# Amide and Nylon New Material Project Hubei Sanning Chemical Industry Co., Ltd.

# Brief Version of Environmental Impact Report

## 1 Project overview

Hubei Sanning Chemical Industry Co., Ltd. intends to build amide and nylon new material projects in Yaojiagang Chemical Industry Park in Zhijiang. The whole project can be divided into two major industrial chains: nylon 6 industrial chain and nylon 66 industrial chain, and the construction contents include 2×400,000 tons/year hydrogen peroxide (35%), 800,000 tons/year sulfuric acid device, 400,000 tons/year caprolactam and 400,000 tons/year nylon 6 polymerization device; the construction contents of nylon 66 industrial chain include 2×400,000 tons/year cyclohexanol device, 2×300,000 tons/year cyclohexanone device, 240,000 tons/year adipic acid device, 4×25,000 tons/year adiponitrile device, 2×50,000 tons/year hexanediamine device and 4×50,000 tons/year nylon 66 device.

# 2 Environmental quality status

According to the monitoring results of the current situation of ambient air, surface water, groundwater, acoustic environment and soil environment in the evaluation area, the environmental quality conditions in the evaluation area are as follows:

(1) Ambient air

According to the statistical results of the *Annual Report on Environmental Quality of Yichang City in 2019* released by Yichang Ecological Environment Bureau, among the six indicators of ambient air of Yichang City in 2019, the average annual concentration of $PM_{10}$ in **Zhijiang City** is 62ug/$m^3$; the average annual concentration of $PM_{2.5}$ is 42ug/$m^3$; the average daily concentration of $O_3$-8h is 160ug/$m^3$; the average annual concentration of $SO_2$ is 12ug/$m^3$; the average annual concentration of $NO_2$ is 28ug/$m^3$; the average daily concentration of CO is 1.2 mg/$m^3$. $PM_{2.5}$ exceeds the requirements of *Ambient Air Quality Standards* (GB3095-2012) and the Class II standard in the revised list.

According to the statistical results of the *Annual Report on Environmental Quality of Yichang City in 2019* released by Yichang Ecological Environment Bureau, among the six indicators of ambient air of Yichang City in 2019, the average annual concentration of $PM_{10}$ in **Yidu City** is 71ug/$m^3$; the average annual concentration of $PM_{2.5}$ is 47ug/$m^3$; the average daily concentration of $O_3$-8h is 168ug/$m^3$; the average annual concentration of $SO_2$ is 16ug/$m^3$; the average annual concentration of $NO_2$ is 27ug/$m^3$; the average daily concentration of CO is 1.2 mg/$m^3$. $PM_{10}$, $PM_{2.5}$ and $O_3$-8h all exceed the requirements of *Ambient Air Quality Standard*s (GB3095-2012) and the Class II standard in the revised list.

According to the statistical results of the *Annual Report on Environmental Quality of Yichang City in 2020* released by Yichang Ecological Environment Bureau, among the six indicators of ambient air of Yichang City in 2020, the average annual concentration of $PM_{10}$ in **Zhijiang City** is 51ug/$m^3$; the average annual concentration of $PM_{2.5}$ is 35ug/$m^3$; the average daily concentration of $O_3$-8h is 130ug/$m^3$; the average annual concentration of $SO_2$ is 9ug/$m^3$; the average annual concentration of $NO_2$ is 22ug/$m^3$; the average daily concentration of CO is 1.4 mg/$m^3$. The concentrations of $PM_{10}$, $PM_{2.5}$, $SO_2$, $NO_2$, CO and $O_3$ all meet the *Ambient Air Quality Standard*s (GB3095-2012) and the Class II standard in the revised list.

According to the statistical results of the *Annual Report on Environmental Quality of*

*Yichang City in 2020* released by Yichang Ecological Environment Bureau, among the six indicators of ambient air of Yichang City in 2020, the average annual concentration of $PM_{10}$ in **Yidu City** is 57ug/$m^3$; the average annual concentration of $PM_{2.5}$ is 39ug/$m^3$; the average daily concentration of $O_3$-8h is 126ug/$m^3$; the average annual concentration of $SO_2$ is 12ug/$m^3$; the average annual concentration of $NO_2$ is 25ug/$m^3$; the average daily concentration of CO is 1.2 mg/$m^3$. The concentrations of $PM_{10}$, $SO_2$, $NO_2$, CO and $O_3$ all meet the requirements of *Ambient Air Quality Standard*s (GB3095-2012) and the Class II standard in the revised list, while $PM_{2.5}$ exceeds the requirements of *Ambient Air Quality Standards* (GB3095-2012) and the Class II standard in the revised list.

Sulfuric acid mist, benzene, toluene, xylene, ammonia, hydrogen sulfide and total volatile organic compounds at each monitoring point in the evaluation area meet the standard limit requirements in Appendix D of *Technical Guidelinesfor Environmental Impact Assessment—Atmospheric Environment* (HJ2.2-2018); non-methane total hydrocarbons meet the standard requirements of *Detailed Explanation of Comprehensive Emission Standards for Air Pollutants*; the odor concentration meets the standard requirements of the *Emission Standards for Odor Pollutants* (GB14554-93).

