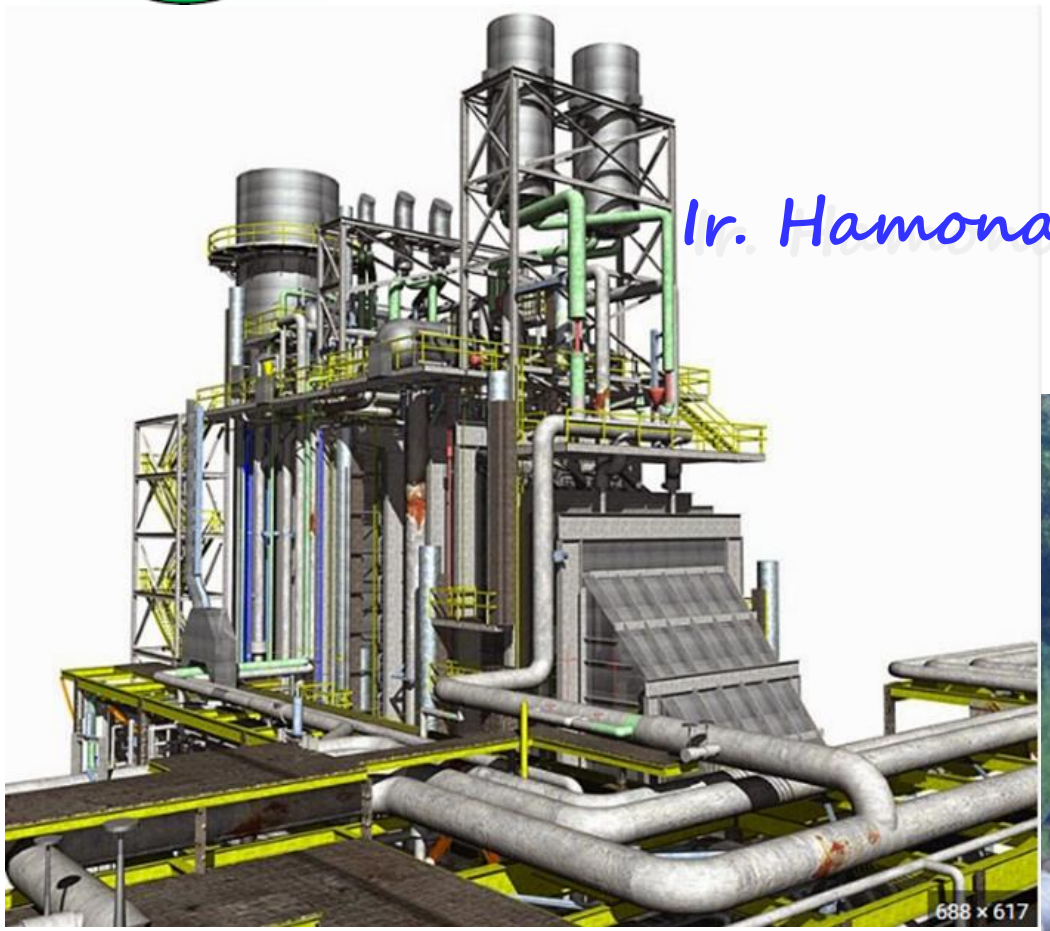
IDENTIFIKASI RISIKO PADA PROYEK OIL & GAS

Ir. Hamonangan Girsang, ST., MT., IPU., ACPE.



Jakarta, 30 April 2024

Short Resume

Ir. Hamonangan Girsang, ST.,MT.,IPU.,ACPE.

- Profession Engineer (Profesi Ir), ITB, Bandung.
- Master Degree CE, Project Management, UI, Depok.
- Bachelor Degree Civil Engineering, ULM, Banjarmasin

- PM – PT. AMYTHAS
- Dosen Teknik Sipil Universitas Mercubuana
- Asesor LAM Teknik
- Penilai Ahli LPJK-PUPR

Short Resume

Ir. Hamonangan Girsang, ST.,MT.,IPU.,ACPE.

- ASEAN Chartered Professional Engineer (ACPE)
- Executive Engineers Profession (IPU)
- Sertifikat Keahlian (SKA) Project Managemet – Utama
- Certificate Competence (SKK) Building Engineer – level 9
- Engineer Registration Certificate (STRI)
- Competence certificate Planning and Execution of Coal Power Plant (PLTU)
- Competence certificate Planning and Execution of Hydropower Plant (PLTA)
- Assesor LAM Teknik

- Persatuan Insinyur Indonesia [PII]

...??

Kemungkinan terjadinya peristiwa

Yang membawa akibat yang tidak diinginkan atas:

Tujuan
Strategi
Sasaran
Target

Tingkat Risiko (Level Risiko) atau Eksposur Risiko

Tinggi rendahnya risiko diukur berdasarkan:

Kemungkinan (likelihood)
Seberapa besar kemungkinan risiko itu dapat terjadi?

Akibat (Consequences)
Seberapa besar akibat yang timbul bila risiko itu benar-benar terjadi?

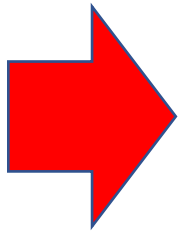
An uncertain event or condition that, if it occurs, negative effect on a project objective

Suatu peristiwa atau keadaan yang belum pasti, dan bila terjadi akan memberikan pengaruh negatif terhadap sasaran proyek

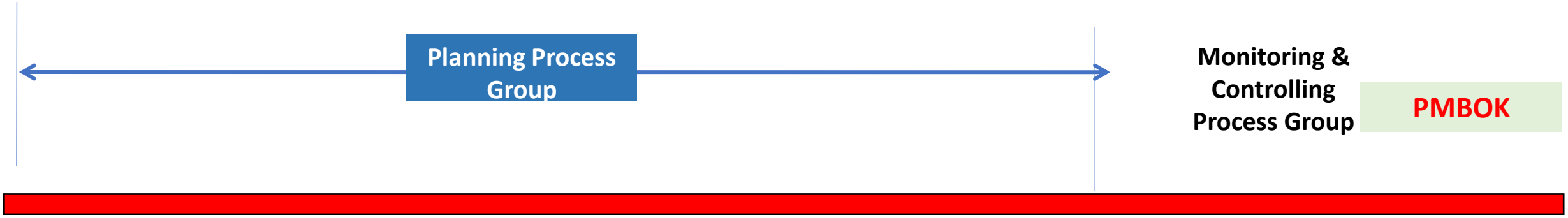
Contoh: Suatu risiko dikategorikan tinggi bila besar akibatnya dan besar kemungkinan terjadinya

Pengelolaan Risiko meliputi :

1. Menetapkan sasaran
2. Identifikasi Risiko
3. Melakukan Asesmen Risiko (Penilaian Risiko)
    a. Menganalisis Risiko
    b. Mengevaluasi Risiko
4. Memberi Tanggapan & Perlakuan atas Risiko
    a. Menerima Risiko
        1. Mempertahankan Risiko
    b. Tidak Menerima Risiko
        1. Mengurangi Kemungkinan (Likelihood)
        2. Mengurangi Akibat (Consequences)
        3. Men-transfer Risiko ke Pihak Lain
        4. Menghindari Risiko
5. Memantau dan Mengkaji-Ulang
6. Komunikasi dan Konsultansi
7. Menyusun Dokumentasi



Process Risk Management



ISO 31000 : Standar Internasional Manajemen Risiko

Enterprise Risk Management (ERM)

AS/NZS 3460:1999
STANDARDS AUSTRALIA

Identifikasi risiko

Pendekatan-pendekatan yang digunakan untuk mengidentifikasi risiko meliputi:

- ✓ **Checklist**
- ✓ **Pertimbangan berdasarkan pengalaman dan catatan**
- ✓ **Flow chart**
- ✓ **Tukar pikiran (brainstorming)**
- ✓ **Analisis sistem**
- ✓ **Analisis skenario**
- ✓ **Teknik rekayasa sistem**

Identifikasi risiko

Setelah mengidentifikasi sebuah daftar kejadian,

- ✓ **Perlu untuk mempertimbangkan penyebab dan skenario yang mungkin.**
- ✓ **Ada banyak jalan awal mula sebuah kejadian.**
- ✓ **Penting untuk tidak menghilangkan satupun sebab-sebab signifikan**

Identifikasi risiko

Apa?

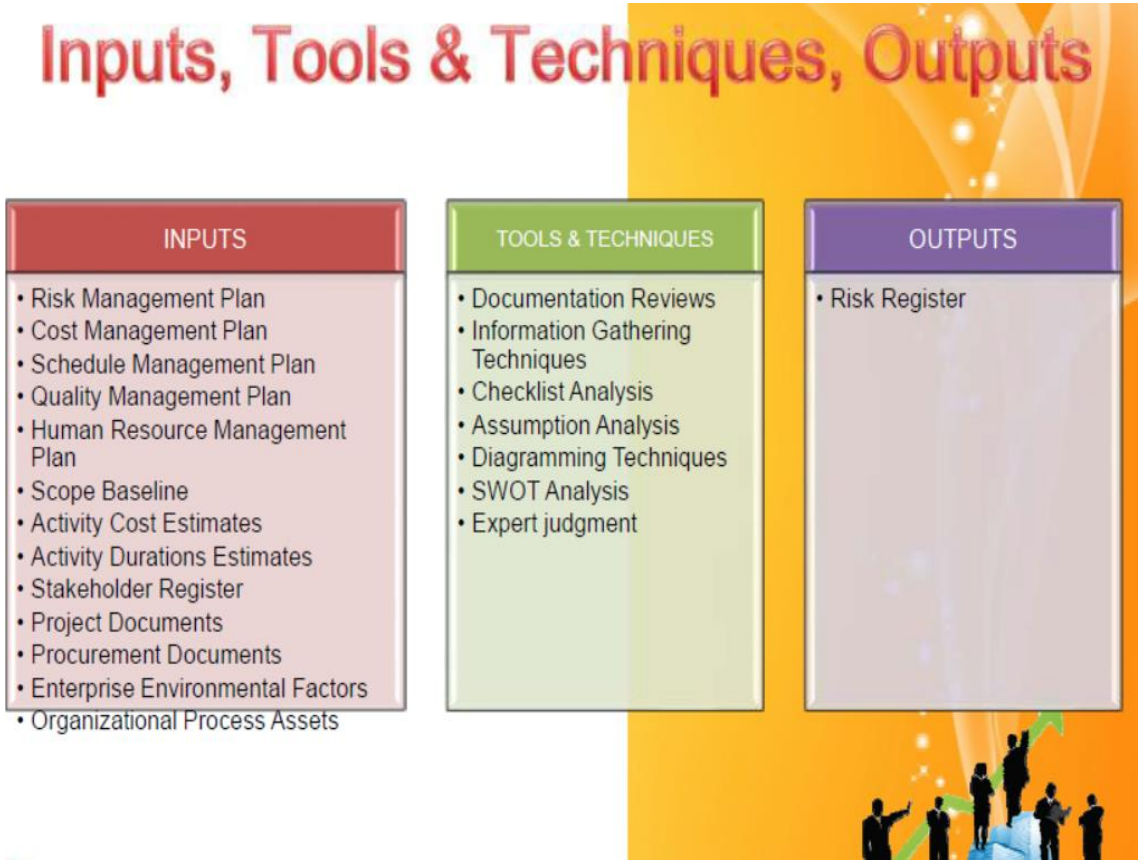
mengidentifikasi seluruh risiko yang harus dikelola

Cara?

melalui proses yang sistematis dan terstruktur

Hasil?

