

# Environmental Checklist: 9. Chemical Manufacturing (1)

Category	Environmental Item	Main Check Items	Confirmation of Environmental and Social Considerations
-	Outline of the Project	(Example) <ul style="list-style-type: none"> <li>- Outline of production/operation process and main facilities/infrastructure</li> <li>- Overview of the project site</li> <li>- Project schedule</li> <li>- Results of alternatives analyses</li> <li>- Environmental legal framework applicable to the project</li> </ul>	
1. Permits and Approvals, Explanations/ consultations	(1) ESIA and Environmental Permits	① Have ESIA reports been officially completed? Have ESIA reports been written in the official language or a language widely used in the host country? ② Have ESIA reports been approved by the government of the host country? ③ Are the conditions for approval of the ESIA reports satisfied by appropriate actions? ④ In addition to the above approvals, will the project obtain or have obtained other required environmental permits from the appropriate regulatory authorities of the host country's government?	
	(2) Consultation with the Public	① Is the project accepted in a manner that is socially appropriate to the country and locality throughout the preparation and implementation stages of the project based on sufficient consultations with stakeholders, such as local residents, conducted via disclosure of project information and potential impacts? ② Are consultations with affected people held in a two-way process free of external manipulation, interference, coercion, or intimidation? ③ Are the records of such consultations with the stakeholders, such as local residents, prepared? ④ Are the written materials for the disclosure prepared in a language and form understandable to the local residents? ⑤ Are ESIA reports available at all times for perusal by stakeholder such as local residents, and copying of the reports permitted? ⑥ Are proper responses made to comments from the public and regulatory authorities? ⑦ Have the project proponents established a point of contact for complaints in order to receive complaints from the third parties at an early stage and to promote their resolution?	

Environmental Checklist: 9. Chemical Manufacturing (2)

Category	Environmental Item	Main Check Items	Confirmation of Environmental and Social Considerations
2. Anti-pollution Measures	(1) Air Quality	<p>① Throughout construction and operation period, are air pollutants, such as sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>) and particulate matter (PM) emitted from the project adequately controlled? Does the emission from the project comply with the host country's emission standards and meet the international standards through suitable emission control measures such as installation of equipment for removal of pollutants and monitoring of exhaust gas?</p> <p>② Are adequate measures taken to prevent air pollution by the leakage of hazardous chemical substances?</p> <p>③ Is there a possibility that air pollutants emitted from the project will cause areas that do not comply with the host country's ambient air quality standards or that do not meet the international ambient air quality standards?</p> <p>④ Are the GHG emissions from the project calculated? Are adequate measures taken to reduce GHG emissions from the project?</p>	
	(2) Water Quality	<p>① Throughout construction and operation period, are adequate measures taken to control pH and pollutants such as BOD, COD, SS and other chemicals (oil and grease) discharged in industrial wastewater, sanitary wastewater and stormwater? Does the quality of wastewater comply with the host country's effluent standards and meet the international standards through suitable effluent control measures, such as installation of wastewater treatment equipment and adequate monitoring?</p> <p>② Are adequate measures taken to prevent contamination of surface water and groundwater by the effluents from storage areas for raw materials, chemicals, intermediate products, final products and wastes?</p> <p>③ Are adequate measures taken to prevent contamination of surface water and groundwater by wastewater and effluents? Is there a possibility that the effluents from the project will result in polluted waterbody that do not comply with the local ambient water quality standards of the host country, or do not meet the international water quality standards?</p>	
	(3) Waste	<p>① Throughout construction and operation period, are adequate measures taken to reduce the amount of waste as much as possible, and recycle if feasible?</p>	