(2) Surface water

Except total nitrogen, the main pollutants in the shoreline of Yaojiagang section of

Zhijiang City of Yangtze River, other indicators, such as pH, chemical oxygen demand, five-day biochemical oxygen demand, sulfide, total phosphorus, cyanide, volatile phenols, petroleum, ammonia nitrogen, fluoride, nitrate, sulfate, benzene, iron, copper, nickel and zinc all meet the requirements of Class III standard limits in *Environmental Quality Standardsfor Surface Water* (GB3838-2002).

(3) Groundwater

According to the monitoring results, the groundwater quality at each monitoring point meets the requirements of Class III standard limit in *Groundwater Quality Standard* (GB/T14848-2017).

(4) Soil

The soil monitoring results show that the soil within the factory area of proposed project meets the requirements of Class II land screening value standards in *Soil Environmental Quality Risk Control Standard for Soil Contamination of Development Land (Trial)* (GB36600-2018), and the current situation of soil environment outside the factory area can meet the requirements of screening value standards in *Soil Environmental Quality Risk Control Standard for Soil Contamination of Agricultural Land (Trial)* (GB15618-2018).

(5) Noise

The monitoring values of daytime and nighttime noise status of monitoring points around the factory boundary can meet the requirements of Class3 standards in *Sound Environmental Quality Standard* (GB3096-2008).

# 3. Emission of pollutants

According to the engineering analysis results, the main pollutant emissions after the completion of the project are as follows.

**表 13.3-1 拟建工程污染物排放情况一览表**

**Table 13.3-1 List of Pollutant Emissions of Proposed Project**

| 项目 Item | | 现有工程排放量（t/a）Emissions of the existing project (t/a) | 拟建项目（t/a）Proposed project (t/a) | | | “以新带老”削减量（t/a）Deduction after “ replacing the old with the new” (t/a) | **最终排放量（t/a）Final Emissions (t/a)** | 排放增减量（t/a）Discharge Increases and decreases (t/a) |
|---|---|---|---|---|---|---|---|---|
| | | | 产生量 Output | 削减量 Reduction | 排放量 Discharge volume | | | |
| 废气 Waste gas | 废气量 Exhaust gas volume $\times 10^4 m^3/a$ | 2772396.8 | 665425.61 | 0 | 665425.61 | 0 | 3437822.41 | 665425.61 |
| | $SO_2$ | 2622.32 | 732.366 | 621.616 | 110.75 | 0 | 2733.07 | 110.75 |
| | $NO_x$ | 3345.12 | 43218.47 | 43112.94 | 105.53 | 0 | 3450.65 | 105.53 |
| | 颗粒物 Particulate matters | 1579.15 | 2419.81 | 2366.73 | 53.08 | 0 | 1632.23 | 53.08 |
| | 氨 Ammonia | 250 | 134.846 | 120.778 | 14.068 | 0 | 264.068 | 14.068 |
| | 非甲烷总烃 Non- methane | 1148.847 | 26555.58 | 26394.758 | 160.822 | 402.947 | 906.722 | -242.125 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | hydrocarbons | | | | | | | |
| 废水 Wastewater | 废水量 $\times 10^4 m^3/a$ Wastewater volume of $\times 10^4 m^3/a$ | 1640.58 | 1110.1245 | 0 | 1110.1245 | 0 | 2750.7045 | 1110.1245 |
| | COD | 820.29 | 16481.998 | 15926.936 | 555.062 | 0 | 1375.352 | 555.062 |
| | 氨氮 Ammonia nitrogen | 82.03 | 943.151 | 887.645 | 55.506 | 0 | 137.536 | 55.506 |
| | 总氮 Total nitrogen | 246.09 | 2397.755 | 2231.236 | 166.519 | 0 | 412.609 | 166.519 |
| | 总磷 Total phosphorus | 8.21 | 23.597 | 18.046 | 5.551 | 0 | 13.761 | 5.551 |
| 工业固体废物 Industrial solid waste | | 0 | 81566.39 | 81566.39 | 0 | 0 | 0 | 0 |

# 4. Major environmental impacts

### 4.1 Atmospheric environmental impact

According to the atmospheric prediction results, the atmospheric environmental impact of this project is acceptable.

(1) There are pollution source substitution reductions in this project area to reduce the emission of air pollutants $NO_2$, $PM_{10}$ and $PM_{2.5}$, and improve the regional environmental quality.

(2) The maximum concentration percentage of the short-term concentration contribution of each pollutant of the proposed project is less than 100%;

(3) The maximum concentration percentage of the annual average concentration contribution of each pollutant of the proposed project is less than 30%;

(4) The concentration of the superimposed pollutants meets environmental quality standards

(5) After the pollution sources and the impact of this project are reduced in the superimposed area of $NO_2$, $PM_{10}$ and $PM_{2.5}$, the calculation of regional environmental quality change shows that the K values of $NO_2$, $PM_{10}$ and $PM_{2.5}$ are all less than-20%, so the regional environmental quality is improved as a whole.

**4.2 Environmental impacts of surface water**

(1) Normal working conditions

According to the engineering analysis, the main sewage generated by the project includes: process wastewater, workshop floor cleaning water, clean drainage, laboratory test wastewater, circulating cooling system drainage, initial rainwater, desalinated water station sewage, waste heat boiler drum drainage, steam condensate, and domestic sewage. The output of wastewater is 1,470.51 $m^3/h$. The wastewater generated by the project is treated by the sewage treatment station.