Daftar risiko yang komprehensif



Identifikasi risiko

Diagram Fish Bone / Diagram Sebab Akibat

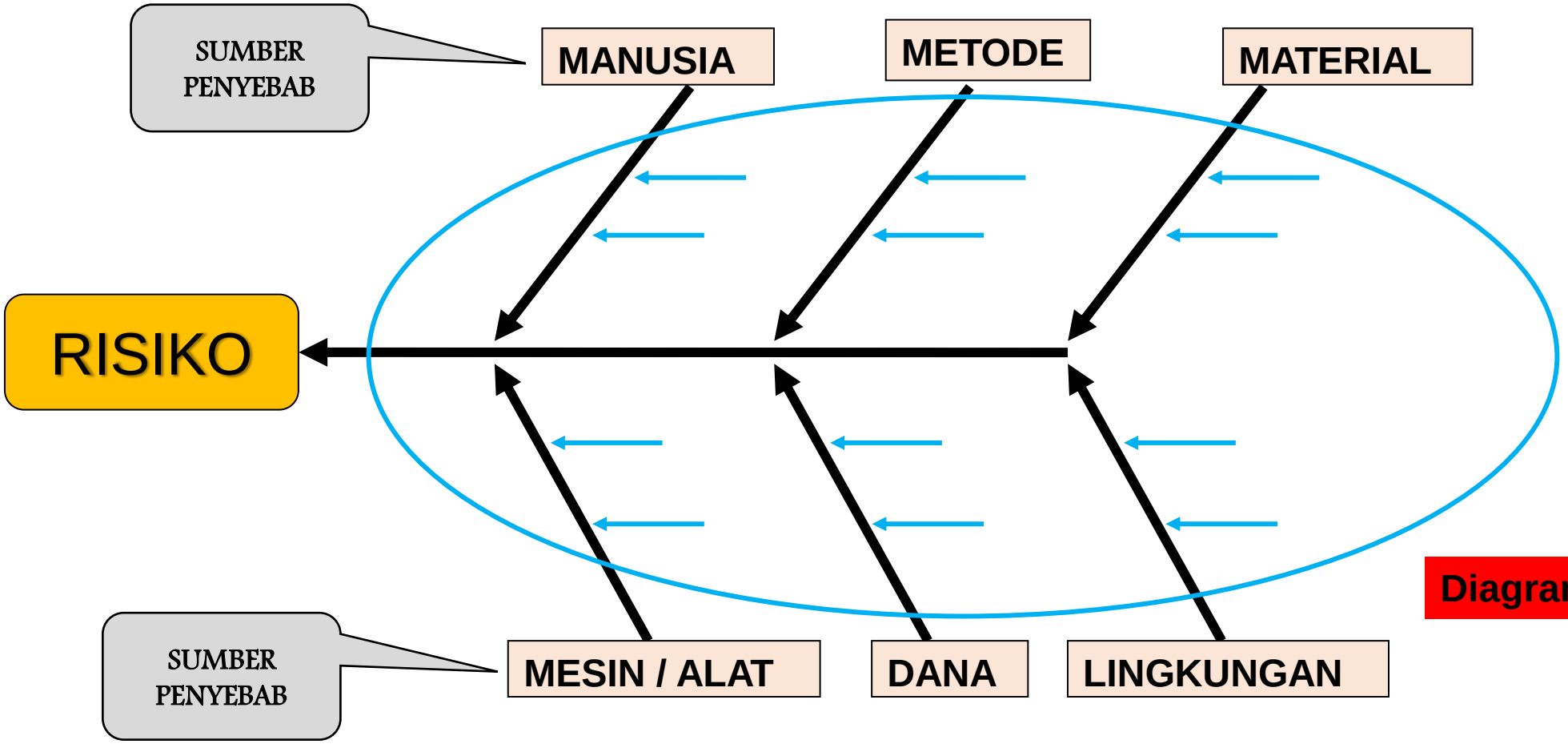
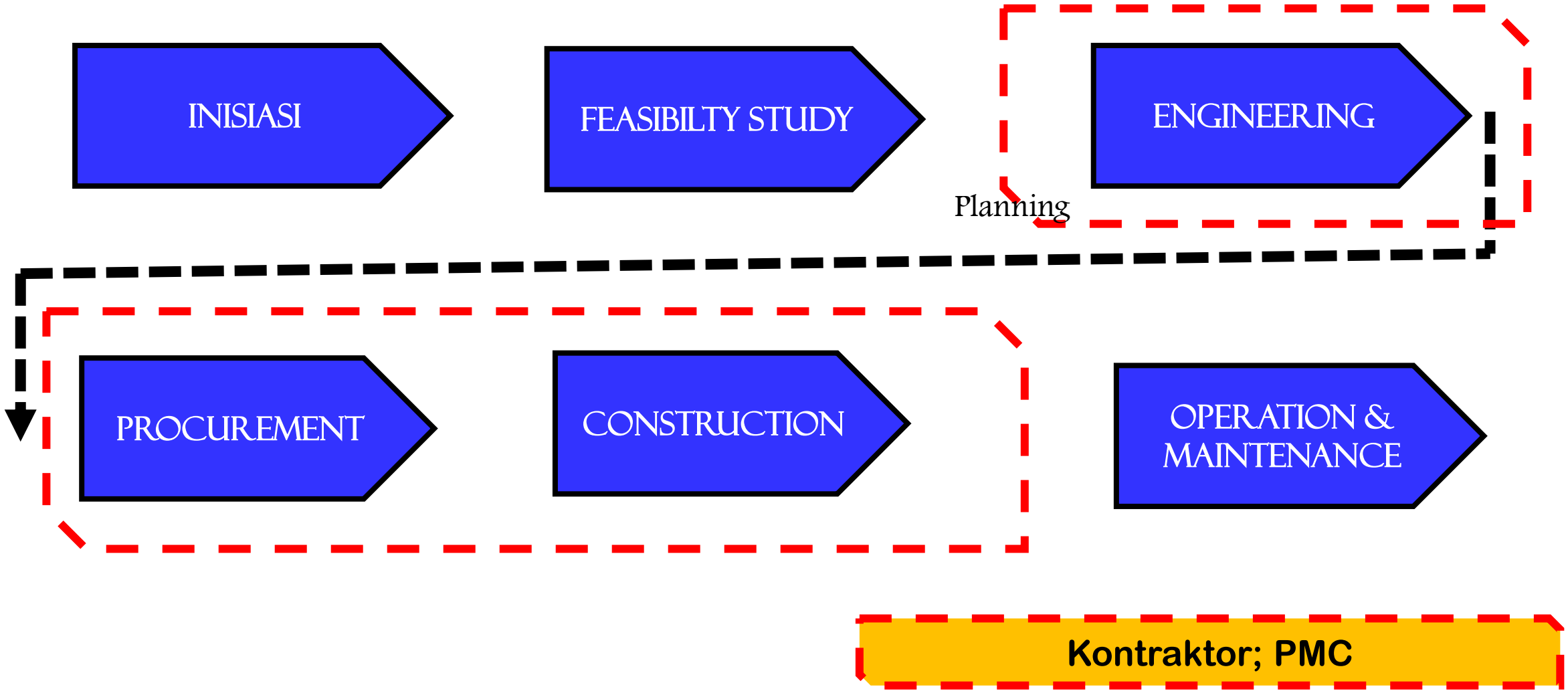
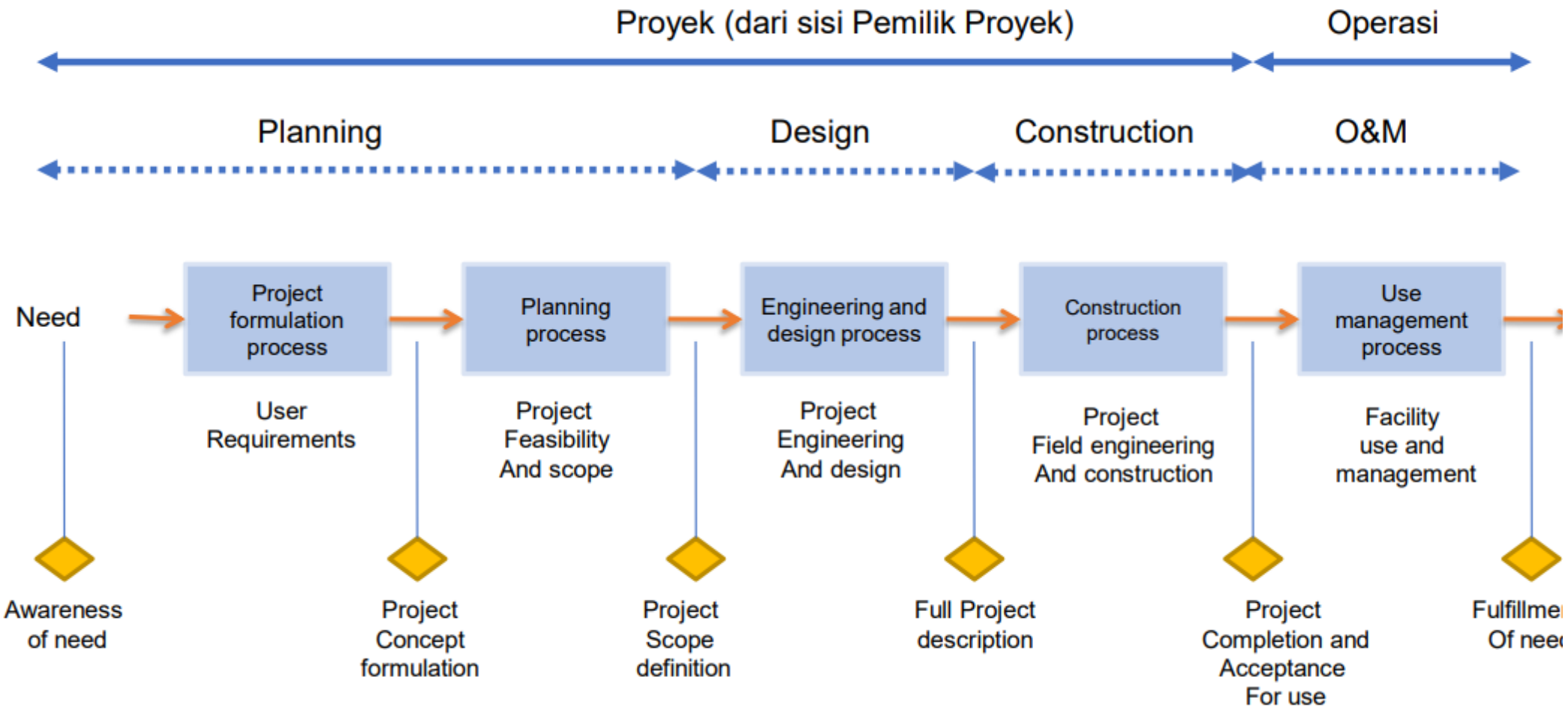


