>• No decorative lighting</li> <li>• Shielded or mounted lighting as low as practicable</li> <li>• Direct lighting away from the coastline and beaches.</li> </ul>			
8141	Is the type of lighting least disruptive to marine turtles used on the vessel?			
8142	Does the intended positioning/work scope of the vessel ensure that it will not be moored with lighting on within 1.5 km of turtle nesting beaches during the turtle nesting season from October to April each year at Wheatstone.			
General Comments:				

[illegible]





# SUPO/INTERMEDIATE INSPECTION

## Marine Safety, Reliability and Efficiency (MSRE) Standardized OE Process – Chevron Marine Standard

### Requirement §2.0 Vessel Assurance

<b>1</b>	<b>Inspection Details</b>			
1.1	Vessel Name	UNIEXPRESS 18		
1.2	Inspection Date	18 July 2024		
1.3	Port of Inspection	Sattahip port, Thailand		
1.4	Inspectors Name	[REDACTED]		
1.5	Last OVIQ Inspection date	28 August 2023		
1.6	Date OVPQ Last Updated	5 July 2024		
1.7	Master's Name	[REDACTED]		
1.8	Scope of Work	SUPO/Intermediate inspection		
	<b>Vessel Capability Variant Being Inspected</b>	<b>Comments</b>		
1.9	Dynamic Positioning	NA.		
1.10	Cargo Operations, Crane Operations or Bunkering	Yes.		
1.11	Spread Moorings	NA.		
1.12	Anchor Handling (AHTS) or Towing	NA.		
1.13	Crew Boats (Alucats, Petro-Craft & Surfers)	Yes.		
1.14	Pipe Lay	NA.		
1.15	Ship Assist or Escort Tug	NA.		
1.16	Emergency Rescue or Response	Yes.		
1.17	SEWOP (Lift Boats)	NA.		
1.18	Barge	NA.		
1.19	ABU	NA.		
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<b>2</b>	<b>General, Certification &amp; Documentation</b>	<b>Yes</b>	<b>No</b>	<b>NA</b>
2.1	Does vessel have current certificates applicable for its size and registration?	✓		
2.2	Does the manning level meet or exceed that required by the local Port and Flag state and/or operations the vessel is engaged in?	✓		
2.3	Are crew certification originals and valid?	✓		
2.4	All crew have FFD (Fitness for Duty) / medical certificates?	✓		
2.5	Are project Specific Documents on board and understood including bridging documents?		✓	

2.6	Verify that the vessel holds ALL in-force BU Marine Notices, Guidelines, and latest Chevron Marine Standard.	✓		
2.7	Is the vessel equipped with the required navigational charts and publications for the area of operation?	✓		
2.8	Are the Master and Crew familiar with any local restrictions such as draft, no-go areas and reporting requirements?	✓		
2.9	Is there evidence of a risk assessment present for working the weather side of an offshore facility and is there evidence of this being communicated to the Designated MSRE Process Authority?	✓		
2.10	Are the Master and Crew familiar with Incident and NM reporting requirements?	✓		
2.11	Has the Master been briefed on the work-scope the vessel is being chartered for?	✓		
2.12	<b>Cabotage / NIMASA Specific Requirements (NMA only)</b>			
2.13	Receipt for or carriage of Annual Waiver Certificate aboard for: - 1) Ownership - Required If Vessel Certificate of Registry does not state a Nigerian address. NB. Must hold an 'in-date' Annual Build Waiver.			✓
2.14	Receipt for or carriage of Annual Waiver Certificate aboard for: - 2) Manning - i.e. A waiver is required if any crew aboard (crewlist) are not Nigerian nationals NB. Vessel must hold an 'in-date' Waiver.			✓
2.15	Receipt for or carriage of Annual Waiver Certificate aboard for: - 1) Building - i.e., if vessel constructed outside Nigeria, then vessel must hold an 'in-date' Annual Building Waiver.			✓
2.16	Vessel Owning Company holds a valid NIMASA Registration Certificate & copy is carried aboard the vessel. This is an Annual Cert and is required to be carried aboard the vessel			✓
General Comments:				
1. Class Annual survey was last conducted on 10/05/2024.				
2. Company approved SMS available on board. SMC Certificate - valid 22/07/2029 by DNV				
3. The "Statement of Facts for Hull Construction and Structural Fire Protection Installation on board" was issued by DNV on 04/04/2023.				
4. There was no bridging documents available on board.				

3	Inspection Close outs / Standards of Management & Culture	Yes	No	NA
3.1	Are Open Deficiencies from the latest OVIQ Inspection Closed? Include a list with the status of all deficiencies.	✓		
3.2	Are Open Deficiencies from the latest SUPO Inspection Closed? Include a list with the status of all deficiencies.	✓		
3.3	Are Open Deficiencies from the latest Internal Audit Closed? Include a list with the status of all deficiencies.	✓		
3.4	Are all Incident and Near Miss Reports Closed out? Include a list of all Incidents and Near Misses recorded within the last 12 months	✓		
3.5	Is the vessel's OVPQ up to date with the latest certification details?	✓		
3.6	Is a copy of the most recent Chevron Marine Standard onboard?	✓		
General Comments:				
1. Last OVPQ update on 05/07/2024.				
2. Chevron Marine Standard onboard available on board.				
3. An incident report with particularly root cause analysis available to inspection and reviewed.				

4	Hazard Identification / Standards of Management & Culture – Bridge, Deck, Galley & Hull	Yes	No	NA
4.1	Are walkways clear of tripping hazards?	✓		
4.2	Are clearances, pinch points, slips, trips and fall hazards highlighted (including guards)?	✓		
4.3	Is all Bridge Equipment including communication equipment in good working order?	✓		
4.4	Are handrail and ladders in good condition, clean and free from obstruction?	✓		
4.5	Are decks nonslip in relevant areas?	✓		
4.6	Are the stuffing tubes, sealants and bulkhead penetrations in good condition?	✓		
4.7	Are the Hull / deck openings, freeing ports and windows/port holes in good condition?	✓		
4.8	Is shell plating and internal structure joints in good condition?	✓		
4.9	Are the remote operated valves and controls in good condition and functioning?			✓
4.10	Does the galley have adequate fire protection devices including the fire blanket?	✓		
4.11	Are Galley spaces, storerooms, fridges clean, neat and tidy? (Standard of housekeeping)	✓		
4.12	Are Drinking water facilities in good and hygienic condition?	✓		
4.13	Are Toilet/WC facilities in a good and hygienic condition?	✓		
4.14	Are deck machinery, wires, dogs, cleats, and roller fairleads etc. well-greased?	✓		
4.15	Are the WT doors and access hatches on weather decks in good condition?	✓		
General Comments:				
1. All walkways are clear of obstructions and tripping hazards.				
2. Bottled water for drinking and cooking supplied on board.				