The production wastewater and domestic sewage are treated by the newly built sewage treatment station and then enter the sewage pipe network of the park, and finally collected and treated at the park's wastewater factory before being evacuated. The concentration of pollutants in the wastewater treated by the sewage treatment station is lower than the indirect emission standards and west city sewage treatment factory takeover standards of *Emission Standard of Pollutants for Petroleum Chemistry Industry*, which meets the requirements of sewage acceptance.

The sewage factory in the park, namely west city sewage treatment factory in Zhijiang City obtained the environmental assessment approval in 2010 (Y.S.H.S. [2010] No. 110) and passed the completion environmental protection acceptance in 2015 (Y.S.H.Y. [2015] No.8). In 2017, it obtained the environmental assessment approval of the upgrading and renovation project (Y.S.H.S. [2017] No. 14), and in the same year, the upgrading and renovation project passed the environmental protection acceptance (Y.S.H.Y. [2017] No.22).

At present, the treatment scale of the sewage factory in the park is 25,000 t/d, and the current treatment water quantity is about 15,000 t/d, which is to be expanded to 150,000 t/d. The water collection area is within 6.59 square kilometers to the west of the city, and its service targets are industrial and mining enterprises in Yaojiagang Group in this area, including Sanning Chemical Industry, Zhongning Chemical Industry, Chutian Plastic, Shanshui Chemical Industry, Liyuan Chemical Industry, Yuangang Chemical Industry, Chutian Plastic and other enterprises. It adopts the treatment process of ozone contact oxidation hydrolytic acidification + $A^2/O$ + sodium hypochlorite reaction tank flocculation filtration + ultraviolet disinfection. The effluent can completely meet the Grade A standard in Table 1 of the *Emission Standard for Pollutants from Urban Sewage Treatment Factory* (GB18918-2002). In the factory area, the continuous and stable operation of the sewage treatment system ensures that on the basis of the emission of wastewater up to the standard, the emission of sewage from the project will basically not have an obvious adverse impact on the surface water environment, and the impact on the surface water environment is acceptable.

(2) Under abnormal working conditions

The abnormal working conditions of the project wastewater include: the sewage treatment station and sewage treatment system have accidents and can not operate normally, the evacuated wastewater can not meet the discharge standards, according to the most unfavorable conditions, the sewage treatment is out of operation due to failures, and all the organic wastewater generated is considered to be discharged. The total wastewater volume discharged from Phase I and Phase II projects under abnormal working conditions is 527.27 $m^3$/h.

The concentration of pollutants in wastewater is high. Therefore, enterprises should strictly manage and take relevant measures to ensure the continuous and safe operation of sewage treatment. In the event of an accident at the sewage treatment station that cannot operate normally, the accident wastewater should be evacuated into the accident pool, and then pumped to the sewage treatment station for treatment after the accident is treated, so as to avoid the impact of abnormal working conditions on the normal operation of the sewage treatment factory in the park and the surface water environment.

The effective volume of the newly built accident pool in this project is greater than 1,300$m^3$, which can accommodate the abnormal discharge of the sewage station for 2 hours. Therefore, in the event of abnormal and accident situations, the production should be stopped in time, and after the accident is finished, it should be pumped to the sewage treatment station for treatment, which can avoid abnormal discharge, such as direct discharge of wastewater without treatment.

Enterprises should set up measures to quickly cut off the accident drainage that directly goes into the accident pool. The accident pond should be taken with safety and impermeability measures, and the accident pond should not be occupied in

non-accident status to ensure that the wastewater generated from possible accidents can be accommodated at any time.

### 4.3 Environmental Impact of Groundwater

According to the simulation results, after a continuous leakage of 1000d, the pollution exceedance range of ammonia nitrogen and petroleum does not exceed the factory boundary, and meets the requirements of relevant specifications. However, due to the deviation between the parameters and the actual topography, the actual situation may be different from the predicted results. Therefore, it is necessary to take strict impermeability measures and a perfect tracking and monitoring system to minimize the impact of pollutants on the surrounding groundwater environment.

In summary, the project has adopted strict impermeability measures, and the possibility of groundwater pollution is small. In addition, the project has set up a perfect groundwater monitoring system. In case of abnormalities in the water quality of the groundwater monitoring wells, the relevant administrative departments and local residents will be notified in a timely manner to take emergency precautions and take corresponding protective measures. Therefore, after taking the above pollution prevention measures, the impact and risk of this project on groundwater environment can be reduced to an acceptable level.

### 4.4 Soil Environmental Impact

The simulation results show that under the working conditions and parameters assumed in this simulation, it takes about 690 days from the beginning of leachate infiltration to the mercury ion concentration on the diving surface exceeded the standard.

### 4.5 Acoustic environment impact

Considering the blocking effect of main buildings (structures) in the factory area on outdoor sound transmission, a 4 m-high solid wall is built on the west side of the project. Considering the sound insulation effect of the solid wall, and other parts are hollow walls.

According to the noise prediction model to calculate the prediction results of the contribution value of the proposed project to the noise of the factory boundary, as well as the prediction results of the noise of environmentally sensitive points. The prediction values of daytime and nighttime noise at each factory boundary are not exceeded, and the noise values at the factory boundary meet the Class 3 standard of the *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008).

### 4.6 Environmental Impact of Solid Waste

According to the engineering analysis, after the solid waste generated by this project is treated and disposed by the measures proposed in the evaluation, all the solid waste generated by the project is treated and not directly evacuated into the external environment. It can be seen that all solid wastes in this project have proper treatment measures, and the environmental impact is acceptable.