# Environmental Checklist: 9. Chemical Manufacturing (3)

Category	Environmental Item	Main Check Items	Confirmation of Environmental and Social Considerations
		<p>② Throughout construction and operation period, are municipal waste, hazardous wastes and other industrial wastes generated from various facilities properly stabilized when necessary, treated and disposed of in accordance with the laws and regulations of the host country?</p> <p>③ When hazardous waste disposal is conducted by third parties, will the client use contractors that are reputable and legitimate enterprises licensed by the relevant government regulatory agencies and obtain chain of custody documentation to the final destination?</p>	
	(4) Soil Contamination	<p>① Has the soil at the project site been contaminated in the past by previous users? If so, are adequate measures taken to prevent health hazard by contaminated soil and groundwater?</p> <p>② Throughout construction and operation period, are adequate measures taken to prevent soil contamination by the leaching and seepage of raw materials, products, fuels, chemicals, waste leachate or any other substance?</p> <p>③ Is soil survey carried out before the construction of landfill or embankment in order to prevent bringing in contaminated soil?</p> <p>④ Is soil survey carried out before the shipment of surplus soil generated from construction activities?</p>	
	(5) Noise and Vibration	<p>① Are adequate measures taken to control noise and vibration during construction and operation at site by soundproofing and vibration damping that comply with the host country's standard and meet the international regulation?</p> <p>② In order to prevent noise pollution generated by the traffic of heavy-duty trucks that transport construction materials, raw materials and products, are adequate measures taken such as strict routing to avoid residential areas, speed limit and load monitoring?</p>	
	(6) Subsidence	<p>① Is the land at the project site designated for subsidence monitoring due to groundwater overdraft?</p> <p>② Throughout construction and operation period, if any incident of subsidence arises by the overdraft of groundwater, would adequate measures be taken to minimize the effects of subsidence by switching water supply and optimizing water usage?</p> <p>③ In case of drilling tunnels or creating large underground cavity, are adequate measures taken to prevent subsidence caused by the lowering of groundwater level, such as soft ground stabilization or application of other proper engineering method?</p>	

Environmental Checklist: 9. Chemical Manufacturing (4)

Category	Environmental Item	Main Check Items	Confirmation of Environmental and Social Considerations
	(7) Odor	① Throughout construction and operation period, are there any odor sources? If so, are adequate odor control measures taken, such as incineration, oxidation, or biological treatment?	
3. Natural Environment	(1) Protected Areas	① Is the land used for the project located in the protected areas designated for biodiversity conservation by the host country's laws or international treaties? Is it located in the habitat of protected species? ② Throughout construction and operation period, is there a possibility that the project will significantly affect the protected areas or the habitat of protected species?	
	(2) Ecosystem and Biota	① Does the project cause significant conversion or significant degradation of ecologically important habitats including habitats for endangered species, endemic species and important migratory species? ② Does the project involve significant conversion or degradation of natural habitats? If so, is it prioritized to avoid the impact? If the impact is unavoidable, will the adequate mitigation measures be taken? ③ Will the evaluation of the impacts on natural habitats by the project and consideration for the offset measures be carried out based on expert opinion? ④ Is the illegal logging of the forest avoided? ⑤ Is there a possibility that the amount of water (e.g. surface water, groundwater) used by the project will adversely affect the ecosystem of the surrounding aquatic environments such as rivers and lakes? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms? ⑥ Throughout construction and operation period, if any adverse impact on ecosystem is expected, will adequate measures be taken to reduce the impacts on ecosystem?	
	(3) Topography and Geology	① Is there a possibility that the installation of structures will cause a large-scale alteration of topographic features and geological structures around the project site?	
4. Social Environment	(1) Resettlement	① Are involuntary resettlement and loss of means of livelihoods caused by project implementation avoidable? Where involuntary resettlement is unavoidable, have appropriate measures been taken to mitigate and minimize adverse impacts on displaced persons and host communities? ② Are the people affected by the project provided with sufficient compensation and support to improve their standard of living, income opportunities and production levels or at least to restore them to pre-	