5	Hazard Identification / Standards of Management & Culture – Engine Spaces	Yes	No	NA
5.1	Are walkways clear of tripping hazards?	✓		
5.2	Are clearances, pinch points, slips, trips and fall hazards highlighted (including guards)?	✓		
5.3	Is the main propulsive machinery fully operational with no reported defects?	✓		
5.4	Is the steering gear fully operational?	✓		
5.5	Specify date of last Emergency Steering test	17/04/2024		
5.6	Are the generators fully operational with no reported defects?	✓		
5.7	Is the machinery and equipment reportedly free of intermittent faults?	✓		
5.8	Is Machinery Space pipe work in a satisfactory condition and free from temporary repairs?	✓		
5.9	Is the condition of the electrical wiring throughout the ship in a safe condition?	✓		
5.10	Is the lighting satisfactory?	✓		
5.11	Is machinery guarded where appropriate?	✓		
5.12	Are floor plates clean, properly secured and non-slip?	✓		
5.13	Are High Pressure Oil pipes secure and protectively sheathed?	✓		
5.14	Is exhaust pipe lagging satisfactory?		✓	
5.14	Are the bilges clean and bilge systems in good condition?	✓		
5.15	Is the emergency escape route well signed / unobstructed?	✓		
5.16	Are Stern Seals in good condition and free from any leaks?	✓		
5.17	Test the Emergency Fire Pump for satisfactory operation	✓		
5.18	Test the Emergency Generator for satisfactory operation		✓	
General Comments:				
1. Emergency fire pump had tested during attendance. Satisfactory condition.				

6	Safety Management / Crew Involvement / Personal Protective Equipment/PMS	Yes	No	NA
6.1	When was the last date Stop Work Authority used and re-enforced by Supervisors? Specify Date:	10/07/2024		
6.2	When was the last JSA completed? Specify Date:	12/07/2024		
6.3	Are Start Work Checks in Place?	✓		
6.4	Are proper & adequate Personal Protective Equipment provided (reserves for replacement & visitors)?	✓		
6.5	Are safety drills regularly carried out and recorded? Is there a drill schedule on board? Provide a copy.	✓		
6.6	Is LSA in survey and good visual condition? (life rafts, lifebuoys, PFD's, life jackets)	✓		
6.7	Is FFE in survey and good visual condition? (portable and fixed firefighting equipment)	✓		
6.8	Are there adequate medical facilities and supplies on board?	✓		
6.9	Is there a PMS on board? If yes, then provide latest weekly printout indicating all overdue and deferred work orders.	17/07/2024		
6.10	If vessel utilizes stand-by or back-down buoys, is a procedure, Risk Assessment, JSA in place?	✓		
6.11	Are weather parameters including maximum limits for operation defined and known on board for the vessels work scope?	✓		
General Comments:				
1. Class memoranda as follow, Maximum speed of the vessel is to be regulated against significant wave height to ascertain a maximum acceleration less than the design value, as specified below: Hs (m), V (knot): Wave Significant Height < 3.0 m = 24 knot (max) Wave Significant Height < 3.5 m = 22 knot (max) Wave Significant Height < 3.95 m = 20 knot (max) Wave Significant Height > 4.0 m = Seek for refuge				

7	Safe Deck & Personnel Transfer	Yes	No	N/A
7.1	Is an effective stern protection system in place?	✓		
7.2	If AHTS is used for cargo operations, has a Risk Assessment been conducted to mitigate crew & cargo exposure to elements, particularly working stern-to-weather?			✓
7.3	Is a 'Safe Deck' Procedure implemented and understood?	✓		
7.4	Is a vessel specific MOPO implemented and understood?	✓		
7.5	Is there evidence of personnel transfer at sea?	✓		
7.6	Are adequate PFDs for all personnel to be transferred provided?	✓		
7.7	Is a JSA conducted before any personnel transfer?	✓		
7.8	Any personnel transfer(s) by Swing Rope?	✓		
7.9	Is weather limit defined for various types of personnel transfer operations (Basket / FROG/Swing Rope)?	✓		
7.10	When the inboard end of the gangway rests on or is flush with the top of the bulwark, is a bulwark ladder provided? (Gangway shall not rest on ship rails unless it has been reinforced for that purpose)	✓		
General Comments:				
1. Vessel specific JSAs were in place for personnel transfer operations. 2. Personnel boarding arrangements on the stern of the vessel were found to be in order.				

8	Vessel Capability - Dynamic Positioning	Yes	No	NA
8.1	Does the vessel have a copy of most recent Annual DP trials details (within 1 year +/- 3 months of anniversary date)?			✓
8.2	Are all Category A recommendations closed? Provide details			✓
8.3	Does vessel have any pending Category B or C recommendations? Provide a list with their status.			✓
8.4	Is Activity Specific Operating Guidelines (ASOG) or WSOG (MODU) limit setting agreement in place for current or intended operations? Provide the latest version.			✓
8.5	Upload latest version of ASOG / WSOG			✓
8.6	Are DP footprints regularly recorded and compared against previous footprints and the DP Capability Plots?			✓
8.7	Is the crew familiar with the DP manual, FMEA & Proving Trials?			✓
8.8	If the answer to 8.7 is yes - How is this verified on board?			✓
8.9	Confirm that the vessel operates with OPEN Bus Tie. If not then inform and seek guidance from the Designated MSRE Process Authority.			✓
8.10	Is there an Electronic Technician or Engineer on board with approved training on the DP system?			✓
8.11	Does the vessel have a Blackout Recovery procedure?			✓
8.12	State date of last Blackout Recovery desktop drill?			N/A.
8.13	Are vessel specific DP Field Arrival Checklist available and completed?			✓
8.14	Has a Field Arrival Trial been completed			✓
General Comments:				