## 5. Adoption of public opinions

This public participation takes the form of online publicity, etc. The results of the public participation survey show that the public thinks the construction of this project is acceptable, and there are no opponents. This evaluation suggests that the construction unit should pay more attention to environmental protection, support local economic development and care about the surrounding public interests. This project should be fully demonstrated, rationally laid out, increased investment, adopted clean production processes and equipment, and earnestly implemented various environmental protection measures. It should be implemented and monitored according to the requirements of "Three Simultaneities", and attention should be paid to the protection of downwind residential areas to minimize the "Three Wastes "emissions.

# 6. Environmental protection measures

## 6.1 Preventive measures for air pollution

### 6.1.1 Summary of nylon 6process waste gas treatment measures

There are many pollution-producing nodes of organic waste gas in each device, and the evaporated materials in each tower are condensed and recovered by second-level or above coolers, and a non-condensing air collection manifold is set. After collecting the non-condensable air, water absorption/activated carbon adsorption treatment measures are selected according to the material characteristics, and finally evacuated through the exhaust funnel at high-altitude.

Nylon 6 project process waste gas treatment measures are shown in the following figure

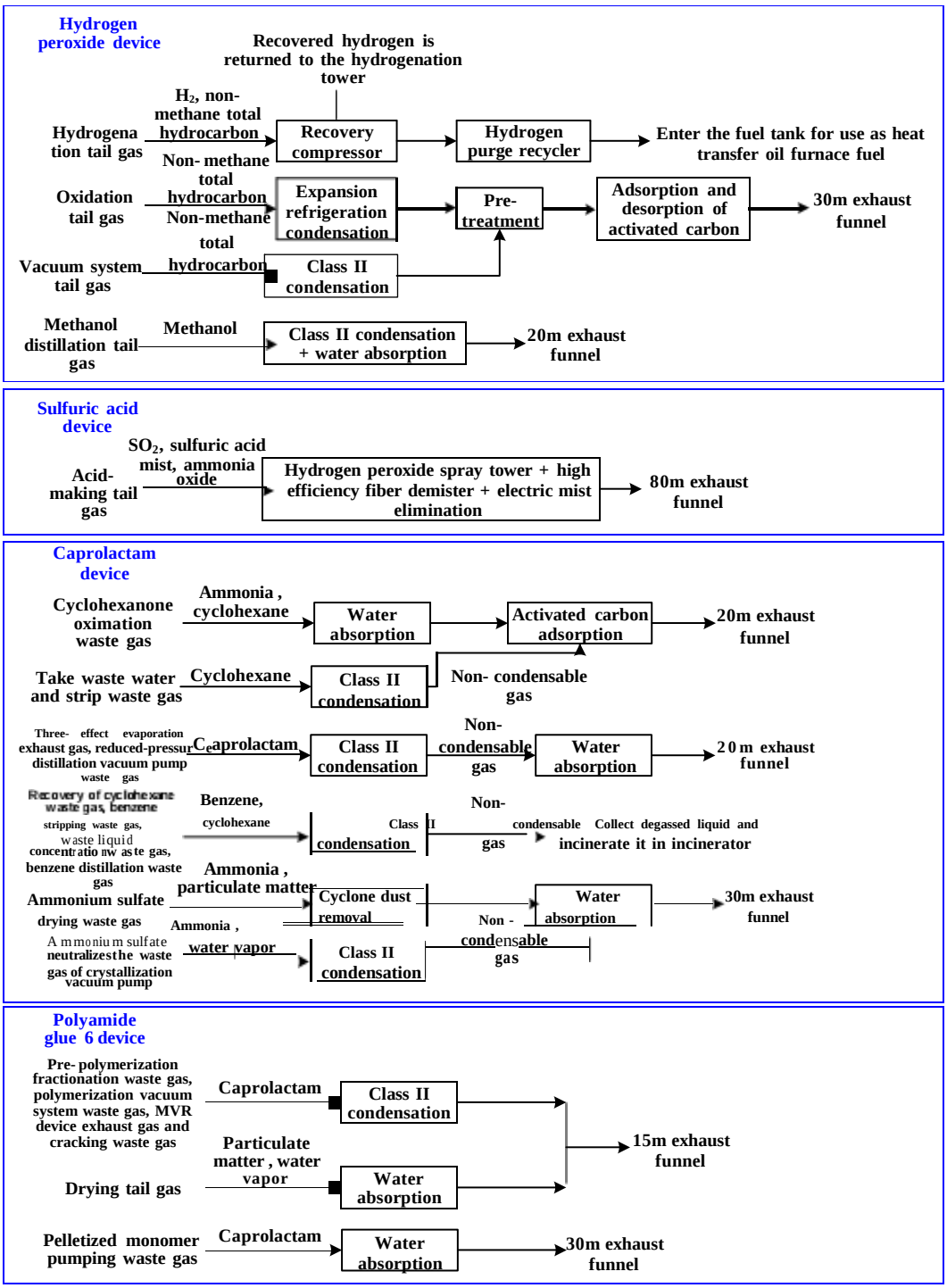


**Figure 6-1 Summary Chart of Process Waste Gas Treatment Measures for Nylon 6 Project**

## 6.1.2Peroxide device tail gas treatment measures

(1) Circulating hydrogen purge

The circulating hydrogen purge is mainly hydrogen, with a small amount of non-methane total hydrocarbons entrained, which is recovered by secondary condensation in the condenser to recover the entrained aromatic hydrocarbons and then entered into the fuel tank for use as heat transfer oil furnace fuel.

