Hengyi Industries Sdn Bhd
恒逸实业（文莱）有限公司

HYBN-T4-06-0100-2025

Emergency Handling Card for Emergency Shutdown of Atmospheric & Vacuum Distillation Unit

常减压装置紧急停工调度应急处置卡片

Issued Date：Oct. 2025　　颁布日期：2025 年 10 月

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审　核：李　军

审　定：孙建怀

步骤 Steps	处置 Response	负责人 Responsible person
征兆及报警 Signs and Alarms	1. 炉管烧穿，塔漏油着火或其它冷换设备及机动设备发生爆炸及重大的火灾事故。 1. Furnace tube rupture, tower oil leakage with fire, or explosion/major fire in heat exchangers and rotating equipment. 2. 较长时间停电、停蒸汽、停仪表风、停循环水。 2. Prolonged power failure, steam outage, instrument air loss, or circulating water outage. 3. 原油、燃料较长时间中断。渣油后路较长时间不通。 3. Prolonged interruption of crude oil or fuel oil supply. Prolonged blockage of vacuum residue outlet. 4. 重要机泵无法修复而备用泵又开不起来，如原油泵、初底泵、常底泵、减底泵等。 4. Critical pumps cannot be repaired and standby pumps fail to start, such as crude pump, atmospheric bottom pump, vacuum bottom pump, etc.	装置操作人员 Unit operators
	5. 向调度室及部门领导报告，装置紧急停工。 5. Report to Dispatch Center and Department Leaders, initiate emergency shutdown of the unit.	装置班长 Unit shift monitor
应急程序启动 Emergency Procedure Activation	1. 接到装置汇报后，立即启动“常减压装置紧急停工”应急程序，在生产协调群中通报情况，同时电话依次通知生产调度部、炼油一部、公司领导、计划经营部、机动部、HSE部、二部、三部、四部、公用工程、港储部、热电部、仪控部、电气运行部、设备检修部、质检部、总经办、人力资源部领导、公司总值班。 1. Upon receiving the report from the unit, immediately activate the “Emergency Shutdown of Atmospheric & Vacuum Distillation Unit” procedure. Announce the situation in the production coordination group. Notify Production & Scheduling Department, No.1 Refinery Department, company leaders, Planning & Commercial Department, Equipment Management Department, HSE	值班长 Shift Dispatch monitor

步骤 Steps	处置 Response	负责人 Responsible person
	Department, No.2 Refinery Department, No.3 Refinery Department, No.4 Refinery Department, Utilities Department, Port and Storage Department, Power Department, Instrument Control Department, Electrical Operations Department, Equipment Maintenance Department, Quality Inspection Department, CEO's Office, HR Department, and the company's Duty Officer by telephone. 2. 组织生产调度员，按照应急卡片，开展应急处置工作。 2. Organize production dispatchers to carry out emergency response according to this card. 3. 生产调度应急车在调度室门口待命。 3. Production dispatch emergency vehicle to stand by at Dispatch Office entrance.	
应急处理步骤 Emergency Handling Steps	**1 系统控制 System Control** 1.1 蒸汽： 1.1 Steam: 1.1.1 常减压装置1.0MPa生产用汽13t/h（停进），轻烃回收装置1.0MPa生产用气1t/h（正常用），电站可根据1.0MPa系统管网压力调整中压双减或汽机抽汽。 1.1.1 ADU/VDU 1.0 MPa steam for production 13 t/h (stop supply); LERU 1.0 MPa steam for production 1 t/h (normal supply); Power Plant adjusts medium-pressure temperature-decreased pressure reducer or steam turbine extraction according to 1.0 MPa grid pressure. 1.1.2 常减压装置0.5MPa生产用气2t/h（正常用），电站可根据0.5MPa系统管网压力调整5#、6#发电机进汽量。 1.1.2 ADU/VDU 0.5 MPa steam 2 t/h (normal supply), Power Plant adjusts 5# and 6# generator steam intake as required by 0.5 MPa grid pressure. 1.2 燃料气：装置用燃料气19000Nm3/h（保留长明灯1500 Nm3/h），产轻烃干气5500Nm3/h（停出），燃料气管网富余约12000Nm3/h，港储调整汽化器及稳压阀，维持管网压力，压力过高时，PSA解吸气排低低压火炬，防止PSA解吸气压缩机跳车（燃料气压力＞0.62MPa时解吸气压缩机联锁跳车）。	调度员 Shift Dispatcher