# Environmental Checklist: 9. Chemical Manufacturing (5)

Category	Environmental Item	Main Check Items	Confirmation of Environmental and Social Considerations
		<p>project levels? Also, is prior compensation at full replacement cost provided as much as possible? Also, is the compensation standard for the affected people applied with transparency and consistency?</p> <p>③ Is appropriate participation by the people affected and their communities promoted in planning, implementing and monitoring involuntary resettlement action plans and measures against the loss of their means of livelihood? In addition, have appropriate and accessible grievance mechanisms been established for the people affected and their communities?</p> <p>④ For projects that will result in large-scale involuntary resettlement or large-scale loss of means of livelihood, have resettlement action plans or livelihood restoration plans respectively been prepared and made available to the public? Does the resettlement action plan or the livelihood restoration plan include elements required in the standard of the international financial institution, which JBIC benchmarks in its environmental review?</p> <p>⑤ When preparing a resettlement action plan or a livelihood restoration plan, have consultations made with the affected people and their communities based on sufficient information made available to them in advance? When consultations are held, are explanations given in a form, manner and language that are understandable to the affected people?</p> <p>⑥ Has appropriate consideration been given to vulnerable social groups, such as women, children, the elderly, the poor and indigenous peoples in the resettlement action plan?</p> <p>⑦ Are agreements with the affected people obtained prior to the resettlement?</p> <p>⑧ Is the organizational structure established to properly implement resettlement? Are the capacity and budget secured to implement the resettlement action plan?</p> <p>⑨ Is there any plan developed to monitor the impacts of resettlement? Are the people affected and their communities properly encouraged to participate in the monitoring process?</p>	
	(2) Living and Livelihood	<p>① Is there a possibility that the project will adversely affect the living conditions and the livelihood of inhabitants in the neighborhood? Are adequate measures taken to mitigate the potential negative impacts?</p> <p>② Is there a possibility that the amount of water used (e.g. surface water, groundwater) by the project will adversely affect the existing water uses and water area uses? If so, are adequate measures taken to mitigate the potential negative impacts?</p>	

# Environmental Checklist: 9. Chemical Manufacturing (6)

Category	Environmental Item	Main Check Items	Confirmation of Environmental and Social Considerations
		<p>③ Does the project affect the baseline ecosystem services that support the foundation of local community's livelihood? If so, are adequate measures taken to mitigate the potential negative impacts?</p> <p>④ Has appropriate consideration been implemented to vulnerable social groups, such as women, children, the elderly, the poor and indigenous peoples?</p>	
	(3) Heritage	① Is there a possibility that the project will damage the local archeological, historical, cultural and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the host country's laws?	
	(4) Landscape	① Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	
	(5) Ethnic Minorities and Indigenous Peoples	<p>① Are the impacts to indigenous peoples avoidable by project implementation? If unavoidable, are efforts made to minimize the impacts and to compensate for their losses?</p> <p>② If the project has adverse impacts on indigenous peoples' various rights in relation to land and natural resources, is such rights respected?</p> <p>③ Is the indigenous peoples plan prepared and made public? Does the indigenous peoples plan include elements required in the standard of the international financial institution benchmarked in its environmental reviews?</p> <p>④ In preparing the indigenous peoples plan, is consultation made with the affected indigenous peoples based on sufficient information made available to them in advance and are explanations given in a form, manner and language that are understandable to them?</p> <p>⑤ Are the free, prior and informed consents of the indigenous peoples obtained?</p>	
	(6) Working Conditions (including occupational safety)	<p>① Is the project proponent not violating any laws and regulations at the host country associated with the working conditions of the direct employees of the project?</p> <p>② Are appropriate human rights considerations in place for the direct employees of the project, such as banning child labor and/or forced labor, implementing anti-discrimination measures and providing equal opportunities?</p> <p>③ In terms of workplace safety and health, are tangible measures taken to prevent occupational hazards of the direct employees such as installation of safety equipment, proper management of hazardous substances, etc.?</p>	

Environmental Checklist: 9. Chemical Manufacturing (7)