(2) Oxidation tail gas

According to the design data, the oxidation tail gas is treated by expansion refrigeration condensation + activated carbon fiber adsorption (4 absorption and 2 removal) and then evacuated from 30m-high exhaust funnel to meet the standard; Non-condensable gas in methanol distillation unit and non-condensable gas in each vacuum system are connected to activated carbon absorber for treatment.

(3) Tail gas treatment measures for the sulfuric acid device

In this project, hydrogen peroxide spray tower + high-efficiency fiber demister electric mist elimination device to treat $SO_2$ in the tail gas of suction tower, $SO_3$ is mainly generated by the oxidation of hydrogen peroxide reacting with $SO_2$, after which $SO_3$ reacts with water to generate $H_2SO_4$, so as to achieve the purpose of removing $SO_2$. At the same time, hydrogen peroxide oxidizes the insoluble low valence nitrogen oxides in the waste gas to soluble high valence nitrogen oxides, thus achieving the purpose of removing nitrogen oxides.

### 6.1.3 Process waste gas treatment measures for caprolactam factory

The main pollutants of cyclohexanone oxime waste gas are ammonia and cyclohexane, as yclohexane is insoluble in water, it is evacuated through 20m-high exhaust funnel after water absorption + activated carbon adsorption treatment. The main pollutants of the three-effect evaporation non-condensable gas and the exhaust gas of the vacuum pump of reduced pressure distillation are caprolactam (calculated by non-methane hydrocarbons), as caprolactam dissolves in water, it is evacuated through 20m-high exhaust funnel after absorbed by water. Other non-condensable gases in caprolactam device are mainly benzene and cyclohexane. After collection, the de-gassing liquid is incinerated in an incinerator.

### 6.1.4Process waste gas treatment measures for ammonium sulfide device

The main waste gas pollution factors of ammonium sulfide drying process are particulate matter and ammonia. After condensation, the drying tail gas is treated by cyclone dust removal and water washing dust removal, and then evacuated through a 40m-high exhaust funnel after the treatment meets the standard.

### 6.1.5Waste gas treatment measures for polyamide 6process

The process waste gas of polyamide 6 device is mainly cut pellet monomer extraction exhaust gas, and the pollutant is mainly caprolactam. Because caprolactam is soluble in water, it is proposed to set up a negative pressure extraction device at the injection head and the guide groove near the cutting chamber, and introduce a small amount of caprolactam monomer volatilized in the granulation process into the immersion sink through the jet pump for absorption, and the purified tail gas is evacuated through a 30m-high exhaust funnel at high altitude.

After the waste gas generated by this device is treated by water absorption, the treatment efficiency of non-methane total hydrocarbons can reach more than 80%.

According to engineering analysis, the emission concentration of non-methane total hydrocarbons in the waste gas can meet the requirements of the special emission limits in the *Emission Standard of Pollutants for Synthetic Resin Industry* (GB31572-2015). It is technically feasible.

### 6.1.6Process waste gas treatment measures for nylon 66project

There are many pollution-producing nodes of organic waste gas in each device, and the steamed materials in each tower are condensed and recovered by second-level or above coolers, and a non-condensable air collection manifold is set to collect the non-condensable gas and send it to the gas-liquid incinerator for treatment; adipic acid nitrous gas is collected into the nitrous gas manifold, recovered by condenser + compressor, then into the nitrous gas tail gas, after the recovery of nitric acid by the absorption tower, enter the gas-liquid incinerator for treatment; the pollutants in the adipic acid drying tail gas are mainly particulate matter and water vapor, which are treated by cyclone dust removal + water washing tower and then evacuated at high altitude; ammonia-containing waste gas from adiponitrile device is absorbed by water and then evacuated at high altitude; the waste gas of nylon 66 device is cooled by low-temperature cooling water and washed by chilled water and then evacuated.

The breathing waste gas and loading and unloading waste gas in storage tank area of Nylon 66 factory area are all connected to gas-liquid incinerator for treatment.

### 6.1.7 Waste gas treatment measures for gas-liquid incinerator

Project burning waste does not contain heavy metals, chlorine and sulfur, then the incineration waste gas basically will not produce $SO_2$, heavy metals and dioxins, and the main pollutants are particulate matter, NOx and non-methane total hydrocarbons.

The gas-liquid incinerator uses X oil and light oil by-product of cyclohexanol factory as fuel, and adopts low-nitrogen combustion technology to reduce the content of NOx in the waste gas. The waste liquid of the project contains nitrogen-containing

compounds, such as adiponitrile and adipamide, so the source of NOx in the project waste gas is mainly fuel-based NOx. Considering that NOx in flue gas may exceed the standard, SCR denitration device is set, and the denitrifying agent is liquid ammonia, and the flue gas after denitration enters the bag filter. The denitration efficiency of flue gas is more than 80%, and the dust removal efficiency is more than 99%, and the flue gas is evacuated through a 60m-high exhaust funnel after treatment. According to engineering analysis, the emission concentration of all pollutants in the flue gas can meet the requirements of the *Standard for Pollution Control on Hazardous Waste Incineration* (GB18484-2020).