<table>
<tr><th>步骤
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1.2 Fuel gas: Unit consumption: 19,000 Nm³/h (retain pilot flame 1,500 Nm³/h). LERU dry gas: 5,500 Nm³/h (stop export). Surplus in fuel gas network: approx. 12,000 Nm³/h. Port and Storage adjusts vaporizers and pressure control valves to maintain grid pressure. If pressure too high, PSA desorbed gas to low-pressure flare to prevent compressor trip (interlock trip when fuel gas >0.62 MPa).
1.3 氮气：压缩机停运干气密封保持不变，安排公用工程做好后备氮供应准备。
1.3 Nitrogen: With compressor shutdown, dry gas seals maintained. Utilities to prepare backup nitrogen supply.
1.4 水系统：塔顶注水停用，循环水用量短时间增大，3套海淡提高负荷，保证消防水罐保持高液位运行，做好应急准备。
1.4 Water system: Stop overhead tower quench water, short-term increase in cooling water consumption, three desalination units increase load to ensure fire water tank remains at high level, prepare for emergency use.
1.5 电网：初期各装置动力设备都在运转，电量波动较小，装置可根据停工步骤，与电调联系，有序停运动力设备。
1.5 Power grid: Initially, equipment continues operating, power fluctuation minimal. Units to coordinate orderly shutdown with Electrical Dispatch according to shutdown sequence.
2 物料安排 Material Arrangement
<table>
<tr><td colspan="3">物料流程 Material Flow</td></tr>
<tr><td>产品侧线
Product Side Streams</td><td>正常流程
Normal flow</td><td>退料流程
Material return flow</td></tr>
<tr><td>初常顶气
Pre.-Dist. & Atm. Overhead gas</td><td>直供轻烃回收装置
Direct to LERU</td><td>改放低压火炬（0.2MPa）管网
Divert to Low-Pressure Flare (0.2 MPa)</td></tr>
<tr><td>初常顶油
Pre.-Dist. & Atm. Overhead oil</td><td>直供轻烃回收装置
Direct to LERU</td><td>经轻烃回收装置后改轻污油
After LERU → reroute to Light Slop Oil</td></tr>
</table>
</td><td></td></tr>
</table>

步骤 Steps	处置 Response			负责人 Responsible person
	常一线 Atm. 1-Sidedraw	直供煤油加氢装置，少量进煤油加氢原料罐 Direct to KHT, small portion to KHT feed tank	根据产品质量情况，后路改柴油加氢原料线或轻污油线出装置 Depending on quality, reroute to DHT feed line or Light Slop Oil	
	常二线 Atm. 2-Sidedraw	直供柴油加氢装置、少量进柴油加氢原料罐 Direct to DHT, small portion to DHT feed tank	根据产品质量情况，后路改柴油加氢原料线或轻污油线出装置 Depending on quality, reroute to DHT feed line or Light Slop Oil	
	常三线 Atm. 3-Sidedraw	直供柴油加氢装置、少量进柴油加氢原料罐 Direct to DHT, small portion to DHT feed tank	根据产品质量情况，后路改柴油加氢原料线或轻污油线出装置 Depending on quality, reroute to DHT feed line or Light Slop Oil	
		并直馏蜡油线 Direct o straight-run VGO line	根据产品质量情况，后路改加氢裂化原料线或重污油线出装置 Depending on quality, reroute to Hydrocracking (HC) unit or Heavy Slop Oil	
	减顶油 Vac. Overhead oil	并轻污油线 To Light Slop Oil line	并轻污油线出装置 Out via Light Slop Oil line	
		直供柴油加氢装置 Direct to DHT		
	减顶气 Vac. Overhead gas	进常压炉做燃料 To Atm. Furnace as fuel	改放低压火炬（0.2MPa）管网 Divert to Low-Pressure Flare (0.2 MPa)	
	减一二三线 Vac. 1-,2-,3-sidedraw	直供加氢裂化装置、少量进加氢裂化原料罐	根据产品质量情况，后路改加氢裂化原料线或重污油线出装置	