Category	Environmental Item	Main Check Items	Confirmation of Environmental and Social Considerations
		<p>④ In terms of workplace safety and health, are intangible measures taken to provide the direct employees of the project with safety training program on traffic safety and public health?</p> <p>⑤ Is a proper internal grievance mechanism established for the direct employees?</p> <p>⑥ Is it confirmed beforehand that a proper internal grievance mechanism and human rights consideration in place for the third parties contracting indirect employees, such as temporary construction workers? Also, is a proper monitoring and management system in place for the third parties to guarantee the human rights of the indirect employees during the terms of contract?</p> <p>⑦ Is there a consistent communication between the project proponent and the primary suppliers to monitor the working conditions of supply chain workers to avoid the risk of child labor and/or forced labor and occupational health and safety issues? In case of aforementioned risk, will the project proponent request supplier to adopt corrective measures? If there is no reasonable prospect for improvement, will the project proponent consider to shift the contract to another supplier that adheres to proper human rights consideration?</p>	
	(7) Community Health, Safety and Security	<p>① Is there a possibility that outbreaks of diseases, including communicable diseases, such as HIV and deterioration of public safety will arise due to influx of workers associated with the project? If negative impacts are expected, are adequate mitigation measures taken to protect public health?</p> <p>② Is there a possibility that large vehicle traffic for transportation of materials, such as construction materials, raw materials and products will cause impacts on traffic in the surrounding areas and impede the movement of inhabitants, and cause risks to pedestrians? If negative impacts are expected, are adequate mitigation measures taken?</p> <p>③ Are appropriate measures including the implementation of education and training being taken to ensure that security guards involved in the project do not violate safety of other individuals involved, or local residents?</p> <p>④ Throughout construction and operation period, is there any prospect for negative impacts over the safety and health of the local community? If so, are adequate mitigation measures taken?</p>	
5. Other	(1) Impacts during Construction	<p>① During construction period, if any negative impact is expected over the natural and social environment besides those already mentioned in the categories in 2. Anti-pollution measures; 3. Natural environment; and 4. Social environment, will adequate measures be implemented?</p>	

## Environmental Checklist: 9. Chemical Manufacturing (8)

Category	Environmental Item	Main Check Items	Confirmation of Environmental and Social Considerations
	(2) Accident Prevention Measures	<p>① Based on the analysis and identification of potential risk of accident in the project, are adequate accident prevention measures in place, such as designing safe environment (eliminating risk of hazards at work places, introducing alternative safer practice); installation of safety equipment and facilities; preparation of safety procedures; installation of safety signs; designating emergency exits and evacuation spaces, etc.? Are those safety procedures periodically reviewed and updated?</p> <p>② Are adequate accident prevention measures in place, including assignment of safety and health manager, establishing monitoring system, periodical maintenance of facilities, provision of safety education and training to workers?</p> <p>③ Is there a comprehensive mitigation plan developed, based on the analysis and identification of potential risk of accidents at the project site and the surrounding area that may be caused by emergency such as flooding, drought, earthquake, tsunami and any other climate related hazards?</p>	
	(3) Monitoring	<p>① Do the monitoring programs and environmental management plans of the project include appropriate quantitative/qualitative indicators, which serve as the basis for periodical performance evaluation?</p> <p>② Does the project proponent properly follow the legal requirements when reporting to the regulatory authority?</p> <p>③ Does the project proponent plan to disclose the monitoring results to the stakeholders of the project?</p>	
6. Notes	(1) Reference to Checklists of Other Sectors	<p>① For petrochemical manufacturing projects, the Petrochemicals checklist should be used.</p> <p>② Where necessary, pertinent items described in the Ports and Harbors checklist should also be checked (e.g. projects including construction of ports and harbor facilities).</p>	
	(2) Notes on Using Environmental Checklists	<p>① If necessary, the impacts to transboundary or global issues should be evaluated (e.g. In case the project causes problems, such as negative effects on international river basin, transboundary waste shipments, acid rain, destruction of the ozone layer and global warming).</p> <p>② The chemicals used in chemical manufacturing differ depending on the specific process configuration. It should be confirmed that adequate environmental protection measures, including wastewater treatment for each process are implemented.</p>	

1) Regarding the Standards for Confirmation of Appropriateness of Environmental and Social Considerations, confirm the background and rationale for deviation and the measures to rectify it if necessary, when the environmental and social considerations of the project substantially deviate from the World Bank Environmental and Social Standards or IFC Performance Standards and a

## Environmental Checklist: 9. Chemical Manufacturing (9)

relevant section of EHS Guidelines, and also where appropriate compare with the standards established by other international financial institutions, other internationally recognized standards, and/or standards or good practices established by developed countries such as Japan, in addition to environmental laws and standards of the host country and local governments concerned. For standards that current regulations in the host country has not been established, examine by comparison with the international standards such as the World Bank Environmental and Social Standards and the standards of developed countries such as Japan.

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete items taking into account the characteristics of the project and the particular circumstances of the country and locality, including the direct and immediate impact of projects, derivative, secondary, cumulative impact and impact of associated facilities and the impact throughout the life cycle of the project.