8	Vessel Capability - Cargo Operations / Crane Operations / Bunkering	Yes	No	NA
8.15	Is the lifting gear used in cargo handling colour coded in accordance with local or BU guidelines for the current year?			✓
8.16	Confirm that the vessel only utilizes ratchet type chain binders for securing of cargo?	✓		
8.17	Are the Master & Crew aware that selective unloading (cherry picking) is not permitted?	✓		
8.18	Verify if Cargo Handling is as per the OCIMF "Deck Cargo Handling on board Offshore Vessels" Information paper	✓		
8.19	Are MSDS available for any liquid products back loaded from offshore?	✓		
8.20	If carried confirm that hoses used for hazardous liquid transfers have a valid test certificate?	✓		
8.21	If carried, are all hoses fitted with sufficient floatation collars as per GOMO?	✓		

8.22	Confirm that the vessel has quick dry disconnect fittings (i.e., TODO, Avery Hardall, Klaw fittings) at the manifold for use in hazardous liquid transfers?	✓		
8.23	Confirm that the vessel has the correct WECO connections and adapters at the manifold.	✓		
8.24	When Knuckle boom cranes are fitted on board verify operation to check for seal leakages on rams			✓
8.25	Confirm Electronic Fuel monitoring system (EFMS) is in place, is non-by-passable, and operational?	✓		
8.26	If no EFMS in place, an operational and calibrated totalizer meter in fuel load and discharge system?	✓		
General Comments: 1. Last TODO tank unit and break away coupling test on 29/08/2023. (Test at 225 psi) 2. Flotation collars 6 pcs were available on board. 3. Last Real time flow meter calibrate on 07/05/2024. 4. Last transfer flow meter calibrated on 07/05/2024.				

8	Vessel Capability - Anchoring & Mooring System Design, Review & Safety Reinforcement (Vessels with Spread Moorings)	Yes	No	NA
8.27	Are pre-move meetings conducted prior any anchor handling operations (weather, SWA, risk assessment...)?			✓
8.28	Are comprehensive JSA's implemented prior to any mooring activity?			✓
8.29	Minimum anchor and mooring clearances from sub-sea structures are known (set by BU) and accounted in the plan?			✓
8.30	Are special mitigation procedures available when anchor patterns call for crossing pipelines or cables?			✓
8.31	Are Marine Notices relating to offshore Mooring and Anchor handling located on board and contents known to crew?			✓
8.32	Verify if Wire Management plan is in place and date of last maintenance /Inspection/Last NDT or Destructive test			✓
General Comments: NA.				

8	Vessel Capability - Anchor Handling (AHTS) & Towing Vessels only	Yes	No	NA
8.33	In date, test certificates shall be held on board for all Tow Spread equipment in use.			✓
8.34	Tow log and tow spread maintenance program in place.			✓
8.35	Valid Bollard Pull Certificate of less than 5 years old issued /endorsed by an IACS Classification society.			✓
8.36	Winches have a quick release mechanism, and all have a documented functional testing regime.			✓
8.37	Are bridge team members fully familiar with the location and operation of the winch emergency release mechanism, its operation and controls? Instructions are to be clearly posted nearby to the release controls.			✓
8.38	Is Tow and work winch tension meter installed with a method of continuous recording and calibrated?			✓
8.39	All watertight doors, hatch openings and emergency escape entrances are marked 'close at sea' and all seals and locking dogs are in satisfactory condition.			✓
8.40	Are work-wire / tow-wire terminations in good condition, properly terminated, steel ferrules, with swivels and associated jewellery? NB: Aluminium ferrules are not acceptable.			✓
8.41	Are short bow sockets in use for operation requiring them to pass over a roller? (long bow spelter sockets not permitted)			✓
8.42	Check that spooling gear is fitted and in good condition.			✓
8.43	Check the operability of mechanical stoppers. Ensure that the correct size of inserts is available for the intended work-scope.			✓
8.44	Check that the vessel has the correct size of chain handling gypsies (wildcats) fitted, suitable for the proposed scope of work			✓
8.45	Are there sufficient shackles, split pins and lead plugs on-board for the intended work scope?			✓
8.46	Is there welding and burning equipment available and are crew qualified to use it?			✓
8.47	Check condition of J-Hook and grapnel, type and SWL?			✓
8.48	The master understands the principles and the consequences of 'Girting'			✓
8.49	Vessel 'Gobbing' equipment is certified and MBL/SWL is the same as the tow wire and associated rigging			✓
8.50	Are tow and work wire terminations fitted with snub-nosed, pee-wee, type sockets (long bow spelter sockets not permitted)			✓

8.51	Verify if Wire Management plan is in place and date of last maintenance /Inspection/Last NDT or Destructive test			✓
8.52	List the date of last maintenance /Inspection/Last NDT or Destructive test	N/A.		
8.53	Verify if Tow Assembly Management plan is in place and date of last maintenance /Inspection/Last NDT or Destructive test			✓
8.54	List the date of last maintenance / Inspection / Last NDT or Destructive test of the Tow Assembly	N/A.		
8.55	Is the length of work wire adequate for operating depth?			✓
8.56	Confirm that no towing from hook (if fitted) is allowed			✓
8.57	Confirm tow bars, aft bulwarks, stern rail, stern roller are free of sharp edges / obstructions which could damage a tow wire or prevent it from free movement.			✓
8.58	Confirm that no use of polypropylene ropes for towing is allowed			✓
8.59	Conduct brake slip test for towing and work winches			✓
8.60	Does the vessel have and adhere to a clear deck policy during operations?			✓
	On Terminal Export and Line Handling Tugs only, confirm the vessel is equipped with bow winch and associated equipment to safely tow from the bow.			✓
General Comments: N/A.				

8	Vessel Capability - Crew boats (Alucats, Petro-Craft & Surfers)	Yes	No	NA
8.61	Are passenger briefings carried out (safe boarding, disembarkation, and general safety)?	✓		
8.62	Are adequate PFDs for all personnel to be transferred provided?	✓		
8.63	Are fenders in a satisfactory condition?	✓		
8.64	Is there a 30cm gap between the bow fender and boat landing ladder?	✓		
8.65	Are searchlight/s available and in working order?	✓		
8.66	Is a night vision camera available and in working order?	✓		
8.67	Is air conditioning available and in working order?	✓		
8.68	Are toilet facilities available and in working order?	✓		
8.69	Are noise levels within the passenger cabin at an acceptable level?	✓		
8.70	Are Crew boat Pilots aware of any local requirements for safe speed during hours of darkness?	✓		
8.71	Are crew boat Pilots aware of the rules for entering 500m Exclusion/Safety Zones?	✓		
General Comments: 1. Last noise levels has been assessed on 07/02/2024.				