The construction unit shall monitor the main components of the incineration flue gas online, and the installation requirements of online monitoring devices shall be implemented according to the *Administrative Measures for Automatic Monitoring of Pollution Sources* and other regulations, and proofread regularly. Online monitoring results should be publicized by electronic billboard and networked with the monitoring center of local environmental protection administrative department. On-line monitoring indicators of flue gas should include at least sulfur dioxide, nitrogen oxides, particulate matter, etc.

### 6.1.8 Waste gas treatment measures at sewage treatment stations

The project builds a new wastewater treatment station, and intends to collect odor from odor generating points, such as regulating tank, anoxic tank, aerobic tank and sludge concentration tank, and then treat odor by alkali washing + biofilter method, and the purified gas will be evacuated through 15m-high exhaust funnel to meet the standard.

### 6.1.9 Waste gas treatment measures for heat-conducting oil furnace

The heat-conducting oil furnace is mainly fueled by water gas, and the combustion flue gas is evacuated through a 20m-high chimney. The boiler realizes low-nitrogen combustion technology by installing a low-nitrogen burner. According to engineering analysis, the pollutant emission concentration meets the requirements of the special emission limits for gas boilers in the *Emission Standard of Air Pollutants for Boiler* (GB13271-2014).

**6.2 Preventive measures for wastewater pollution**

The sewage treatment station adopts the combined treatment process of "pretreatment (oil separation/Fenton/neutralization) + hydrolytic acidification + enhanced A/O + secondary sedimentation tank + Fenton post-treatment + high-efficiency sedimentation tank". After pretreatment by septic tank, domestic sewage enters the sewage treatment station and is treated together with production wastewater in order to increase the biochemical properties of wastewater.

After the project wastewater is treated by the combined treatment process, the discharge concentration of each pollutant in the project effluent quality can steadily reach the indirect emission standards and west city sewage treatment factory takeover standards of *Emission Standard of Pollutants for Petroleum Chemistry Industry* (GB31571-2015). It is technically feasible.

**6.3 Preventive measures for solid waste pollution**

Project solid waste storage methods, treatment and disposal methods and disposal cycle are shown in the following table.

**Table 6-1 Detailed Table of the Project Solid Waste Storage and Disposal Cycle**

| 装置<br>Plant | 代号<br>Code | 名称<br>Name | 产生量<br>Output<br>t/a | 危废类别/代码<br>Hazardous waste category/code | 处理处置措施<br>Treatment and disposal measures | 处置周期<br>Disposal cycle |
|---|---|---|---|---|---|---|
| 双氧水<br>Hydrogen peroxide | $S_{1-1}$ | 废钯触媒<br>Waste palladium catalyst | 2.8 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 2 年 1 次<br>Once every two years |
| | $S_{1-2}$ | 废活性氧化铝<br>Waste activated alumina | 2960 | / | 外售综合利用<br>Sold to outside for comprehensive utilization | 4 月 1 次<br>Once every four months |
| | $S_{1-3}$ | 废吸附树脂<br>Waste adsorption resin | 19.8 | HW13<br>900-016- 13 | 交有资质单位处置<br>to be disposed by a qualified organization | 3 年 1 次<br>Once every three years |
| | $S_{1-4}$ | 废活性炭<br>Waste activated carbon | 29.3 | HW49<br>900-039-49 | 交有资质单位处置<br>to be disposed by a qualified organization | 3 月一次<br>Once every three months |
| | $S_{1-5}$ | 甲醇精馏废液<br>Methanol distillation waste liquid | 4800 | HW11<br>900-013- 11 | 焚烧装置处理<br>Incineration device treatment | 1 日 1 次<br>Once a day |
| 硫酸<br>Sulphuric acid | $S_{2-1}$ | 过滤废渣<br>Filter waste residue | 1752 | / | 外卖给硫铁矿制酸企业<br>Sold out to sulfur iron ore acid enterprises | 1 周 1 次<br>Once a week |
| | $S_{2-2}$ | 废催化剂<br>Waste catalyst | 20 | HW50<br>261- 173-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 1 年 1 次<br>Once a year |
| 己内酰胺<br>CPL | $S_{3-1}$ | 废肟化催化剂<br>Waste oximation catalyst | 20 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 间歇<br>Intermittent |