Diagram Ishikawa

Siklus Project Konstruksi



Siklus Project Konstruksi



Identifikasi Risiko

ENGINEERING

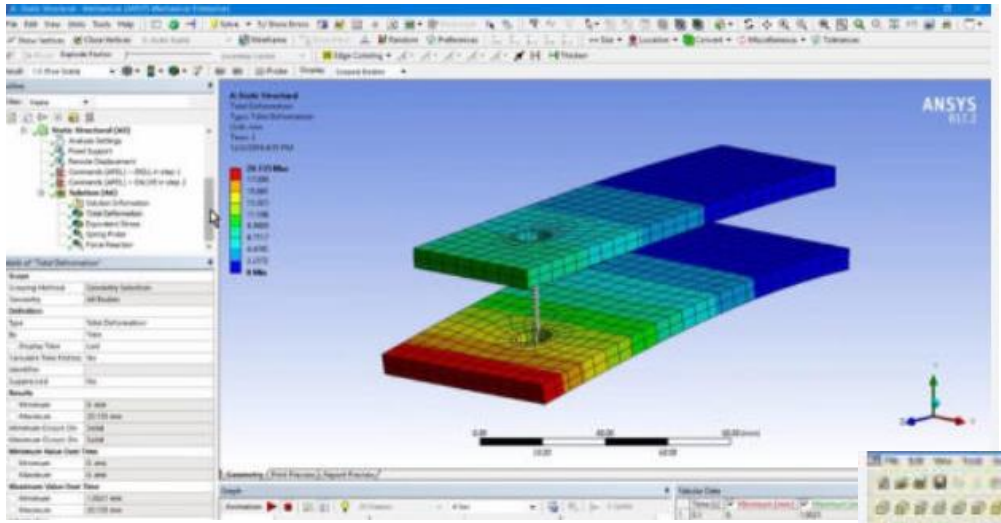
PROCESS DESIGN

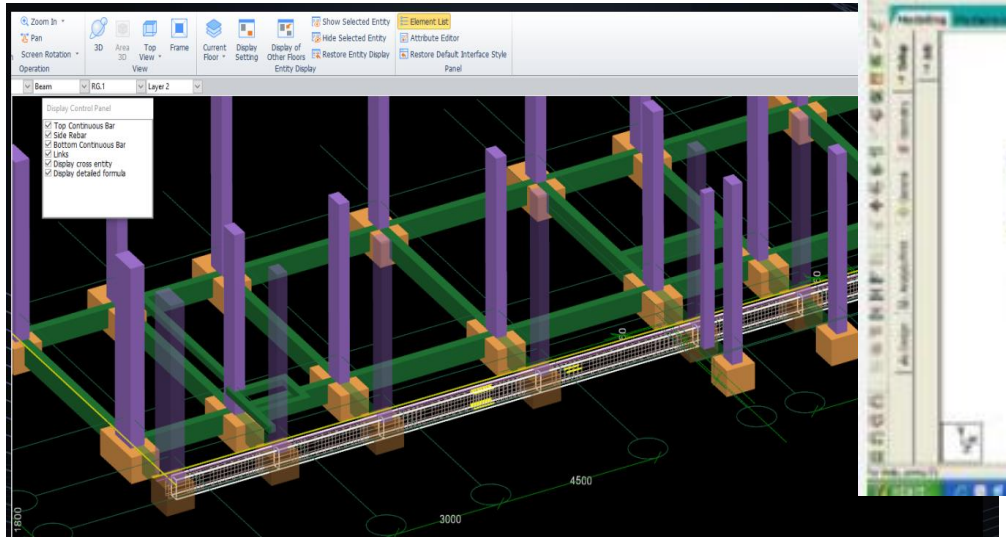
PERISTIWA APA YANG MUNGKIN TERJADI PADA SETIAP TAHAPAN PROSES DESIGN ?

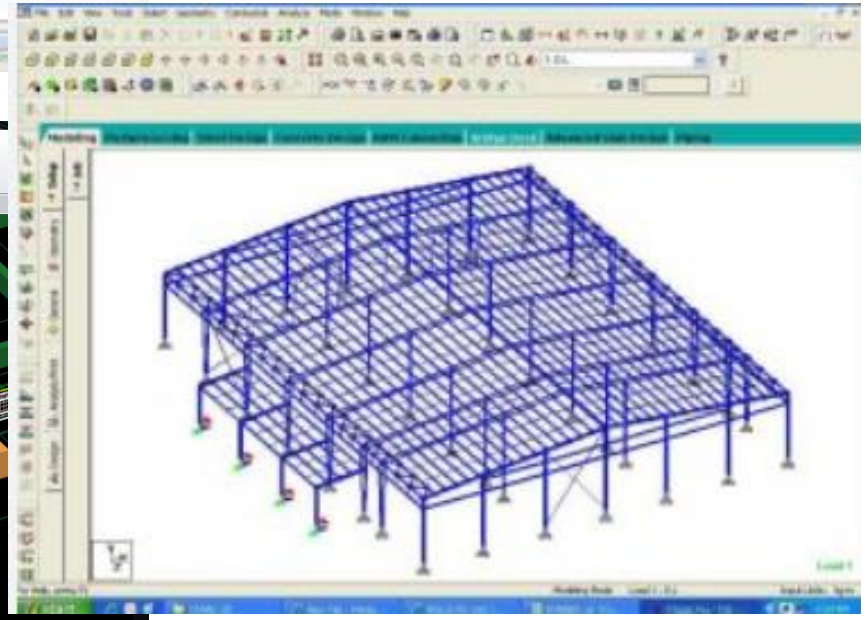
- Kurang tepat modelling struktur
- Salah input Load (DL, LL, EL, WL)
- Running software
- Interpretasi Code & Standard
- Dimentional Drawing

Identifikasi Risiko

ENGINEERING







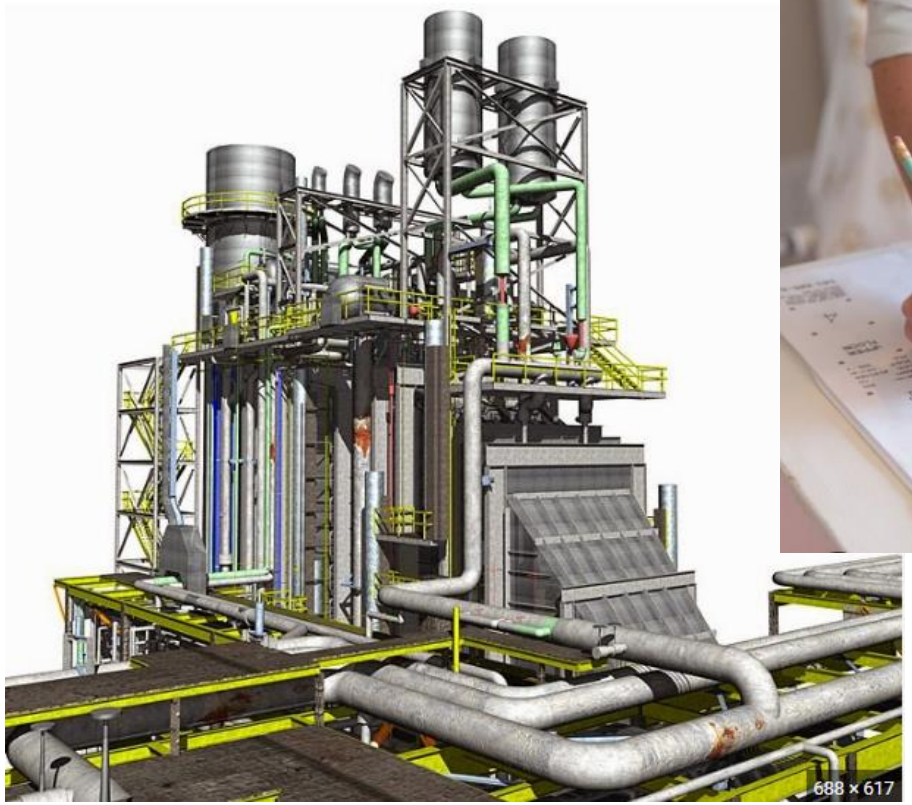
APA PERISTIWA (RISIKO) PADA SETIAP TAHAPAN BIM (Building Information Modelling) PROCESS

1. Input data tidak tepat(soil, material, existing, dll)
2. Kompetensi Operator BIM belum tepat
3. Kesalahan perencanaan

BIM PROCESS

Identifikasi Risiko

ENGINEERING



PERISTIWA APA YANG MUNGKIN TERJADI PADA CALCULATION MATERIAL ?

- Over Estimate
- Under Estimate
- Interpretasi gambar kurang tepat (Kompetensi)

MATERIAL & CALCULATION MATERIAL (MTO)

Identifikasi Risiko

PLANNING

PERISTIWA RESIKO APA YANG MUNGKIN TERJADI PADA ESTIMASI DURATION ?

- Penjadwalan proyek tidak tepat
- Kapasitas produktifitas tidak akurat
- Penentuan jumlah resources (alat) tidak tepat

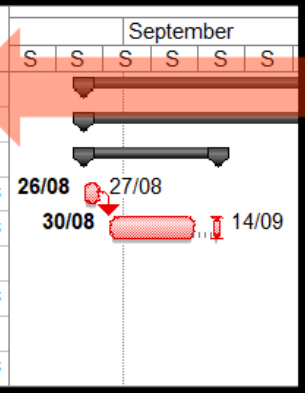
PENGGUNAAN ALAT

No	Jenis	Merek / Kap	Kap Produksi	Jumlah
1	Excavator	PC 200	60 m 3 / jam	2 unit
2	Dump Truck	DT Hino 20 ton	10 m3 / jam	12 unit
3	Buldozer	Cat D 65	120 m3 / jam	1 unit

ESTIMASI DURASI

No	Jenis	Volume	Koefisien Prod	Satuan	Durasi
1	Galian dibuang kesamping	100.000 m3	2 x 60	M3 / Jam	100.000 / (2x60)
2	Galian dibuang keluar (, 10 km)	200.000 m3	2 x 60	M3 / Jam	200.000 / (2x60)

ID	Task Name	Duration
1	**PONDASI**	**86 days**
2	**TANAH**	**69 days**
3	**GALIAN**	**14 days**
4	STRIPING	2 days
5	PEK GALIAN	11 days
6	**URUGAN**	**27 days**
7	TIMBUNAN	5 days
8	**PEMADATAN**	**27 days**
9	TRIAL PEMADATAN	2 days