8	Vessel Capability - Pipe Lay	Yes	No	NA
8.72	Is there evidence that effective risk assessments are carried out for pipelay operations?			✓
8.73	Is the firing line hazard marking and restricted access managed effectively?			✓
8.74	Are firing line ventilation arrangements sufficient?			✓
General Comments: NA.				

8	Vessel Capability - Ship Assist/Escort Tug	Yes	No	NA
8.75	Is there evidence that effective risk assessments are carried out for ship assist/escort tug operations?			✓
7.76	Is the length of tow line adequate for planned operation?			✓
8.77	Is the MBL of tow line and associated equipment adequate for rated Bollard Pull or expected tensions for the planned operation?			✓
8.78	Do short bow/snub nose type end fittings make up the tow wire terminations?			✓
8.79	Have Tow wires been re-terminated in the last 2 years?			✓
8.80	Are 'snap back' zones and hazards understood by crew?			✓
8.81	The master understands the principles and the consequences of 'Girting'			✓

8.82	Are in date test certificates held on board for all Tow Spread equipment in use?			✓
8.83	Valid Bollard Pull Certificate of less than 5 years old issued /endorsed by an IACS Classification society.			✓
General Comments: N/A.				

8	Vessel Capability - Emergency Rescue & Response Vessel	Yes	No	NA
8.84	Is there evidence that effective risk assessments are carried out for ERRV/Stand-By operations	✓		
8.85	Are adequate PFDs provided and in satisfactory condition for all personnel to be transferred?	✓		
8.86	Are qualified personnel onboard for FRC operations and has a drill been conducted in the preceding 3 months?			✓
8.87	Is the recovery time of a MOB during the last drill in accordance with the performance standards in the safety Case if applicable?	✓		
8.88	Is the Dacon scoop available and has a drill been conducted in the preceding 3 months?		✓	
General Comments: 1. FRC was not fitted on board. 2. There was no Dacon scoop drill record. 3. Last Man Overboard drill on 17/04/2024.				

8	Vessel Capability - SEWOP (Lift Boats)	Yes	No	NA
8.89	Is there documented evidence of NDT of the legs and racks, including lower terminus?			✓
8.90	Is there documented evidence of annual visual inspections of the legs, racks and pinions?			✓
8.91	Is their evidence that the vessel is following the content of any BU Marine Guidance Notes on SEWOP inspection guidelines?			✓
8.92	If non IACS Classed, are the NDT being conducted by an IACS Class approved company?			✓
8.93	Are intermediate welded sections visible on the leg pinion support brackets?			✓
8.94	Is their visual evidence of any dents or cracks to the leg structure, teeth, pinion tower?			✓
8.95	Are the legs and pinions sufficiently greased?			✓
General Comments: N/A.				

8	Vessel Capability - Barge	Yes	No	NA
8.96	Load line and draught marks clearly visible			✓
8.97	Verify Hull condition, must be intact, minor indentations acceptable			✓
8.98	Tow bridle adequate, in good condition and spread fully certified with a functional retrieval winch.			✓
8.99	Manholes fully sealed and watertight			✓
8.100	Tank vents are self-sealing (float type with mesh). Floats to be tested as free			✓
8.101	Verify condition of specific build design access ladder on either side of the barge is in good condition			✓
8.102	Verify - fully functional port, starboard and aft navigation lights with adequate power source (Battery/Solar Power)			✓
8.103	Verify - navigational day shapes, mast and lanyard on board			✓
8.104	Check condition of mooring ropes/wires as acceptable			✓
8.105	Check that the barge's side rubbing band is in good condition without jagged edges and adequate fendering in place as applicable			✓
8.106	Is the barge equipped with a fit for purpose anchor and spread with a dedicated winch and means of emergency release?			✓
8.107	On barges without handrails is the edge highlighted with a contrasting colour to the rest of the deck?			✓
8.108	Is the working deck painted with non-slip paint?			✓
8.109	Check the cleanliness of the deck, (no remnants of previous cargoes)			✓
8.110	Internal Compartments are to be dry and free of hydrocarbons.			✓

Do NOT enter any compartment,			
General Comments: N/A.			

8	Vessel Capability - ABU Specific Environmental	Yes	No	NA
8.111	Does the vessel have asset (WHS / GOR / JANSZ) subsea infrastructure and pipelines included on vessel marine charts?			✓
8.112	Is the vessel working under the Gorgon DomGas operational area?			✓
8.113	If yes, has the vessel been provided with Bombora location data?			✓
8.114	If required, do crane operators meet the training and competency requirements of Unit of Competency – MASUP305A?			✓
8.115	Has the vessel completed pre-arrival reporting in accordance with the Australian Biosecurity Act 2015? i.e. Biosecurity Status Document from Department of Agriculture and Water Resources			✓
8.116	Spill kits adequately stocked, in good condition and available in proximity to where hazardous materials /chemicals are being stored/used?			✓
8.117	If the vessel will be discharging via the Oily Water Separator - Is the OWS IMO compliant and maintenance is up to date.			✓
8.118	If the vessel be discharging via the Sewage Treatment Plant- Is the STP IMO compliant and maintenance is up to date.			✓
8.119	If the vessel will be discharging food waste via a macerator- Is the macerator certified and maintenance of the macerator up to date?			✓
8.120	Is IAPP certification in place and IAPP record book and PMS maintenance for Engines and Incinerators up to date?			✓
8.121	Does the vessel have a Waste / Garbage Management Plan and is it within its review date?			✓
8.122	Are lidded bins provided in open areas of the vessel where waste has a risk of being blown to the ocean (e.g. general waste, loose plastic)?			✓
8.123	Are Waste receptacles labelled to identify waste stream, securely stored and contained?			✓
8.124	Are hazardous wastes stored in designated waste storage areas with secondary containment for liquid waste?"			✓
8.125	Vessel light spill reduced at night including lights 'off' when not required.			✓
8.126	Internal and external lighting managed to reduce light spill and include, where practicable: <ul style="list-style-type: none"> <li>• Manage bridge lighting</li> <li>• Close curtains and blinds at night</li> <li>• Remove unnecessary lighting</li> <li>• No decorative lighting</li> <li>• Shielded or mounted lighting as low as practicable</li> <li>• Direct lighting away from the coastline and beaches.</li> </ul>			✓
8.127	Is the type of lighting least disruptive to marine turtles used on the vessel?			✓
8.128	Does the intended positioning/work scope of the vessel ensure that it will not be moored with lighting on within 1.5 km of turtle nesting beaches during the turtle nesting season from October to April each year at Wheatstone.			✓
General Comments: N/A.				