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<table>
<tr><td></td><td>Direct to Hydrocracking unit, small portion to HC feed tanks</td><td>Depending on quality, reroute to Hydrocracking or Heavy Slop Oil</td></tr>
<tr><td>减压渣油
Vac. Residue</td><td>直供灵活焦化装置、少量进焦化原料罐
Direct to Flexicoking unit, small portion to Flexicoking feed tank</td><td>继续走焦化原料线或改重污油线出装置
Continue to Flexicoking unit or reroute to Heavy Slop Oil</td></tr>
</table>
注意：装置退污油时，需控制排放速度及温度，避免流量过大，导致污油罐浮盘损坏，大量退污油时与计划经营部沟通，安排将污油改至原油罐收；并需加强监控进罐温度及退油量。
Note: When routing to slop tanks, control discharge rate and temperature to prevent floating roof damage. For large volumes, coordinate with Planning & Commercial Department to divert to crude tanks. Strengthen monitoring of inlet temperature and oil volume.
3 其它 Others
3.1 常减压作为全厂物料源头，当常减压装置停工时，下游装置短时间可靠中间罐库存维持生产，长时间停工根据物料平衡按照计划要求调整负荷。
3.1 As ADU/VDU is the refinery feed source, downstream units rely on tank inventory short-term; long-term shutdown requires adjustments per material balance and plan.
受影响装置动态表
Impacted Units Status Table
<table>
<tr><th>装置
Units</th><th>动态
Status</th></tr>
<tr><td>常减压
ADU/VDU</td><td>停工
Shutdown</td></tr>
<tr><td>轻烃回收
LERU</td><td>常减压停工后，吸收塔液相缺失、稳定塔热源缺失，装置停工，各塔保压。根据常减压事故进展情况择机安排石脑油退料。
Shutdown due to lack of absorption liquid and stabilizer</td></tr>
</table>
</td><td></td></tr>
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<table>
<tr><td></td><td>tower’s heat source, each tower maintain pressure. Arrange naphtha return to tank farm as appropriate.</td></tr>
<tr><td>产品精制
Acid Gas and LPG treating unit</td><td>轻烃液化气、干气中断，饱和干气及液化气系统保压，保持胺液系统正常循环运行。其它各塔正常运行。
LPG/dry gas interrupted. Saturated gas and LPG systems hold pressure, amine circulation normal. Other towers operate normally.</td></tr>
<tr><td>气分
LPG Fractionation unit</td><td>气分 I 系列原料减少降负荷运行。
First series feed reduced, lower load.</td></tr>
</table>
3.2 安排港储部立即增启直馏煤油、直柴、直馏蜡油、减压渣油、预加氢原料供料泵，做好装置中间物料的供应，打通轻、重污油流程，并加强污油罐监控，防止速度过快损坏设备；维持好燃料气系统稳定运行；监控火炬及气柜系统运行，及时调整消烟蒸汽，分液罐及时脱液。
3.2 Tank Farm: Start SR kerosene, SR diesel, SR VGO, VDU residue, Pre-hydrogenation feed pumps to ensure supply. Open slop oil routing and monitor tanks closely. Maintain fuel gas stability, monitor flare/gasholder, adjust smokeless steam.
3.3 轻烃回收因常二中热源缺失，安排煤、柴油加氢石脑油、柴油加氢轻烃、预加氢石脑油停出或改轻污油（尽量停出，减少污油量），煤、柴油加氢、预加氢塔顶气改放火炬。
3.3 LERU: With heat source lost, stop or reroute K/DHT and Pre-hydrogenation naphtha/KHT light hydrocarbons to slop (prefer stop to reduce slop oil amount). K/DHT and Pre-hydrogenation tower overhead gases to flare.
3.4 产品精制装置因轻烃液化气、轻烃干气中断，轻烃液化气、干气脱硫停运，其它正常运行。
3.4 Acid Gas and LPG treating unit: LPG/dry gas desulfurization stopped; others normal.
3.5 煤油加氢、柴油加氢、加氢裂化、预加氢、灵活焦化装置停收直供料，全部改收罐供料，维持装置正常生产。</td><td></td></tr>
</table>

步骤 Steps	处置 Response	负责人 Responsible person
	3.5 Kerosene HT, Diesel HT, Hydrocracking, Pre- hydrogenation, Flexicoking: Stop direct feed, switch to tank supply. 3.6 通知气分装置，轻烃液化气减少，I 系列根据上游原料供应量及时调整负荷。 3.6 LPG Fractionation Unit: First series adjust loads per LPG availability. 3.7 提醒其它各装置和岗位做好调整，减少因常减压装置停工对生产带来的影响；硫磺回收、溶剂再生、酸性水汽提、公用工程等根据实际情况做好生产调整。 3.7 Other Units: Adjust to reduce impact. Sulfur Recovery unit, Solvent Regeneration unit, Sour Water Stripping unit, Utilities dept. adjust accordingly. 3.8 通知公用工程，常减压装置初馏塔，常压塔，减顶气吸收塔需要使用氮气维持正压，做好供氮准备。 3.8 Notify Utilities that the ADU/VDU — including the Pre-fractionator, Atmospheric Column, and Vacuum Overhead Gas Absorber — requires nitrogen to maintain positive pressure. Ensure nitrogen supply is prepared. 3.9 安排热电部做好汽电平衡，防止各等级蒸汽管网和电网波动造成事故扩大。 3.9 Power Plant: Maintain steam/power balance, prevent wider accidents.	
生产调整 Production Adjustments	1. 根据全厂物料平衡情况以及常减压恢复情况，调整其它装置生产加工计划。 1. Based on material balance and ADU/VDU recovery, adjust other unit processing plans.	计划经营部 Planning department
	2. 组织生产调度根据生产计划，落实装置调整，保证系统平稳。 2. Organize production dispatch to implement adjustments per production plan, ensure system stability.	值班长 Shift Dispatch monitor
生产恢复 Production Recovery	1. 组织生产调度，按常减压开工方案，做好开工原料、公用介质供应，调整物料及产品后路。 1. Organize dispatch per startup plan, ensure feed/utilities, adjust routing. 2. 组织生产调度，根据计划要求调整重整、柴油加氢、煤油加氢、加氢裂	值班长 Shift Dispatch