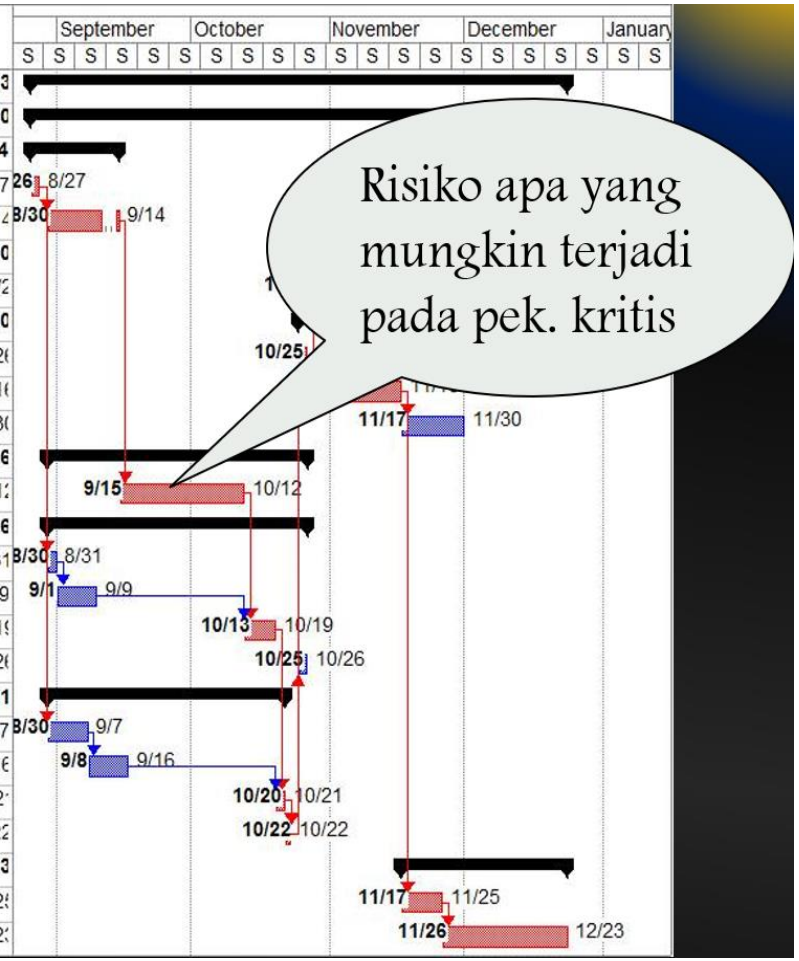
Masuk kedalam penyusunan schedule

ESTIMASI DURATION

Identifikasi Risiko

PLANNING

ID	Task Name	Duration	Start	Finish
1	**PONDASI**	**86 day**	**Thu 8/26**	**Thu 12/23**
2	**TANAH**	**69 day**	**Thu 8/26**	**Tue 11/30**
3	**GALIAN**	**14 day**	**Thu 8/26**	**Tue 9/14**
4	STRIPING	2 day	Thu 8/26	Fri 8/27
5	PEK GALIAN	11 da	Mon 8/30	Tue 9/14
6	**URUGAN**	**27 day**	**Mon 10/25**	**Tue 11/30**
7	TIMBUNAN	5 day	Wed 10/27	Tue 11/2
8	**PEMADATAN**	**27 day**	**Mon 10/25**	**Tue 11/30**
9	TRIAL PEMADAT	2 day	Mon 10/25	Tue 10/26
10	PEMADATAN	10 da	Wed 11/3	Tue 11/16
11	TEST LAB	10 da	Wed 11/17	Tue 11/30
12	**BETON**	**42 day**	**Mon 8/30**	**Tue 10/26**
13	LNT KERJA	20 da	Wed 9/15	Tue 10/12
14	**BEGISTING**	**42 day**	**Mon 8/30**	**Tue 10/26**
15	GAMBAR BEGISTIN	2 day	Mon 8/30	Tue 8/31
16	FABRIKASI	7 day	Wed 9/1	Thu 9/9
17	INSTAL	5 day	Wed 10/13	Tue 10/19
18	PEMBONGKARAN	2 day	Mon 10/25	Tue 10/26
19	**PEMBESIAN**	**39 day**	**Mon 8/30**	**Thu 10/21**
20	BUISTAT	7 day	Mon 8/30	Tue 9/7
21	FABRIKASI	7 day	Wed 9/8	Thu 9/16
22	INSTAL	2 day	Wed 10/20	Thu 10/21
23	COR BETON	1 da	Fri 10/22	Fri 10/22
24	**FINISHING**	**27 day**	**Wed 11/17**	**Thu 12/23**
25	LANDSCAPE	7 day	Wed 11/17	Thu 11/25
26	PEMELIHARAAN	20 da	Fri 11/26	Thu 12/23



KINERJA WAKTU PROYEK

1. Keterlambatan Proyek
2. COD Mundur
3. Biaya Operational bertambah

Identifikasi Risiko

PLANNING

Harga Tiang Pancang Per m1

No.	Nama Barang	Sat	Vol/m2	Vol. Total	Harga Satuan	Harga Total	Bobot	Kumulatif
1	Beton K 500	m3	0.26	0.26	Rp 641,566.00	Rp 164,401.29	49.44%	49.44%
3	PC Strand 1/2"	kg	4.93	4.93	Rp 20,150.00	Rp 99,319.35	29.87%	79.30%
6	Besi Beton Polos dia 6 mm	kg	6.44	6.44	Rp 8,000.00	Rp 51,550.04	15.50%	94.80%
7	Solar	ltr	1.02	1.02	Rp 5,735.00	Rp 5,852.04	1.76%	96.56%
8	Bekisting	m2	1.00	1.00	Rp 5,000.00	Rp 5,000.00	1.50%	98.07%
9	Besi Beton Ulir dia 13 mm	kg	0.54	0.54	Rp 8,000.00	Rp 4,290.65	1.29%	99.36%
10	Minyak bekisting	ltr	0.08	0.08	Rp 10,850.00	Rp 911.40	0.27%	99.63%
10	Kawat Beton	rol	0.00	0.00	Rp 312,500.00	Rp 782.01	0.24%	99.86%
11	Kayu Kaso Sobsi (5/7)	m3	0.00	0.00	Rp 750,000.00	Rp 450.00	0.14%	100.00%
					Total Bahan =	Rp 332,556.78	100.00%	

Dari **scope** yang dominan di breakdown untuk mengetahui **komponen** yg dominan

NO	JENIS	ASAL SUPLIER	BERAT JENIS	BERAT ISI kg/m3	PEMAKAIAN %	PEMAKAIAN /M3	HARGA SATUAN /M3	HARGA Rp	Bobot %	Komul %
1	SEMEN	INDO	3.15		77.5	249.84 kg/m³	Rp843,500.00 ton	Rp210,736	52.44%	52.44%
2	SPLIT 5 - 25	Rumpin	2.6	1434	100	1010.93 kg/m³	Rp125,300.00 m³	Rp88,333	21.98%	74.43%
3	PASIR 1	Bangka	2.58	1480	30	599.12 kg/m³	Rp168,250.00 m³	Rp68,109	16.95%	91.38%
4	ABU BATU	Rumpin	2.55	1475	70	238.03 kg/m³	Rp106,800.00 m³	Rp17,235	4.29%	95.66%
5	FLY ASH	Suralaya			22.5	72.53 kg/m³	Rp126,500.00 ton	Rp9,175	2.28%	97.95%
7	ADD G	Plastiment-PZ				g/m³	Rp3,300.00 ltr	Rp8,245	2.05%	100.00%
							Total biaya bahan	Rp401,834	100.00%	

Peristiwa apa yg mungkin terjadi yg berdampak pada komponen dominan thd biaya proyek

KINERJA BIAYA PROYEK

1. Budget Project bertambah
2. Estimasi harga tidak tepat
3. Profitable perusahaan ?

Identifikasi Risiko

PLANNING

KINERJA MUTU

1. Tidak tercapai standard mutu (spesifikasi), melakukan repair
2. Tidak memenuhi syarat kekuatan (demolish & reworks)
3. Mungkin ganti spesifikasi

Identifikasi Risiko

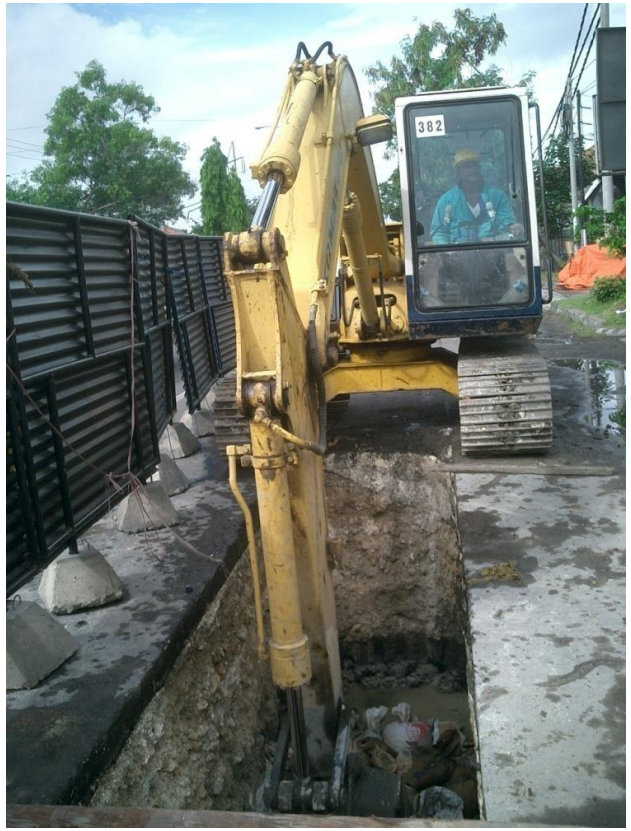
PROCUREMENT

Peristiwa risiko apa yang mungkin terjadi pada tahapan procurement, penyusunan kontrak proyek konstruksi

- Kontrak project strategi tidak didefinisikan sesuai kebutuhan project
- Dasar estimate tidak dieklasikan terhadap periode akhir proyek
- Daftar kuantitas pada amandement kontrak dlm negosiasi terlalu tinggi.
- Strategy for monitoring agreements may have not yet been defined.
- Budget available may not meet the need to amend contracts