OBSERVATIONS		
Observation Number	Details	Action/ Due Date / Close out Remarks
2.5	There was no bridging documents available on board.	Click here to enter a date.
5.14	Vessel under repair exhaust manifold of Port and Starboard M/E, Due to leaking. (Completed repair and approved by Class on 18 July 2024 however the vessel still waiting documented from Class)	Click here to enter a date.
5.18	There was no Emergency Generator provided.	Click here to enter a date.
8.88	There was no Dacon scoop drill record.	Click here to enter a date.
		Click here to enter a date.

ภาคผนวก 27

แผนการตอบสนองต่อเหตุการณ์ฉุกเฉินของเรือที่ใช้ในการติดตั้งโครงสร้างในทะเล  
(*Construction Vessel SOP Emergency Response Plan*)

PROJECT EMERGENCY RESPONSE PLAN INCLUDING MEDICAL EMERGENCY RESPONSE PLAN		Doc. No. MSS-GEN-HES-PRO-003	
Rev: 0	Status: AFC	Date: 06-Mar-24	Page 1 of 40



**CHEVRON THAILAND EXPLORATION AND PRODUCTION, LTD.  
AND CHEVRON OFFSHORE THAILAND, LTD.**

**2024 WELLHEAD PLATFORM AND PIPELINE INSTALLATION AND  
WELLHEAD PLATFORM REMOVAL CAMPAIGN**

**PROJECT EMERGENCY RESPONSE PLAN  
INCLUDING MEDICAL EMERGENCY RESPONSE PLAN**

	CONTRACT NO. _____
<b>STATUS CODE</b>	
<input checked="" type="checkbox"/>	1 - Approved
<input type="checkbox"/>	2 - Approved except as note revise and resubmit
<input type="checkbox"/>	3 - Not Approved. Contractor to correct and resubmit. Contractor shall not proceed.
<input type="checkbox"/>	4 - Receipt Noted
Approval of this document does not relieve the Contractor of responsibility for the accuracy of dimensions, performance, design, design details or conformance to Specification and Contractor Requirements.	
Signed / Date:	 10 Mar 24
FOR CHEVRON	

Rev	Status	Date	Status Description	Prepared By	Checked By	Approved By	Approved By CHEVRON
ZZ	IIR	21-Dec-23	Issued for Internal Review	SS	SS	TCP	
A	IFR	03-Jan-24	Issued for Review	SS	SS	TCP	
B	IFR	13-Feb-24	Issued for Review	AB	SS	TCP	
C	IFR	04-Mar-24	Issued for Review	AB	SS	TCP	
0	AFC	06-Mar-24	Approved for Construction	 AB	 SS	TCP	



<b>PROJECT EMERGENCY RESPONSE PLAN INCLUDING MEDICAL EMERGENCY RESPONSE PLAN</b>		<b>Doc. No. MSS-GEN-HES-PRO-003</b>	
Rev: 0	Status: AFC	Date: 06-Mar-24	Page 2 of 40

**DOCUMENT REVISION HISTORY SHEET**

Revision	Revision Description	Date Issued	Update/Amendment Details
ZZ	Issued for Internal Review	21-Dec-23	-
A	Issued for Review	03-Jan-24	New issued
B	Issued for Review	13-Feb-24	Incorporate comments
C	Issued for Review	04-Mar-24	Incorporate comments
0	Approved for Construction	06-Mar-24	-

**HOLDS**

No.	Section	Description	Input From	Planned Date

	<b>PROJECT DOCUMENT COMMENT SHEET</b>	
CLIENT: CHEVRON CONTRACTOR: Mermaid Subsea Services (Thailand) Ltd.	PROJECT : 2024 WHP&PL Installation and WHP removal	Date : 04/Mar/24
Document Type : PRO		
Document No. : <a href="#">MSS-GEN-HES-PRO-003</a>	Revision : C	Date : 04-Mar-24
Document Title : Project Emergency Response Plan including Medical Emergency Response Plan		
Received by : Chevron	Date : 04-Mar-24	Transmittal No. FDS1941436-T-MSS-CTEP-0118

Item	Reference pages	Comment	Comment By	MSS Response
		No comment	Ti	

<b>PROJECT EMERGENCY RESPONSE PLAN INCLUDING MEDICAL EMERGENCY RESPONSE PLAN</b>		<b>Doc. No. MSS-GEN-HES-PRO-003</b>	
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## 1 INTRODUCTION

### 1.1 General

Mermaid Subsea Services (Thailand) Ltd. hereafter referred as “CONTRACTOR” has been contracted by Chevron Thailand Exploration and Production Ltd referred to as “COMPANY” to provide project management and execution for wellhead platforms and pipelines installation and removal of jackets, topsides, and pipelines in the Gulf of Thailand.

For the two Work Packages, CONTRACTOR will mobilize the following major installation vessels:

1. WHP and Pipelines installation and removal of existing jackets and topsides – HLV Hailong 106 on or around the 25 March 2024, for an infield date of 1 April 2024.
2. Pipelines Removal – DP DLV Huan Qiu 1200 (HQ 1200) and DSV Van Gogh, on or around 27 January 2024, for an infield date of 17 February 2024.

The Installation and Removal (IR) program shall be split between these major vessels, with HLV Hailong 106 switching modes between new pipelines installation (2 nos.), new WHP installation (2 nos.), and WHP removal.

The area of operations is the Gulf of Thailand in water depths of between 55m-75m. The area of operations is further distinguished by installation and removal activities within Chevron Thailand areas of control, and removal activities within PTTEP areas of control (known as Block G1/61).