| | | | | | | |
|---|---|---|---|---|---|---|
| | $S_{3-2}$ | 浓缩废液<br>Concentrated waste liquid | 42550 | HW11<br>900-013- 11 | 焚烧处置<br>Incineration disposal | 1日 1次<br>Once a day |
| | $S_{3-3}$ | 废加氢催化剂<br>Waste hydrogenation catalyst | 80 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 1年 1次<br>Once a year |
| 聚合 6<br>Polymerization 6 | $S_{4-1}$ | 切粒机废带条<br>Waste strips of pelletizer | 227 | / | 外售综合利用<br>Sold to outside for comprehensive utilization | 1日 1次<br>Once a day |
| | $S_{4-2}$ | 布袋除尘器收集粉尘<br>Dust collected by a bag dirt remover | 200 | / | 外售综合利用<br>Sold to outside for comprehensive utilization | 1月 1次<br>Once a month |
| | $S_{4-3}$ | MVR 过滤滤渣<br>MVR filter residue | 320 | / | 外售综合利用<br>Sold to outside for comprehensive utilization | 1日 1次<br>Once a day |
| 环己醇<br>Cyclohexanol | $S_{5-1}$ | 苯预处理废催化剂<br>Benzene pretreatment waste catalyst | 80 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 1年 1次<br>Once a year |
| | $S_{5-2}$ | 苯部分加氢废催化剂<br>Benzene partial hydrogenation waste catalyst | 1.44 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 1年 1次<br>Once a year |
| | $S_{5-3}$ | 环己烯水合废催化剂<br>Cyclohexene hydration waste catalyst | 104 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 1年 1次<br>Once a year |
| | $S_{5-4}$ | 环己烷处理废催化剂<br>Cyclohexane treatment waste catalyst | 4.8 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 1年 1次<br>Once a year |
| | $S_{5-5}$ | 蒸馏残渣<br>Distillation residue | 117 | HW11<br>900-013- 11 | 去焚烧装置<br>De-incineration device | 1周 1次<br>Once a week |
| 环己酮<br>Cyclohexanone | $S_{6-1}$ | 脱氢废催化剂<br>Dehydrogenation waste catalyst | 150 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 2年 1次<br>Once every two years |
| 己二酸 | $S_{7-1}$ | 废活性炭 | 177 | HW49<br>900-039-49 | 交有资质单位处 | 1年 1次 |

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| Adipic acid | | Waste activated carbon | | | 置<br>to be disposed by a qualified organization | Once a year |
| | $S_{7-2}$ | 废树脂<br>Waste resin | 144 | HW13<br>900-016- 13 | 交有资质单位处置<br>to be disposed by a qualified organization | 1周 1次<br>Once a week |
| 己二腈<br>Adiponitrile | $S_{8-1}$ | 底部焦油<br>Bottom tar | 9419 | HW11<br>900-013- 11 | 焚烧处理<br>Incineration treatment | 1日 1次<br>Once a day |
| | $S_{8-2}$ | 过滤滤渣<br>Filter residue | 12 | HW11<br>900-013- 11 | 焚烧处理<br>Incineration treatment | 1日 1次<br>Once a day |
| | $S_{8-3}$ | ICCP 晶体<br>ICCP crystal | 444 | HW11<br>900-013- 11 | 焚烧处理<br>Incineration treatment | 1日 1次<br>Once a day |
| | $S_{8-4}$ | 轻组分<br>Light component | 2770 | HW11<br>900-013- 11 | 焚烧处理<br>Incineration treatment | 1日 1次<br>Once a day |
| 己二胺<br>Hexanediamine | $S_{9-1}$ | 废催化剂<br>Waste catalyst | 784 | HW50<br>261- 152-50 | 交有资质单位处置<br>to be disposed by a qualified organization | 1年 1次<br>Once a year |
| | $S_{9-2}$ | 过滤滤渣<br>Filter residue | 120 | HW11<br>900-013- 11 | 焚烧处理<br>Incineration treatment | 1日 1次<br>Once a day |
| | $S_{9-3}$ | 底部焦油<br>Bottom tar | 2366 | HW11<br>900-013- 11 | 焚烧处理<br>Incineration treatment | 1日 1次<br>Once a day |
| | $S_{9-4}$ | 轻组分<br>Light component | 2858 | HW11<br>900-013- 11 | 焚烧处理<br>Incineration treatment | 1日 1次<br>Once a day |
| 尼龙 66<br>Nylon 66 | $S_{10-1}$、<br>$S_{10-2}$ | 切粒水槽过滤废渣<br>Filtering waste residue in pelletizing sink | 6087 | / | 外售综合利用<br>Sold to outside for comprehensive utilization | 1周 1次<br>Once a week |
| | $S_{10-3}$ | 氮气再生过滤废渣<br>Nitrogen regeneration filters | 13 | / | 外售综合利用<br>Sold to outside for comprehensive utilization | 1周 1次<br>Once a week |

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| | | waste residue | | | | |
| 公辅工程 auxiliary engineering | / | 废活性炭 Waste activated carbon | 207 | HW49 900-039-49 | 交有资质单位处置 to be disposed by a qualified organization | 1周 1次 Once a week |
| | / | 焚烧炉过滤废渣 Waste residue filtered by incinerator | 6.55 | HW49 772-006-49 | 交有资质单位处置 to be disposed by a qualified organization | 1月 1次 Once a month |
| | / | 焚烧炉灰渣及飞灰 Incinerator ash and fly ash | 241.7 | HW18 772-003- 18 | 交有资质单位处置 to be disposed by a qualified organization | 1月 1次 Once a month |
| | / | 废脱硝催化剂 Waste denitrification catalyst | 40 | HW50 772-007-50 | 交有资质单位处置 to be disposed by a qualified organization | 3月 1次 Once every three months |
| | / | 污水处理站污泥 Sewage treatment station sludge （干基） (Dry basis) | 1621 | / | 鉴定后处置 Post-appraisal disposal | 1周 1次 Once a week |
| | / | 废包装材料 Waste packaging materials | 5 | HW49 900-041-49 | 交有资质单位处置 to be disposed by a qualified organization | 1周 1次 Once a week |
| | / | 检验废液、废试剂瓶、废手套等 Inspection of waste liquid, waste reagent bottles, waste gloves, etc. | 3 | HW49 900-047-49 | 交有资质单位处置 to be disposed by a qualified organization | 3月 1次 Once every three months |
| | / | 检修废油 Inspection and repair of waste oil | 100 | HW08 900-214-08 | 交有资质单位处置 to be disposed by a qualified organization | 1周 1次 Once a week |
| | / | 废油桶 Waste oil drum | 10 | HW08 900-249-08 | 交有资质单位处置 to be disposed by a qualified organization | 1周 1次 Once a week |
| | / | 废导热油 Waste heat conducting oil | 700 | HW08 900-249-08 | 交有资质的厂家回收并处置 to be disposed by a qualified organization | 5年 1次 Once every five years |
| | / | 生活垃圾 | 424 | / | 委托环卫清收 | 1周 1次 |