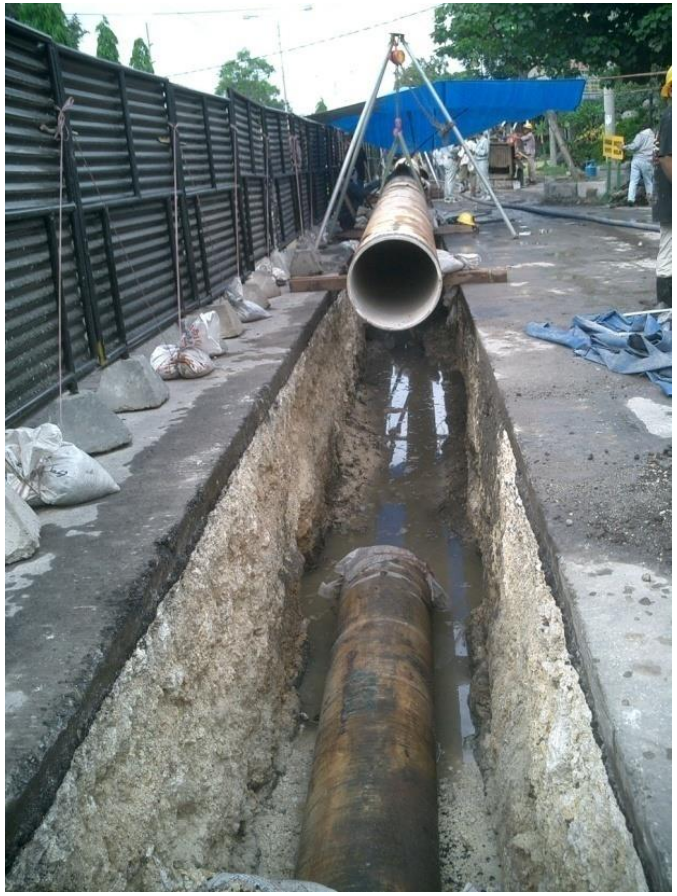
Identifikasi Risiko

CONSTRUCTION



PERISTIWA APA YANG MUNGKIN TERJADI PADA SETIAP TAHAPAN PELAKSANAAN PROYEK

APA YANG MENJADI SASARAN AKHIR PEKERJAAN INI



APA RISIKO PADA SETIAP TAHAPAN PELAKSANAAN PROYEK

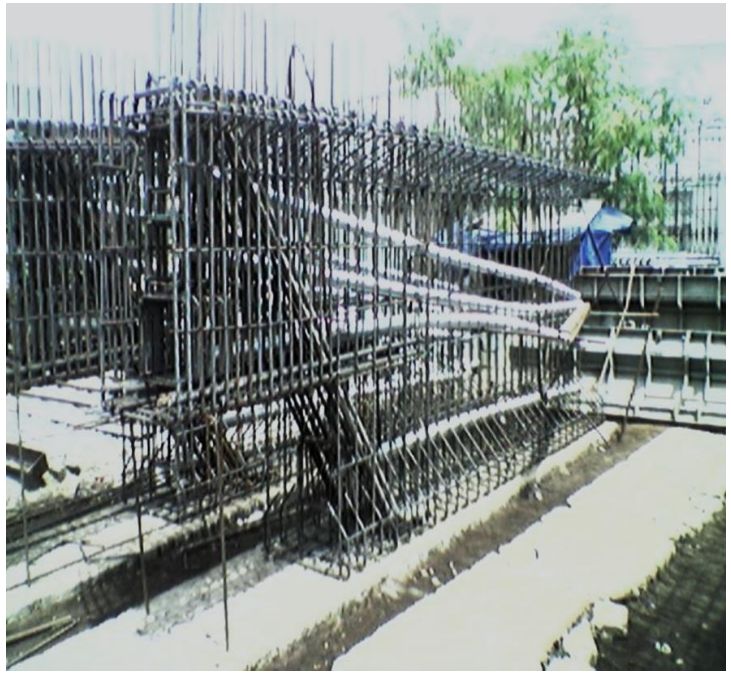
Galian Longsor, Jalur galian, Equipment Low In, Operator

Identifikasi Risiko

CONSTRUCTION

PERISTIWA APA YANG MUNGKIN TERJADI PADA SETIAP TAHAPAN PELAKSANAAN PROYEK

APA YANG MENJADI SASARAN AKHIR PRODUK INI



PEMBESIAN

FORM WORK

PENGECORAN

Saat Pengecoran collaps, Fabrikasi besi salah, dimensional dan Operator Equipment

Identifikasi Risiko

CONSTRUCTION

HANDLING

PERISTIWA RISIKO APA YANG MUNGKIN TERJADI PADA SETIAP TAHAPAN HANDLING MATERIAL/EQUIPMENT PROYEK ?

- Material rusak
- Material/Equipment hilang
- Keterlambatan Material/Equipment di lokasi proyek
- Equipment damage

Identifikasi Risiko

CONSTRUCTION

PERISTIWA APA YANG MUNGKIN TERJADI PADA SETIAP TAHAPAN GRINDING, WELDING JOINT, TRENCHING PELAKSANAAN PROYEK PIPA ?

GRINDING, WELDING JOINT, TRENCHING

- Joint Pipa bocor
- Luka bakar pada welder
- Pengangkatan pipa patah
- Kebakaran lokasi

Identifikasi Risiko

CONSTRUCTION

PERISTIWA RISIKO APA YANG MUNGKIN TERJADI PADA SETIAP TAHAPAN COATING PIPE PELAKSANAAN PROYEK PIPA ?

ERECTION/CONSTRUCTION EQUIPMENT

PRESSURE VESSEL TESTING

COATING PIPE

1. Kejatuhan Erection
2. Tidak tercapai pressure vessel
3. Coating tidak berfungsi

Identifikasi Risiko

CONSTRUCTION

RISIKO APA YANG MUNGKIN TERJADI PADA SETIAP TAHAPAN OFFSHORE PILING RIQ PELAKSANAAN PROYEK DAN KEBAKARAN PLANT ?

OFFSHORE PILING RIQ

1. Piling riq tenggelam
2. Posisi piling pondation tidak tepat
3. Produksi plant berhenti

KEBAKARAN PLANT

Identifikasi Risiko

OPERATION MAINTENANCE

1. List spare parts tidak divalidasi ketersediannya
2. Biaya maintenance tidak tercover secara hitungan
3. Management plant material, spare part s, stock tidak dibuat
4. Operating maintenance procedure (SOP) tidak diterapkan
5. Training Operator maintenance tidak dilakukan secara berkala.

Rangkuman Daftar risiko

Discipline	Risk Description
ENG	**SCOPE**
ENG	The scope of the current project may not consider the possibility of production scalability.
ENG	The proposed production rate of the project has not yet been approved by the local authorities.
ENG	The engineering scope has not been aligned with the involved departments yet.
ENG	The engineering scope has not yet been validated by the strategic planning and commercial department.
ENG	The execution team has not yet been involved in developing the project.
ENG	The execution team may have gotten involved in the project development too late.
ENG	The execution team may not have been adequately represented in the project development.
ENG	The operational and maintenance department have yet been involved in the project definitions and in the project approval flow.
ENG	The strategic planning department may introduce changes in production volumes, which leads to modifications in the project scope.
ENG	Part of the scope of a different capital project or operations sustaining project may be transferred to this project.
ENG	Part of the project scope may be transferred to another capital or to na operations sustaining project.
ENG	The formal process for approval of the Requested changes has not yet been established.
ENG	The formal approval process for Requests for Scope changes has been established but it has not yet been thoroughly complied with.

Discipline	Risk Description
ENG	**CAPEX**
ENG	CAPEX definition : services, indirect costs and spare parts
ENG	The planned budget for the execution of services may be conservative (over estimated) in relation to its scope.
ENG	The Basis of Estimate has not yet been defined for the cost of one or more services included in the project scope.
ENG	The planned budget for the indirect execution costs may be over estimated.
ENG	The project may face problems regarding the planned budget for the indirect costs.
ENG	The estimated capEx may not include the budget for one or more indirect execution costs.
ENG	The Basis of Estimate has not been defined for the indirect execution costs budgeted value.
ENG	The budgeted values for indirect execution costs may have been based on outdated historical data from older projects.
ENG	The planned budget for the acquisition of spares may be over estimated in relation to the project's requirements.
ENG	The project may face problems regarding the planned budget for spare parts.
ENG	The planned budget for the acquisition of spares may be under estimated in relation to the project's requirements.
ENG	The defined spare parts are likely to undergo changes in variations, type and quantity.
ENG	The Basis of Estimate for equipment spare parts costs has not yet been defined.
ENG	The budgeted values for equipment spare parts costs may not have been based on historical data of similar operations.

Discipline	Risk Description
ENG	**PIPING**
ENG	Issuing and control processess for the list of isometrics and pipes
ENG	The isometrics are likely to indicate a need for more piping than what was planned.
ENG	The Iisometrics are likely to indicate a need for less piping then was planned.
ENG	The process of issuing the list of isometrics items may not have been controlled properly.
ENG	The list of isometric items may have been issued with delay.
ENG	The overlapping disciplines when preparing the detailed engineering may be causing either a standstill or rework in sizing the piping.
ENG	The piping specifications with special lining needs may not have been validated by the Operational Team (EO)
ENG	The need for valves, particularly the special ones (material or functional)
ENG	The valves considered for the process may have uncommon characteristics for Client’s operations.
ENG	The number of detailed valves may differ from the quantity planned in the basic design.
ENG	The process of issuing the valve specifications may not have been controlled properly.
ENG	The valve specifications may have been issued with delay.
ENG	The valves considered for the process may use uncommon materials when compared to Client's operations.
ENG	The specifications for special valves may be still in the process of being validated.

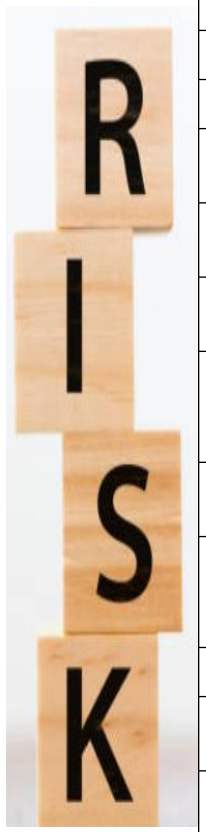
Discipline	Risk Description
ENG	**AUTOMATION AND CONTROL**
ENG	OCC - Operation Control Centre
ENG	The units of measure between the control systems may not be standardized.
ENG	The OCC - Operation control centre location and the layout have not yet been defined.
ENG	The project may face difficulty regarding the Operation control centre.
ENG	The planned control system may be not compatible with the current one being used in the operations.
ENG	The control centre considered in the project may interfere in current Operation control centre.
ENG	The planned Operation control centre systems may not be compatible with the systems being currently used by other Client's areas.
ENG	The control system proposed by the project may introduce innovative techniques.
ENG	The existing Operational Control Center may not have the capacity to support the new load necessary for its expansion.
ENG	The planned Operation control centre so far has not been commented on and/or approved by all areas involved.
ENG	The Operational Readiness Team so far has not commented on and/or approved the location and layout for the Operation control centre.
ENG	The corporate security area have not yet commented on and/or approved the control center's corporate security assumptions.
ENG	The project's assumption is to use the existing Operation control centre but it has not yet been validated by the operational department.

Discipline	Risk Description
ENG	**OPERATIONAL / ENTERPRISE SAFETY**
ENG	Fire prevention suppression
ENG	The budget for the purchase/modification of equipment and facilities with special requirements has not yet been planned / prepared.
ENG	The budget for the purchase/modification of equipment and facilities with special requirements for fire prevention and fighting in tube conveyors has not yet been planned / prepared.
ENG	The budget for the purchase/modification of equipment and facilities with special requirements for fire prevention and fighting in substations and control rooms has not yet been planned/ prepared.
ENG	The budget for the purchase/modification of equipment and facilities with special requirements for fire prevention and fighting in maintenance workshops and freight cars has not yet been planned / prepared.
ENG	The budget for the purchase/modification of equipment and facilities with special requirements for fire prevention and fighting in pumping stations has not yet been planned/prepared.
ENG	The fire supression system has not yet been considered in project according to the technical standards.
ENG	The planned budget for the construction of a water supply network to be used by operations for fire fighting may not be sufficient.
ENG	The definition of the location and capacity of the fire-fighting water network to be used by the operation may depend on data that has not yet been consolidated.
ENG	The fire supression system has not yet been considered in project according to the technical standards.

Discipline	Risk Description
ENG	**HANDLING OF SHIPS AND OPERATIONS FOR LOADING AND ANLOADING**
ENG	Access channel.
ENG	The project team may not be familiar with the need for works on the access channel.
ENG	The access channel is likely to require widening due to an increase in traffic and this activity may not be included in the project scope.
ENG	The increase in flow on the access channel has not yet been negotiated/validated with the Port Authorities.
ENG	There are uncertainties concerning the required volume of dragging for the construction/expansion of the access channel.
ENG	The access channe need to be dragged, but the hydrogeological studies may not have been conducted (Hydrodynamic Model [erosion and deposits] and Shallow Seismic (check for the existence of rocky soil)).
ENG	The project team has not yet conducted the bathymetry to confirm whether the access channel has the required daft for operations.
ENG	Towboats and pilots
ENG	The need for towboats may not have been considered in the project scope and they may indeed be necessary.
ENG	The towboats which currently operate in the region may not support the new demand and this factor may not have been considered in the project.