### 1.2 Scope of Work

In summary, the Scope of Work for 2024 campaign consists of:

Year	Installation			Removal (Base Business)			Removal (Block G1/61)		
	Topside Re-Use (Unit)	Total Re-Use (Unit)	Pipeline (Unit)	Topside Removal (Unit)	Jacket Removal (Unit)	PL Removal (Unit)	Topside Removal (Unit)	Jacket Removal (Unit)	PL Removal (Unit)
2024	2	0	2	0	0	18	33	34	46
2025	4	1	5	5	10	12	0	0	0
2026	5	0	5	11	14	18	0	0	0
Total	11	1	12	16	24	48	33	34	46

Detail breakdown of the Scope of Work consists of:

#### a) Installation Phase 65

- 2 new jackets and their appurtenances installation i.e., BEWZA (BED-01) and MGWL (MGD-25).
- 2 re-use topsides installation, which are stored in Chevron's designated onshore yard and will be loaded to offshore with the new fabricated jackets.
- 2 pipelines installation i.e., BEPLZA Pipeline diameter 10" x 1.09km and MGPLL Pipeline diameter 10" x 4.96km.
- Subsea tie-in from new laid pipeline to both ends facilities.
- Pipeline subsea hydrotest for 10" BEPLZA pipeline.

#### b) Tantawan Pipeline Removal

- 18 pipelines removal to COMPANY onshore designated dismantling yard.

#### c) G1 Pipeline Removal





# **2024 Emergency Drill Scenario Typhoon Emergency Response**

**Project Name:**

**Transportation, Installation and Removal Support of  
Topside, Jacket and Associated PL for 2024 Campaign**

**Vessel Name:**

**HAI LONG 106**

**Location:**

**BAWE, ERAWAN FIELD**

Chevron I&R team  
September 2024

## **EMERGENCY Drill Scenario**

### **Purpose**

This emergency drill scenario is developed to exercise the project specific emergency response plan to ensure that it is effective and to drill the key personnel to be more familiar with the emergency response plan.

The drill is to also perform voice call and evaluate readiness of communication system. And to evaluate effectiveness of communication among key concerned parties related to emergency response.

### **Background**

The emergency drill scenario picks the scenario of "Typhoon Emergency Response" as the drill case to cover the communication with both internal and external parties including Chevron operations, and PTTEP ED Operations Team.

## **DRILL INTRODUCTION**

1. "This is the drill, this is the drill, this is the drill."
2. Introduction: Name, Job title, Specific Information (Working Location – Company – Project Name- in G1 area)
3. Purpose call: To perform the drill of "Typhoon Evacuation Drill".

*Example: AR Offshore Personnel in Charge calls to Funan Field Manager.*

1. *"This is the drill, this is the drill, this is the drill". This is AR PIC from Chevron for vessel pipelines removal campaign in Funan field. This is notification to perform the drill of vessel pipelines removal campaign.*
2. Describe current scenario's situation.

## EMERGENCY DRILL SCENARIO

- Typhoon emergency response communication drill

Date	20 September 2024																										
Time	Sequence Details		Check																								
Before the drill	Chevron AR Offshore PIC has informed <b>CAR</b> 's that a tropical disturbance watch has been announced and monitored.		✓																								
Daily monitoring	<b>Marine captain</b> has conducted day to day weather monitoring and gathering weather information along with advising during daily progress meeting & brief all key personnel of the 4 Phases of the typhoon.		✓																								
20 Sept 2024 1450hrs	Tropical Cyclone Tracking and weather updates distributed on increased frequency consistent with the tropical cyclone threat moving transit Operations Alert Boundary.		✓																								
20 Sep 2024  1455hrs	<div>Non-essential spread vessel to prepare and depart to shelter (Tugs and material barge)</div> <div>Marine Spread</div> <table><tr><th>Vessel/Barge</th><th>Description</th><th>Remark</th></tr><tr><td>HAI LONG 106</td><td>Main Work Barge</td><td>BAWE platform removal</td></tr><tr><td>JHT 9001</td><td>AHT</td><td>Tied-up at Mooring-buoy no.2.</td></tr><tr><td>MP PROWESS</td><td>AHT</td><td>Standing steaming outer anchors patterns of H-106.</td></tr><tr><td>Limin Handler + Limin 2805</td><td>Junk barge</td><td>Tied-up at Mooring-buoy no.3.</td></tr><tr><td>Swiber Challenger + Scena 2803</td><td>Material barge 2 (BAWE)</td><td>Alongside H106</td></tr><tr><td>Swiber Sapphire + CREST-301</td><td>AHT</td><td>Alongside jetty ferry Sattahip port (Chuksamet PortHarbor)</td></tr><tr><td>TC Mermaid + MB Scena 2804</td><td>AHT</td><td>Standby at shelter area Koh Samui</td></tr></table>		Vessel/Barge	Description	Remark	HAI LONG 106	Main Work Barge	BAWE platform removal	JHT 9001	AHT	Tied-up at Mooring-buoy no.2.	MP PROWESS	AHT	Standing steaming outer anchors patterns of H-106.	Limin Handler + Limin 2805	Junk barge	Tied-up at Mooring-buoy no.3.	Swiber Challenger + Scena 2803	Material barge 2 (BAWE)	Alongside H106	Swiber Sapphire + CREST-301	AHT	Alongside jetty ferry Sattahip port (Chuksamet PortHarbor)	TC Mermaid + MB Scena 2804	AHT	Standby at shelter area Koh Samui	✓
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20 Sept 2024 1500hrs	<ul style="list-style-type: none"><li>Chevron AR PIC informed <b>CAR/HAI LONG 106</b> to prepare and activate evacuation plan as following as CTEP Typhoon evacuation plan.</li></ul>		✓																								
20 Sept 2024 1505hrs	<ul style="list-style-type: none"><li><b>CAR</b> called meeting on <b>HAI LONG 106</b> to brief key personnel the Typhoon situation, Typhoon tracking map and typhoon evacuation plan.</li></ul>		✓																								
20 Sept 2024 1506hrs	<ul style="list-style-type: none"><li><b>OCM</b> gave instructions to all supervisors to stop operation and start securing the worksite to prepare for evacuation.</li><li><b>OCM</b> instructed crew change to be suspended. All parties were informed.</li></ul>		✓																								
20 Sept 2024	<ul style="list-style-type: none"><li><b>Marine Captain</b> advised the designated shelter area as per below:</li></ul>																										