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| | | Domestic waste | | | Entrusted to the sanitation workers for cleaning | Once a week |

### 6.4 Preventive measures for noise pollution

The noise sources of the project are mainly mechanical noise and aerodynamic noise, among which the mechanical noise is mainly produced by solid vibration, and the mechanical noise sources of the project mainly include polymerization kettle, twin-screw extrusion, etc.; Aerodynamic noise is mainly produced by gas vibration, and the main source of aerodynamic noise in the project are fans and so on.

(1) The measures taken against mechanical noise mainly include:

In the selection of equipment, firstly, advanced low-noise equipment should be selected, and appropriate noise reduction measures should be taken, such as setting gaskets on the foundation of the unit to isolate it from the building structure, so as to reduce the influence of noise from the source;

Reasonable arrangement of noise-producing equipment, make noise-producing equipment as far away from the factory boundary as possible, so that the distance between equipment and factory boundary is > 10m;

Strengthen the maintenance of equipment to ensure good lubrication and reduce the surface roughness of the bonding surface of the relative moving parts, so that the equipment is in the best working state;

Various pumps are set up in the pump house, with sound insulation enclosures and vibration reduction bases. The pump body and the water supply pipe are connected by soft joints;

Elastic support is adopted at the place where the pipeline contacts with the wall, and elastic cushion is installed in the through-wall pipeline. Excavate a low concrete foundation, and connect the pump base with the foundation by ZGT damping steel spring vibration reduction apparatus.

(2) The measures taken against aerodynamic noise mainly include:

Silencers for the import and export of various fans; Adopt isolation arrangement, all adopt vibration reduction bases, and adopt flexible joints at joints;

In the design of equipment and pipeline, attention should be paid to anti-vibration and anti-impact to reduce vibration and noise, and attention should be paid to improving the flow field during gas transportation to reduce aerodynamic noise;

Strengthen and improve auxiliary noise reduction measures such as greening roads and factory areas. On both sides of the road, around the main plant and near other sound sources, plant as many tall trees as possible, using the noise reduction effect of plants to reduce the noise level, reducing the noise by about 3-5dB (A).

According to different noise equipment, the project adopts targeted noise control measures, such as foundation vibration damping, flexible interface and other measures. Through a reasonable layout to reserve sufficient attenuation distance, adopting advanced equipment, installing silencers and other measures to ensure that the factory boundary noise to meet the requirements of Class 3 standard of the *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008).

### 6.5 Preventive measures for groundwater and soil pollution

In this project, measures, such as source prevention, process blocking and zoning prevention and control, are taken to formulate emergency response plans for groundwater risk accidents, specify the measures to be taken in the state of risk accidents, such as closure and interception, and propose specific plans to prevent the diffusion of contaminated groundwater and to treat the contaminated groundwater. With the above measures, groundwater can be effectively prevented from being affected.

## 7. Conclusions

The construction of amide and nylon new materials project of Hubei Sanning Chemical Industry Co., Ltd. conforms to the national industrial policy and the relevant planning requirements of relevant local departments. The project adopts domestic advanced cleaner production technology. In the case of implementing the pollution prevention and control measures determined in this evaluation, the pollutant emissions in waste gas and waste water can meet the requirements of national emission standards, and solid waste can be utilized or disposed reasonably. From the perspective of environmental protection, this project is feasible.

The report is translated on Sep. 23rd 2022 by a certified company with license as below.

The Chinese name of the company is 甲骨易（北京）语言科技股份有限公司. The English company name is China Besteasy

统一社会信用代码

91110102767512562K

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（副 本）(1-1)

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类 型 股份有限公司(非上市、自然人投资或控股)

法定代表人 姜征

经营范围 技术开发、技术转让、技术咨询、技术服务、技术推广；软件开发；经济贸易咨询；数据处理（数据处理中的银行卡中心、PUE值在1.4以上的云计算数据中心除外）；版权代理；市场调查；会议服务；设计、制作、代理、发布广告；专业设计服务；销售计算机、软件及辅助设备；翻译服务；影视策划；文艺创作；企业管理咨询；承办展览展示；组织文化艺术交流活动（不含演出）；应用软件服务；计算机系统服务；建设工程项目管理；广播电视节目制作经营。（市场主体依法自主选择经营项目，开展经营活动；广播电视节目制作经营以及依法须经批准的项目，经相关部门批准后依批准的内容开展经营活动；不得从事国家和本市产业政策禁止和限制类项目的经营活动。）

注册资本 1000万元

成立日期 2004年10月12日

营业期限 2004年10月12日至 长期

住 所 北京市顺义区南彩镇彩达二街2号12-113

登记机关

2021 年 10 月 21 日

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