Discipline	Risk Description
ENG	**TERMINALS FOR LOADING AND UNLOADING**
ENG	Manoeuvers and train formation.
ENG	The assumptions for train formation in the terminal have not yet been validated by operations.
ENG	The assumptions for train formation in the terminal may be modified, thereby requiring changes in the singleline.
ENG	The planned train formation areas may be pending validation by the terminal operators.
ENG	The number of tracks may have to be increased due to the required switching for which no provisions were made in the terminal operation sample.
ENG	Handling dangerous cargoes and/or cargoes potentially hazardous to soils and tributaries.
ENG	The dangerous cargoes have not yet been mapped out, neither were the required controls for handling them.
ENG	The containment/treatment of effluents systems have not yet been considered in the terminal project.
ENG	The containment/treatment of effluents systems may be undersized in relation to the volume of harzadous cargoes to be handled in the terminal.
ENG	The budget for the containment and treatment of the effluents system in the terminal has not yet been included in the CapEx or it may be undersized.
ENG	The budget for the containment and treatment of the effluents system in the terminal has not yet been included in the CapEx or it may be undersized.
ENG	Storage areas
ENG	The storage areas have not yet been defined.
ENG	The storage areas' contemplated capacity may be undersized in relation to the storage needs.

Discipline	Risk Description
PLN	**PROJECT DEFINITION**
PLN	Personnel demobilization plan does not consider manpower histrogram for project yet.
PLN	Timeframe defined for detailed engineering may create high level of parallelism between disciplines, hindering their integration.
PLN	Detailed engineering may have a high degree of parallelism with work fronts.
PLN	Need for creating independent work faces has not yet been assessed.
PLN	Plans of attack for project execution have not yet been established.
PLN	Project planning may not have taken into account heating up of the market.
PLN	Project plannning may not have taken into account heating up of the market for possible needs of basic design contract amendment.
PLN	Project plannning may not have taken into account heating up of the market for possible needs of detailed design contract amendment.



Discipline	Risk Description
PLN	**PEP - PROJECT EXECUTION PLAN**
PLN	Project master plan
PLN	Project master plan may not be completed.
PLN	Venture master plan may not be completed.
PLN	Venture master plan preparation may not have started..
PLN	Master plan does not present all temporary facilities required for project yet.
PLN	Master plan does not present project main accesses yet.
PLN	Master plan has not yet been approved by operational area, in case of brownfield project.
PLN	Master plan has not yet been aligned with other projects in the same project area.
PLN	Master plan has not yet considered interferences with existing facilities, in case of brownfield project.
PLN	Team definition
PLN	Discipline coordinators may not be available fulltime for project.
PLN	A team member may accumulate more than one key-function.
PLN	Project may not have all disciplines' coordinators confirmed.
PLN	Planning coordinator has not yet been confirmed.
PLN	Budgeting coordinator has not yet been confirmed.

Discipline	Risk Description
PLN	**PRODUCTIVITY INDEX**
PLN	Productivity indexes used in resources definition
PLN	Productivity values and manpower costs considered planning have been obtained from engineering design contractor database and have not yet been validated by Client.
PLN	Productivity and cost index assumptions may not have a known **base.**
PLN	Productivity and cost data have been obtained in a region different from the project execution region.
PLN	Productivity and cost data have been based on a history of past projects.
PLN	Planning assumptions may not take into account agreements established with regulatory agencies of working hours..
PLN	Handling of climate seasonality
PLN	Part of earthworks activities not foreseen may be executed during the rainy period.
PLN	Part of foundations activities not foreseen may be executed during the rainy period.
PLN	Productivity considered for execution of assemblies may not consider climatic factors.
PLN	Productivity considered for execution of assemblies may not take into account the rainy period /electrical discharges.
PLN	Productivity considered for execution of assemblies may not take into account strong winds period.
PLN	Productivity considered for execution of assemblies may not take into account snowstorms or severe cold periods.

Discipline	Risk Description
PLN	**PHYSICAL PROGRESS MEASUREMENT CRITERIA**
PLN	Physical-financial measurement criteria
PLN	Criteria for project physical and financial follow-up has not been established.
PLN	Criteria established may not be followed by project/ managing company.
PLN	Criteria established may not determine adherence between physical and financial execution.
PLN	Financial control software may not be compatible with software performing project physical control.

Discipline	Risk Description
PRO	PROCUREMENT PLAN
PRO	Project contracting strategy has not yet been defined for project.
PRO	Contracting strategy has not yet been validated by procurement area.
PRO	Local company contracting strategy does not comply with scope to be contracted.
PRO	Contracting strategy has not yet been defined according to bonus and penalties politics for sample to be contracted.
PRO	Contracting strategy does not foresee possibility of contracting companies with no history of execution of required size projects.
PRO	Contracting strategy does not foresee possibility of contracting companies with no experience on execution of Client standards projects.
PRO	Contracting strategy does not foresee possibility of contracting companies with no experience in the region where project is to be executed.
PRO	Restrictions for sub-contracting in project have not yet been defined.
PRO	Options for sub-contracting in project have not yet been defined.
PRO	In the CapEx, the project may be considering the use of fiscal incentives without said incentives being confirmed by competent authorities.
PRO	The estimated base has not yet been defined for the escalation used in the project.
PRO	Procurement plan may present an excessive number of packages with contracting periods shorter than those practised in the company.
PRO	Project planning may include contracting timeframes shorter than those determined in procurement plan.

Discipline	Risk Description
PRO	GUARANTEES AND ASSISTANCE
PRO	Training
PRO	Conduction of training may not be foreseen in contract with vendor.
PRO	Budget for vendor training for operators and maintenance personnel may not have been foreseen.
PRO	Training method to be offered by vendor is not yet defined.
PRO	Training timeframes to be offered by vendor are not yet defined.
PRO	Training to be offered by vendor may be postponed.
PRO	Training difficulties due to predominant project language being different from vendor language.
PRO	Assisted Operation
PRO	Contracting of assembly support and equipment manufacturer tests may have not been foreseen in purchase contract.
PRO	Budget for contracting of assembly support and equipement manufacturer tests may have not been foreseen.
PRO	Assisted operation for first months of operation may not have been foreseen in purchase contract.
PRO	Assisted operation contracting budget for first months of operation may not have been foreseen.
PRO	Assisted operation responsibilities are not yet defined.

Discipline	Risk Description
PRO	CONTRACT MANAGEMENT
PRO	Claims
PRO	Strategy for monitoring agreements may have not yet been defined.
PRO	Anti-claim strategy for agreements may have not yet been defined.
PRO	Anti-claim strategy may not have been followed by project.
PRO	Legal assistance resources in relation to contractual clauses and potential claims may not have been established.
PRO	Contractors may still present new claims.
PRO	Claims already filed by contractors still under negotiation process.
PRO	Budget for claim payments may not be sufficient.
PRO	Disapproved claims may be renegotiated with project.
PRO	Contractual amendments
PRO	Quantity of contractual amendments with documentation under preparation may be high.
PRO	Quantity of contractual amendments under negotiation process may be high.

Discipline	Risk Description
PRO	CONTRACT MANAGEMENT
PRO	Procurement team may not yet know the quantity of amendments to be negotiated.
PRO	Budget available may not meet the need to amend contracts.
PRO	Some services have been carried out without the contractual amendments having been regularized.
PRO	Delays in supplies
PRO	Equipment/materials fabrication may be delayed.
PRO	Equipment/materials transportation may be delayed.
PRO	Equipment/materials road transportation may be delayed.
PRO	Equipment/material rail transportation may be delayed.
PRO	Equipment/materials sea/river transportation may be delayed.
PRO	Equipment/materials air transportation may be delayed.
PRO	Equipment/materials customs clearance may be delayed.
PRO	Equipment/materials disembarkation at port may be delayed.
PRO	Definition of port storage area may be delayed.
PRO	Problems with contractors' payment

Discipline	Risk Description
CTR	**PLANNING, ORGANIZATION, AND STRUCTURING**
CTR	Scheduling
CTR	Project may experience problems relating to progress monitoring.
CTR	The progress criteria may not have been defined.
CTR	The progress criteria may have been partially defined.
CTR	Project progress may not be consistent with the project's actual execution.
CTR	Project may experience problems with its contingency budget.
CTR	Contingency value used may not be known to project team.
CTR	Project may have used the total contingency value foreseen in CapEx.
CTR	Contingency use rate may be above prediction.
CTR	Contingency use may not be controlled by the project team.
CTR	Project may experience problems caused by the effect of monetary variation in the prices of raw materials.
CTR	The prices of certain raw materials may be above the escalation curve used by the project.
CTR	Escalation curve may not have been considered in the project budget.
CTR	Indicators used to calculate the escalation curve may not match the services or raw materials used by the project.
CTR	Escalation curve used by the project may not have a defined base.

Discipline	Risk Description
CTR	**PLANNING, ORGANIZATION, AND STRUCTURING**
CTR	INFRASTRUCTURE
CTR	Infrastructure Temporary Facilities
CTR	Electric power demand for jobsites has not yet been defined.
CTR	Local power company may not have the capacity to meet the jobsite’s electrical power demand.
CTR	Number of power generators foreseen may be insufficient to meet the jobsite’s electrical power demand.
CTR	Potable water in the region may not have satisfactory quality.
CTR	Number of potable water suppliers may be lower than that required for the project.
CTR	Artesian wells that will be opened to supply the jobsites may not have enough water or the required quality.
CTR	Water grant for artesian wells or spirngs that will supply the jobsites has not yet been requested.
CTR	Project may experience difficulties with regards to lodgings.
CTR	Location for construction of lodgings is not yet included in the project scope.
CTR	Number of lodgings foreseen for execution personnel may be insufficient.
CTR	Location foreseen for construction of lodgings may not have taken into account a safe distance between contractors, so as to avoid possible conflicts.
CTR	Lodgings design does not yet foresee the construction of living and recreational areas.

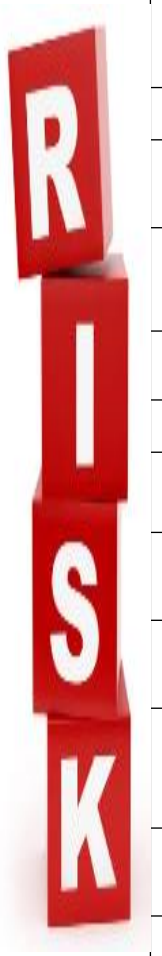
Discipline	Risk Description
CTR	**PLANNING, ORGANIZATION, AND STRUCTURING**
CTR	Piping
CTR	Piping technical specifications (e.g.: coating, seam, material) may not be defined.
CTR	Port/railway terminals may not have the capacity to receive pipes for the execution.
CTR	Release of pipes by storage areas may be lower than needed.
CTR	Project may experience problems with pipe supply.
CTR	Pipe supply quantities (ton/month) foreseen may be higher than Client projects' average.
CTR	Pipe supply quantities (ton/month) foreseen may be undefined.
CTR	Pipe supply quantities (ton/month) foreseen may be lower than Client projects' average.
CTR	Pipe supply scheduling may not be integrated with planned assembly sequence.
CTR	Heated market conditions may hinder pipe supply.
CTR	Pipes supplied to some areas may differ from what has been specified.
CTR	Project may experience problems with piping assembly.
CTR	Piping assembly strategy may not be fulfilled as planned.
CTR	Piping preparation for assembly may be lower than what is needed.
CTR	Releasing of work fronts for piping assembly may be lower than that foreseen due to delays in the deliveries of detailed designs.