1507hrs	<p>Location: SKL outer anchorage Coordinates: Lat: 07-20.0N / Long: 100-44.5 E Distance: 111nm Designated Speed: 4.0 kts Towing Estimate Time: 27.5 Hours</p> <ul style="list-style-type: none"> <li>• <b>Lead Engineer</b> inform that work site abandon operation is estimation around: 40.0 Hours</li> <li>• <b>Marine Captain</b> onboard <b>HAI LONG 106</b> conducted to confirm POB.</li> </ul>	✓
20 Sept 2024  1510hrs	<ul style="list-style-type: none"> <li>• Confirmed readiness to all stations and destination.</li> </ul> <p>ETD: 22<sup>nd</sup> September 2024 @ 22:10 Hrs. ETA: 24<sup>th</sup> September 2024 @ 01:40 Hrs.</p>	✓
20 Sept 2024 1515hrs	<ul style="list-style-type: none"> <li>• <b>OCM</b> and <b>Marine Captain</b> confirmed CAR all station ready to depart from work area to designated shelter area.</li> </ul>	✓
20 Sept 2024  1517hrs	<ul style="list-style-type: none"> <li>• <b>CAR</b> informed Chevron AR PIC, OCC and Project Manager to leave the work area to Shelter area.</li> </ul> <p>AR PIC: Somchai T. 02-545-6451/ Pairoj Th. 02-110-7735 OOC: K. Sarawut P. +66 83914-5691/OOC: K. Nipon P. +66 86327 0470 WHP Installation &amp; Removal PM: K. Nontiwat H. +66 93810-5741 CVX Marine Control: 02-545-5941</p>	✓
20 Sept 2024  1520hrs	<ul style="list-style-type: none"> <li>• <b>MSS CSR</b> informed to Installation Manager and Project Manager about leaving field to shelter area:</li> </ul> <p>Installation Manager: Chanin Suchaxaya / +66 61-656-9654 Project Manager: Teo Chor Ping / +66 89245 0441</p>	✓
	<ul style="list-style-type: none"> <li>• <b>The Marine Captain</b> and <b>OCM</b> informed the Marine Manager and Project Manager about leaving field to shelter area.</li> </ul> <p>Marine Manager: John E Nicholas/ +62 8127042142 Project Manager: Venkatram Rammurthy / +65 85990915</p>	✓
20 Sept 2024  1525hrs	<ul style="list-style-type: none"> <li>• Chevron AR PIC Informed PTTEP ED FM, G1 Marine Control, Chevron Marine Control about leaving field to Shelter area location and ETA.</li> </ul> <p>POB: 233 Pax</p>	✓
Assuming arrival at SKL anchorage: 24 Sept 2024 @0140hrs	<ul style="list-style-type: none"> <li>• <b>HAI LONG 106</b> had arrived at the shelter area safely and standby for further instruction. <b>CAR</b> reported to;</li> </ul> <p>AR PIC: Somchai T. 02-545-6451/ Pairoj Th. 02-110-7735 OOC: K. Sarawut P. +66 83914-5691/OOC: K. Nipon P. +66 86327 0470 WHP Installation &amp; Removal PM: K. Nontiwat H. +66 93810-5741 CVX Marine Control: 02-545-5941</p>	✓
	<ul style="list-style-type: none"> <li>• <b>MSS CSR</b> informed to Installation Manager and Project Manager:</li> </ul> <p>Installation Manager: Chanin Suchaxaya / +66 61-656-9654 Project Manager: Teo Chor Ping / +66 89245 0441</p>	✓
	<ul style="list-style-type: none"> <li>• <b>Marine captain</b> and <b>OCM</b> informed to Marine Manager &amp; Project Manager:</li> </ul> <p>Marine Manager: John E Nicholas/ +62 8127042142</p>	✓

	Project Manager: Venkatram Rammurthy / +65 85990915	
20 Sept 2024 1545hrs	Drill de-briefing.	✓
<b>End of the drill</b>		

## Emergency Contact List

**Chevron: 02-545-5555 Ext....**

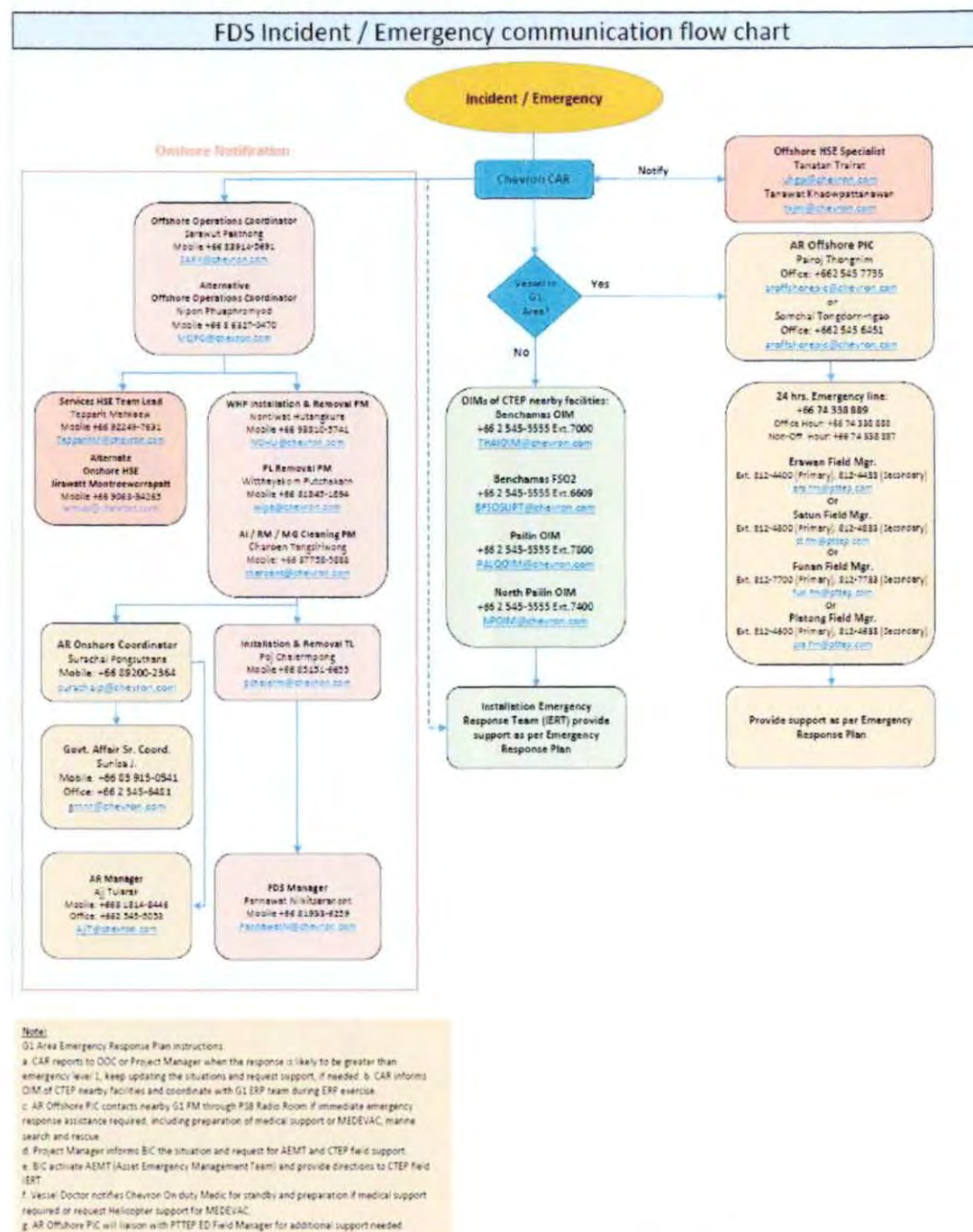
Field Clinic	Ext.
BELQ	7003
PALQ	7803
NPLQ	7403