步骤 Steps	处置 Response	负责人 Responsible person
	化负荷。 2. Adjust CCR unit, DHT unit, KHT unit, hydrocracking unit per plan.	monitor
注意事项 Precautions	1. 常减压停工时，首要任务是保证下游装置的物料供应，确保下游装置稳定运行；装置正常运行时，港储在运供料泵正常情况为小泵，预加氢原料、直馏煤油、直馏柴油、直馏蜡油、减压渣油均需切换大泵或增启泵，需提醒港储注意人员合理安排，保障装置供料。 1. During the shutdown of the ADU/VDU, the primary task is to ensure the material supply to downstream units and maintain their stable operation. When the unit is in normal operation, the feed pumps from the terminal/storage are normally operated with small pumps; however, for pre-hydrotreating feed, straight-run kerosene, straight-run diesel, straight-run VGO, and vacuum residue, it is necessary to switch to large pumps or start additional pumps. Port & Storage dept. should be reminded to reasonably arrange personnel to ensure stable feed supply to the unit. 2. 常减压发生停工事故未停工时，由调度第一时间通知港储部停止供应凝析油、CPC等液化气收率较高的轻质原油，常减压恢复开工过程中，稳定石脑油合格前，原则上不掺炼凝析油和液化气收率高的轻质油。 2. In the event of an incident where the ADU/VDU experiences a shutdown but has not yet been completely stopped, the dispatcher shall immediately notify the Port & Storage dept. to stop supplying condensate oil, CPC, and other light crude oils with high liquefied gas yields. During the restart process of the ADU/VDU, before the stabilized naphtha meets quality specifications, in principle, condensate oil and light crude oils with high liquefied gas yields shall not be blended. 3. 常减压开工时，原则上控制550t/h至700t/h负荷，防止退污油量过大。 3. During startup of the ADU/VDU, in principle, the load shall be controlled within 550 t/h to 700 t/h in order to prevent excessive return of contaminated oil. 4. 轻烃回收装置稳定塔顶改放火炬，尽量把稳定石脑油中液化气组分闪蒸出去。 4. In the LERU, the Stabilizer overhead shall be diverted to flare, in order to flash off the liquefied gas components contained in the stabilized naphtha as much as possible. 5. 轻烃回收装置轻污油尽量进凝析油罐，必要时可以安排两台罐同进，降低浮盘上升速度，同时关注轻烃进罐风险，提醒港储加强收储罐安全检查。 5. The LERU’s light slop oil shall be directed to the condensate oil tank. If necessary, two	

步骤 Steps	处置 Response	负责人 Responsible person
	tanks may be arranged to receive simultaneously, so as to reduce the floating roof rising rate. At the same time, attention shall be paid to the risk of light hydrocarbons entering the tank, and the Port & Storage dept. shall be reminded to strengthen the safety inspection of storage tanks. 6. 常减压停工时，燃料气会富余，港储需及时调整燃料气压力，避免解析气压缩机因背压联锁跳机。 6. When the ADU/VDU is shut down, surplus fuel gas will be generated. The Port & Storage dept. shall promptly adjust the fuel gas pressure to avoid backpressure interlock trip of the absorber gas compressor. 7. 注意装置各侧线退油温度，防止管线凝堵或储罐超温。 7. Pay attention to the return oil temperature of each side stream of the unit to prevent pipeline solidification or storage tank over-temperature. 8. 重污油退油结束后，安排蒸汽扫线。 8. After completion of heavy slop oil return, arrange for steam line sweeping.	

Table 1 Revision, compilation and approval of this document

表 1 文件版本编制和审批情况

2	2025-10-15	蒲小龙	李军	孙建怀
Revision 版本	Issued date 颁布日期	Composed by 编制人	Reviewed by 审核人	Approved by 批准人