Discipline	Risk Description
CTR	**PLANNING, ORGANIZATION, AND STRUCTURING**
CTR	Electrical /Instrumen
CTR	Project may experience problems with instrumentation/automation equipment.
CTR	Instrumentation/automation supply may be lower than that foreseen.
CTR	Electric panels supply may be lower than that foreseen.
CTR	Electrical assembly productivity may be lower than that foreseen.
CTR	Electrical assembly productivity is or may be more than planned.
CTR	Market heating-up may hinder the supply of power transformers.
CTR	Electric motors supply may be lower than that planned.
CTR	Electric cable supply (m/month) may be lower than that planned.
CTR	Assembly of electro-mechanical equipment/systems may be delayed due to supply/logistics problems.
CTR	Assembly fronts may be shut down due to difficulties in the large-size equipment delivery logistics.
CTR	Port/railway terminals may not have the capacity to receive equipment foreseen.
CTR	Boilermaking productivity may be lower than that planned.
CTR	Boilermaking productivity may be above that planned.
CTR	Project may experience problems with mechanical/electro-mechanical assembly.
CTR	Mechanical assembly productivity may be lower than that planned.

Discipline	Risk Description
HS	**INFORMATION ON HEALTH, SAFETY, AND LEGAL REQUIREMENTS**
HS	Health and safety legal and regulatory requirements
HS	Contractors may not comply with safety standards to be implemented for the execution phase.
HS	Project development may not have considered compliance with RACs or legal requirements.
HS	Compliance with RACs or legal requirements may not been have considered during contracting processes.
HS	Project CAPEX did not yet include specific budget for compliance with RACs or legal requirements at execution phase.
HS	Budget foreseen in project CAPEX may be insufficient for compliance with RACs or legal requirements at execution phase
HS	Budget foreseen in project CAPEX for implementation of GUG-700 may be insufficient
HS	RAC's execution percentage may be below that established by Client.
HS	Contractors may not comply with safety standards applicable to the execution phase.
HS	Productivities loaded into the project schedule may not have considered the required time for carrying out health and safety acitivities.

Discipline	Risk Description
HS	**INFORMATION ON HEALTH, SAFETY, AND LEGAL REQUIREMENTS**
HS	HEALTH AND SAFETY PLANNING AT EXECUTION
HS	Health and safety planning
HS	Health & safety plan has not yet been detailed for execution phase
HS	Health & safety plan has yet not been disclosed to the project team.
HS	Health and safety plan does not yet include the commissioning and assisted operation phases.
HS	Health & safety plan has not been validated by existing operation.
HS	Contractors' and/or Project's health & safety plan may not have been approved by the pertinent authority.
HS	Productivities loaded into the project schedule does not consider required time for the conduction of health and safety activities.
HS	Project CapEx may not have considered specific budget for H&S management at execution.
HS	Budget foreseen in CapEx for health and safety may be undersized in relation to the project scope.
HS	Safety management plan for execution phase has not yet been drafted.
HS	Party responsible for drafting the safety management plan for execution phase has not yet been defined.
HS	The corporate health and safety area has not yet validated the safety management plan for execution phase.
HS	Contractors' health and safety plans may not be aligned with the project safety plan.

Discipline	Risk Description
HS	**INFORMATION ON HEALTH, SAFETY, AND LEGAL REQUIREMENTS**
HS	BEHAVIORAL DEVELOPMENT AND TRAINING ON HEALTH AND SAFETY
HS	Occupational Health and Safety (OHS) training for contractors at the execution phase
HS	Contractors' mobilization timeframe may not have considered the conduction of safety training.
HS	Time estimated for the conduction of safety training may be shorter than average Client projects.
HS	Safety team may not be sufficient to carry out safety training for headcount to be contracted.
HS	There may be personnel working on critical activities without full health and safety training.
HS	Infrastructure for the conduction of safety training at project region may be insufficient to withstand mobilization of contractors for execution phase.
HS	Safety training in project region may not be in accordance with Client requirements and/or Clientr Foundation.
HS	Project may take advantage of partnerships with other institutions of region for the conduction of health and safety trainings.
HS	Party responsible for health and safety training plan for contractors during execution phase has not yet been defined.
HS	Parties responsible, timeframes, costs may not have been defined in detailed safety plan.
HS	Possible use of resources already trained in health and safety, in other projects, for execution phase, provided that they are within the expiration date.
HS	Health and safety training control plan has not yet been defined.



Discipline	Risk Description
HS	**INFORMATION ON HEALTH, SAFETY, AND LEGAL REQUIREMENTS**
HS	FIRE AND TOXICATION PREVENTION AND FIRE FIGHTING
HS	Fire fighting water distribution system
HS	Route and hold-up time of fire fighting water system for execution phase may not have been defined.
HS	Route and hold-up time of fire fighting water system for execution phase has not yet been defined.
HS	Fire fighting system for execution has not yet been defined.
HS	Fire fighting system for operation has not yet been defined.
HS	Fire fighting system may not be available for project start up and ramp up.
HS	Fire fighting system basic design may not have been validated by health and safety expert.
HS	Fire fighting system design for execution has not yet been approved by Fire Department.
HS	Execution design foresees the use of local Fire Department resources (public or private) that may not have conditions of service (minimum distance, capacity, etc).
HS	For brownfield projects, fire fighting system for operation may not comply with project needs.
HS	Project CapEx may not have considered budget for purchase or lease of trucks suitable for fire fighting during execution.
HS	Equipment and installations with special requisites for fire prevention and fire fighting

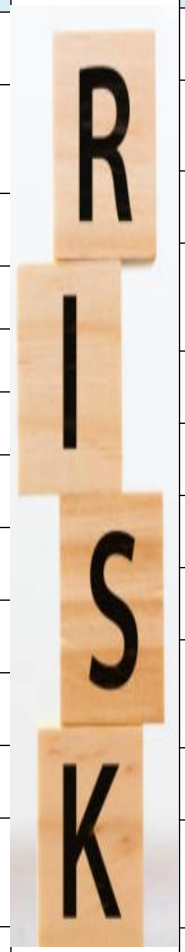
Discipline	Risk Description
ENV	LOCAL CONDITIONS AND STUDIES FOR LICENSING
ENV	Project schedule does not foresee study of impacts on historical and cultural heritage.
ENV	Project may have difficulty to contract survey services for the recording of cultural heritage remembrance.
ENV	Project may start activities in areas of high cultural heritage remembrance potential without the supervision of a professional qualified by the local agency.
ENV	Project may experience difficulties with issues related to speleology.
ENV	Project may experience difficulties in contracting speleological studies.
ENV	Project has not yet identitified all caves with which it may interfere.
ENV	Project has not yet determined strategy to be adopted in case there is interference with caves.
ENV	Project has not yet foreseen budget in CapEx for contracting speleological studies.
ENV	Budget foreseen for contracting speleological studies may be insufficient.
ENV	Project has not yet foreseen budget in CapEx to address interference with caves.
ENV	Project schedule has not yet included speleological studies.
ENV	Project schedule has not yet foreseen acitivitty for addressing interference with caves.

Discipline	Risk Description
ENV	WASTE AND EMISSIONS
ENV	Management of Solid Waste
ENV	Sanitary landfill location for execution has not yet been foreseen.
ENV	Sanitary landfill location for operation has not yet been foreseen.
ENV	Sanitary landfill devised for execution may be foreseen for a municipality different from that of waste generation.
ENV	Location foreseen for execution sanitary landfill may not bear the volume of waste generated.
ENV	Location foreseen for operation sanitary landfill may not bear the volume of waste generated.
ENV	Operation tailings dam may be foreseen for a municipality different from that of waste generation.
ENV	Wastes generated during execution and their control systems have not yet been totally mapped out by the project.
ENV	Wastes generated during operation and their control systems have not yet been totally mapped out by the project.
ENV	Wastes/tailings treatment proposed by project may be incompatible with legislation.
ENV	Possible changes in the waste treatment system may not be compatible with legislation.
ENV	Wastes/tailings treatment system proposed by project may be undersized for the load foreseen for execution.
ENV	Wastes/tailings treatment system proposed by project may be undersized for the load foreseen for operation.
ENV	Wastes / tailings treatment system for execution works has not yet been defined.

`	Risk Description
COM	COMMUNICATION PROGRAM
COM	Communication strategy
COM	Some areas have not yet been engaged in defining the communication strategy.
COM	A strategy for relationship with major stakeholders has not yet been defined.
COM	Benefits for the project region have not yet been mapped.
COM	Impacts generated by the project have not yet been mapped.
COM	Dissemination strategy has not yet included the project gains to offset the possible negative impacts generated.
COM	Strategy for disseminating project gains/impacts has not yet been defined.
COM	Strategy for relationship with major stakeholders may not be followed.
COM	Programs for mitigating social impacts have not yet been prepared with the region's pertinent authorities.
COM	Project institutional positioning may not fulfill the region's expectations and needs.
COM	Demands of public hearings already conducted are not yet being considered in the communication strategy.
COM	Communication plan
COM	Poject's communication plan has not been finalized/prepared.

`	Risk Description
COM	SOCIO-ECONOMIC INDICATORS MONITORING PLAN
COM	Socio-economic indicators
COM	Socio-economic indicators of the project region have not yet been mapped.
COM	Project does not yet have a plan for monitoring the socio-economic indicators for the execution phase in the region.
COM	Project is not yet conducting the monitoring of socio-economic indicators in the region.
COM	Fundação Client may not have been engaged in defining a plan for monitoring the socio-economic indicators in the region.
COM	Plan for monitoring the socio-economic indicators during the execution phase may not have taken into account some important indicators for the region.
COM	Action plan to address issues related to monitoring the socio-economic indicators in the project region has not yet been prepared.
COM	CAPEX for actions resulting from degradation of social indicators in the project region may be undersized.
COM	Execution of the plan of action for addressing issues relating to the monitoring of socio-economic indicators in the project region may be delayed in relation to that agreed with the community and/or with the pertinent social agencies.
COM	Socio-economic indicators in the project region may change.
COM	Prostitution activities within the communities of the project region may increase during the execution phase.
COM	Number of robberies and hold-ups within the communities of the project region may increase during the execution phase.
COM	Default of businesses within the communities of the project region may increase during the execution phase.

Discipline	Risk Description
OR	**COMMISSIONING**
OR	Battery limits among Construction/Commissioning/Operation are not yet clearly defined.
OR	Responsibilities of those involved (operation, construction, assembling company, vendors, EPO) in the commissioning process may not have been defined or may not be clear.
OR	Commissioning may not be shown on the overall project organizational chart
OR	Overall Commissioning Planning
OR	Preliminary Commissioning Plan may not have been prepared
OR	Final Commissioning Plan may not have been prepared
OR	Commissioning Plan may not have been validated by the EPO and UN (Business Unit)
OR	Commissioning Plan may not have been disclosed to contractors / assembling companies
OR	Project schedule may not be in accordance with the logical sequence of tests defined by commissioning
OR	Commissioning schedule may not have been prepared to the level of subsystems
OR	Commissioning communication plan may not have been prepared
OR	Documentation of mechanics and construction completion to be delivered at Construction Handover to Commissioning may not have been defined.
OR	Commissioning documentation to be delivered at Commissioning Handover to Operation may not have been validated between the project and the client.
OR	Operational contingent to support commissioning and execution of performance tests may have not been sized.