## PTTEP ED Emergency Contact list.

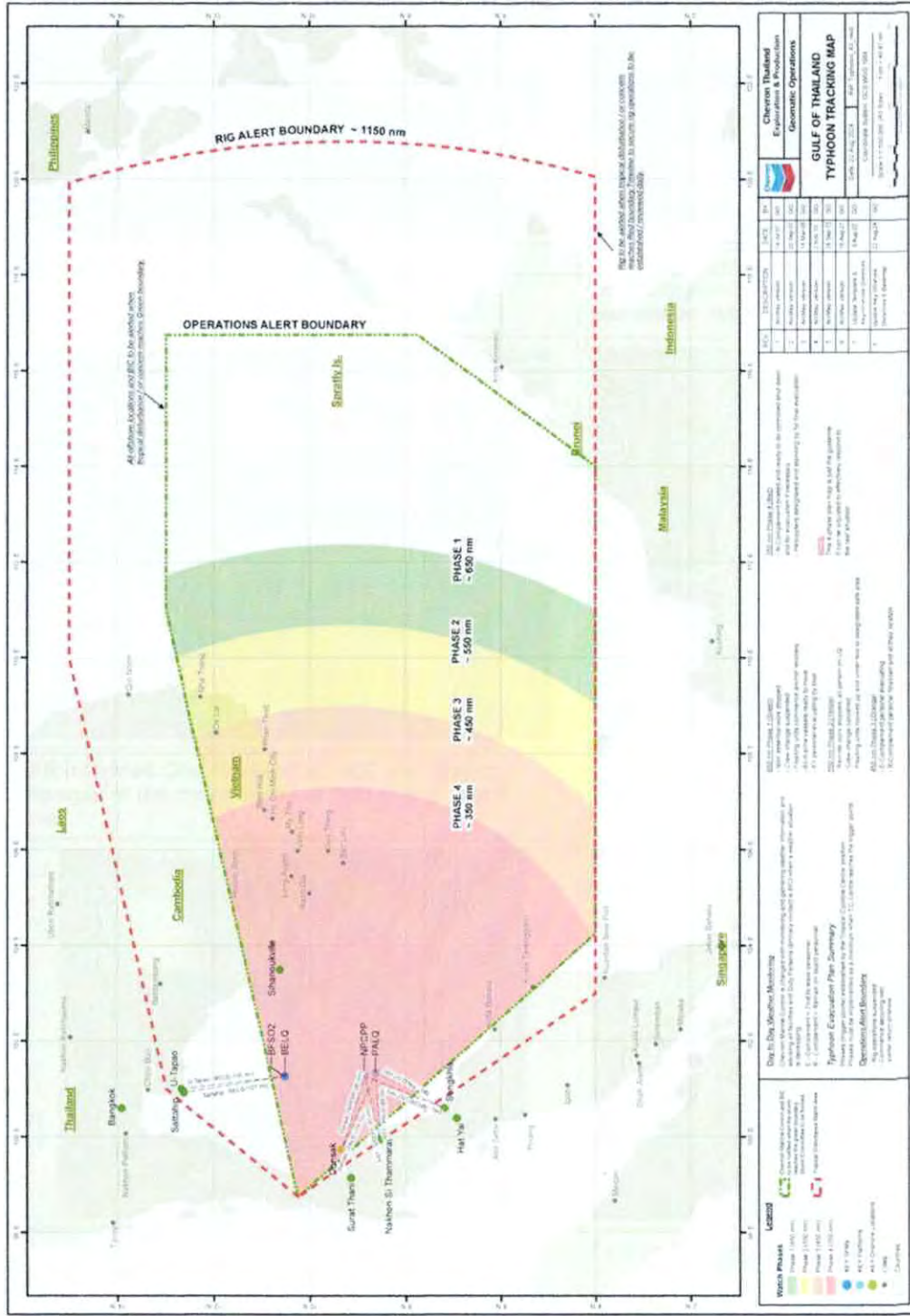
Contact list	Position	Contact number
Erawan Field	Field Manager	02-537-4000 Ext. 812-4400 Radio room: Ext. 812-4478 <a href="mailto:era.fm@pttep.com">era.fm@pttep.com</a>
Funan Field	Field Manager	02-537-4000 Ext. 812-7700 Radio room: Ext. 812-7778 <a href="mailto:fun.fm@pttep.com">fun.fm@pttep.com</a>
Satun Field	Field Manager	02-537-4000 Ext. 812-4800 Radio room: Ext. 812-4878 <a href="mailto:sat.fm@pttep.com">sat.fm@pttep.com</a>
Platong Field	Field Manager	02-537-4003 Ext. 812-4600 Radio room: Ext. 812-4678 <a href="mailto:pla.fm@pttep.com">pla.fm@pttep.com</a>

## REFERENCE

### - FDS Incident / Emergency communication flow chart



# TYPHOON EVACUATION GEOMATICS





### **Drill result and de-brief.**

**1. Did we achieve our objective?**

- **Yes, everyone understands the necessity of staying out of the typhoon's path.**

**2. What went well?**

- **Effective communication throughout planning and implementation.**
- **Conducted timely and efficiently.**
- **When called, emergency critical personnel onshore answered the phone.**
- **Alternative modes of communication are available on board. (i.e. GMDSS radio, VSAT phone, WhatsApp's call etc.)**

Prepared by: 	Reviewed by: 
Verified by: 