Discipline	Risk Description
OR	**COMMISSIONING**
OR	Verification flow and pendencies survey, as well as their elimination, may not have been defined.
OR	Tests runtime with and without load may not have been considered in the commissioning schedule
OR	Estimated time for commissioning supervision (Vendors) may not have been defined.
OR	RT's may not be differentiating the number of vendors' hours for the supervision of assembly and commissioning
OR	Commissioning responsibilities matrix may not provide the required level of detailing for activities.
OR	Commissioning Procedures
OR	Commissioning procedures and tests may not have been prepared
OR	Commissioning procedures and tests may not have been validated by operation
OR	Parameters for approval of commissioning and performance testing may not have been validated by UN (Business Unit).
OR	Commissioning procedures may not have been included in HSE topics
OR	Testing sequence of a given commissioning system may not be well defined / clarified in commissioning procedures.
OR	Detailed schedule for execution specific activities of pre-commissioning and commissioning may not have been prepared.
OR	Acceptance criteria in commissioning protocols may not have been defined.

Discipline	Risk Description
HR	**ORGANIZATIONAL STRUCTURE**
HR	Project Team
HR	Number of personnel for execution has not yet been defined.
HR	Personnel contracting plan may present uncertainties as to the number of people and their professional qualifications needed for execution
HR	Proposed strategy to contract personnel for execution has not yet been drafted with the Human Resources department.
HR	Personnel contracting strategy may not have taken the socioeducational analysis into consideration in the project region.
HR	Personnel contracting strategy may not have taken the need for manpower training into consideration in the project region
HR	Project CapEx does not take into account payment for travel time, which may have an impact on execution and operation manpower costs.
HR	Personnel contracting demand for project technical functions has not yet been reported to the Human Resources department.
HR	Operational Team
HR	Number of personnel needed for the operation has not yet been defined.
HR	Personnel contracting plan may present uncertainties on quantitative and professional skills needed for operation.
HR	Number of personnel and their professional qualifications needed for operation may not have been validated by the EPO.
HR	Personnel recruitment and training activities for operation are not yet being considered in the project schedule.

Discipline	Risk Description
HR	**ORGANIZATIONAL STRUCTURE**
HR	CapEx for operational headcount contracting and training may be undersized.
HR	CapEx for operational headcount contracting and training may be oversized
HR	Proposed strategy for contracting operational personnel has not yet been drafted together with the Human Resources department.
HR	INFORMATION ON LOCAL LABOR MARKET
HR	Availability and qualified manpower for the execution
HR	Amount of qualified manpower required for execution phase may not be sufficient in the project region.
HR	Infrastructure and qualified professionals to train specialized manpower for execution may be insufficient in the project region.
HR	Salaries offered by project may be lower than the average in the project region.
HR	Turn-over considered for construction labor may be higher than what has been planned.
HR	Turn-over considered for the Owner Team may be higher than what has been planned.
HR	Turn-over considered for the management team may be higher than what has been planned.
HR	Turn-over considered for the civil works execution manpower may be higher than what has been planned.
HR	Turn-over considered for the execution phase manpower may be below average in the project region.

Discipline	Risk Description
HR	**HR PLANNING**
HR	Team planning
HR	Party responsible for the project personnel recruitment processes has not yet been designated by the Human Resources department.
HR	Human Resources team may be undersized to meet the project demand.
HR	Human Resources team may not have experience in personnel contracting in the project region
HR	Project region may have a history of strikes during the implementation
HR	Special training plan
HR	Specific training for special technical functions have not yet been started as planned.
HR	Specific training demand for special technical functions has not yet been reported to the Human Resources department.
HR	Special training conduction may be below the planned pace.
HR	Infrastructure and qualified professionals for training specialized personnel for operation may be insufficient in the project region.
HR	CAPEX foreseen for special training outside the country or region where the project is being implemented may be underestimated.

Discipline	Risk Description
HR	**HR PLANNING**
HR	"On the job" training
HR	"On the job" training has not yet been started as planned.
HR	"On the job" training may be below the planned pace.
HR	"On the job" training foreseen has not yet been negotiated with the operational areas responsible for conducting the training.
HR	Operational area that will conduct the "on the job" training may not be able to handle the planned demand
HR	Training plan for operational team
HR	Operational training conduction has not yet started as planned
HR	Operational training conduction may be below the planned pace.
HR	**PERSONNEL MOBILIZATION**
HR	Operation plan for mobilization
HR	Personnel mobilization timeframe for execution may may be undersized.
HR	Time needed for integration training may not have been considered in the personnel mobilization timeframe for the execution phase
HR	Personnel contracting process for technical functions has not yet been started as planned.
HR	Personnel contracting process for technical functions may be below the planned pace.

DAFTAR RISIKO

Seksi :
Sasaran/Target :
Tanggal : **Disusun oleh :** **Diperiksa Oleh :**

No	Resiko			Faktor Positif yang Ada Sekarang	Rating Akibat	Rating Kemungkinan	Level Risiko	Prioritas Risiko
	Peristiwa	Akibat (Consequences)	Kemungkinan (Likelihood)					
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								

Catatan : Uraikan lebih rinci pada kertas pendukung (Lampirkan, bila perlu, Kertas Kerja Analisis Perkiraan Akibat & Kemungkinan

Resiko			Faktor positif yang Ada Sekarang	Rating Akibat	Rating Kemungkinan	Level Risiko	Prioritas Risiko
Peristiwa	Akibat (Conse-quencess)	Kemungkinan (Likelihood)					
Isi dengan apa yang potensial dapat terjadi & mengganggu pencapaian sasaran/target	Isi dengan seberapa besar besar deviasi yang timbul atas sasaran/target	Isi dengan seberapa besar probabilitas terjadi terjadinya peristiwa tsb.	Isi dengan kondisi positif yang sekarang telah ada untuk menghadapi peristiwa tsb.	Tentukan ratingnya apakah: tidak Penting, Minor, Medium, Mayor atau Malapetaka	Tentukan ratingnya apakah: sangat Besar, Besar, Sedang, Kecil atau Sangat kecil	Tentukan level risiko apakah: Ekstrim, Tinggi, Moderat atau Rendah	Tentukan urutan prioritas di dalam pemberian tanggapan & Perlakuan atas risiko

Rating Akibat	Kuantitatif	Kualitatif
1. Tidak signifikan	Sd. ……..%	
2. Minor	> ……% sd. …….%	
3. Medium	> ……% sd. …….%	
4. Major	> ……% sd. …….%	
5. Malapetaka (catastrophic)	Di atas ……..%	

Rating Kemungkinan		Kuantitatif	Kualitatif
I	Sangat besar	> 80%	
II	Besar	> 60% sd. 80%	
III	Sedang	> 40% sd. 60%	
IV	Kecil	> 20% sd. 40%	
V	Sangat Kecil	sd. 20%	

Kemungkinan (Likelihood)	Akibat (Consequences)				
	Tidak Penting 1	Minor 2	Medium 3	Mayor 4	Malapetaka 5
I. (sangat besar)	T	T	E	E	E
II. (besar)	M	T	T	E	E
III. (sedang)	R	M	T	E	E
IV. (Kecil)	R	R	M	T	E
V. (sangat kecil)	R	R	M	T	T

INTEGRATED RISK ASSESSMENT AND MANAGEMENT						**Risk Analyst:**					
RISK REGISTER FOR FEL2 / FEL3 / EXECUTION - ENGINEERING						**Risk Controller:**					
Date of last revision:						**Risk Identification Date:**					
TYPE	PHASE	DESC	SEQ.	RISK CODE	RISK DESCRIPTION	RELATIONSHIP	CONSEQUENCE	COMMENTS	QUALITATIVE ASSESSMENT		
									Risk occurrence probability	Severity of risk impact	Severity
		ENG			General						
		ENG			SCOPE						
		ENG			Project adaptation and alignment to business needs, restrictions and purposes						
		ENG			Scope freezing and possible changes in the project						
		ENG			CAPEX						
		ENG			CAPEX definition: services, indirect costs and spare parts.						
		ENG			DATA SURVEY						
		ENG			Geotechnical drillings.						
		ENG			ENGINEERING TEAM						
		ENG			Engineering team and designer qualification and knowledge with project scope						
		ENG			Engineering team and designer sizing and continuity						
		ENG			ENGINEERING PROJECT						
		ENG			Progress of engineering execution						
		ENG			Lead-time of drawings revision cycle of the project and vendor						
		ENG			Communication with the field engineering team						
		ENG									
		ENG									

The Next Steps,…

QUALITATIVE RISK ANALYSIS

NO	Code Risiko	Jenis Risiko	Probability (P)	Impact (I)	Severity (S=PxI)
		TAHAP DESIGN/ENGINEERING			
1	E1	Ketidaksempurnaan Design	4	5	20
		TAHAP ADMINISTRASI DAN KONTRAK			
2	AK1	Ketiadaan bukti formal tentang dokumen IMB, AMDAL	2	4	11
3	AK2	Ketiadaan ijin pendirian direksi kit	3	2	6
4	AK3	Ketidakjelasan kemampuan keuangan partner	2	4	8
5	AK4	Ketidakjelasan split of work	2	4	8
		TAHAP KONSTRUKSI			
6	C1	Ketidakcukupan pengetahuan dan keterampilan	2	3	6
7	C2	Ketidaksesuain koordinasi dan komunikasi	3	2	6

Probability-Impact (P-I) matrix: the multiplication of the scale value of probability and impact (P x I). The result is classified into high risk, moderate risk, or low risk

		IMPACT				
		Very Low	Low	Medium	High	Very High
		1	2	3	4	5
PROBABILITY	Very High 5	5	10	15	20	25
	High 4	4	8	12	16	20
	Medium 3	3	6	9	12	15
	Low 2	2	4	6	8	10
	Very Low 1	1	2	3	4	5


RISK
MANAGEMENT
PROJECT
LOSS
RESOURCES
PROBABILITY
IMPACT
COMMUNICATION
PROCESS
EVENT
OCCURRENCE
CONSEQUENCES
INFORMATION
THREATS
MEASURES
PLAN
METHOD
TECHNOLOGY
IDENTIFICATION
DEVELOPMENT
IMPLEMENTATION
ANALYSIS
MITIGATION
REDUCTION
VALUE
INSURANCE
BUSINESS
ASSESSMENT
COST
TIME
ORGANIZATION
COMPANY
TRANSFER
AVOID
SOFTWARE
OCCUR
EVENTS
POSSIBLE
PRACTICE
CONTROLS
POTENTIAL
BASED
APPLIED
MANAGING
IDENTIFIED
ASSESSED
HAZARD
AVAILABLE
SEVERAL
ENTERPRISE
NEGATIVE
HIGH
CONTEXT
KNOWN
SOURCE
CASE
SECURITY
FINANCIAL
TERMS
CAUSE
FOLLOWING


THANK YOU