



**Integration of Environmental Considerations in
the Independently Financed Water and Power
Projects (IWPP) being undertaken in
Saudi Arabia**



Hesham Alghamdi

**Project Development Manager
ACWA Power Projects**

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Agenda

- An introduction to Project Financing
- Environmental regulations
- (SEA) Report
- Examples of Environmental Considerations
- Summary



What is Project Financing

- Financing on the basis of the expected future revenues
- Structured with limited recourse to the shareholders
- Commercial lenders may provide up to 90% of the project funding requirements
- Require a very long development period due to robust due diligence process
- Address the entire spectrum of risks including environmental consideration
- Usually for major utility or public service projects



Environmental Standards

- National Regulatory Requirements of PME
 - General Environmental Regulations 2001 (GER 2001)
 - Environmental Standards (MEPA 1409-01)
- Lenders require compliance with Equator Principals
 - Banking industry framework to address Environmental & Social Risks in Project Financing
 - Based on World Bank document (WB OP/BP 4.01, 2004 Update)

Social and Environmental Assessment



SOCIAL AND ENVIRONMENTAL ASSESSMENT REPORT

- Identifies potential social and environmental risks
- Evaluates social and environmental impacts
- Proposes measures to avoid or mitigate impact
- Identifies framework for long term management and monitoring of the impact mitigation plan



Environmental Assessment

- **Location:** Suitability and alternatives
- **Technology and Design Solution:** footprint and alternate processes
- **Waste Disposal:** Hazardous materials & Land Fills
- **Soil:** Ground Contamination
- **Air:** Ambient Air Quality and stacks emissions
 - **Sea:** Marine Water quality, Ecology and Recirculation
 - **Noise:** workers and near by communities
- **Aesthetics:** Visual intrusion

Marine Water quality, Ecology and Recirculation

○ Modeling of water flow patterns

- Model construction works impacting sea conditions
- Model Operational flows, both drawn from the sea to the project and discharged from the Project into the sea

○ Assessment of Impact

- Predict impact to the marine environment and to existing infrastructure during construction and operations
- Predict impact on any nationally or internationally designated protection sites



Marine Water quality, Ecology and Recirculation

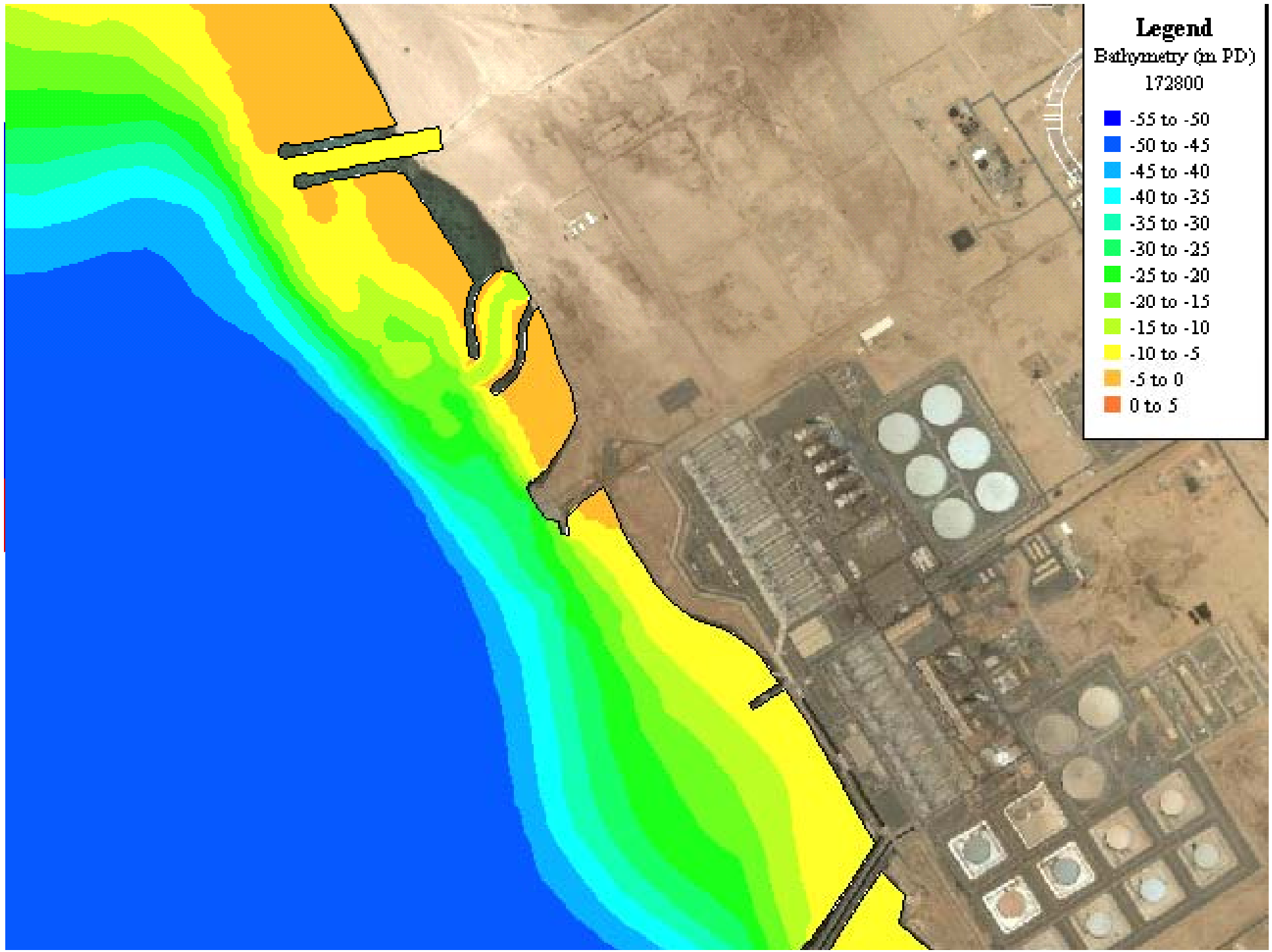
Typical Mitigation Measures

- **During Construction**

- Minimizing any dredging works to avoid loss of coral reef
- All dredged material to be disposed off at designated sea disposal sites.
- Use of silt curtains to minimize deposits of sand on coral reef

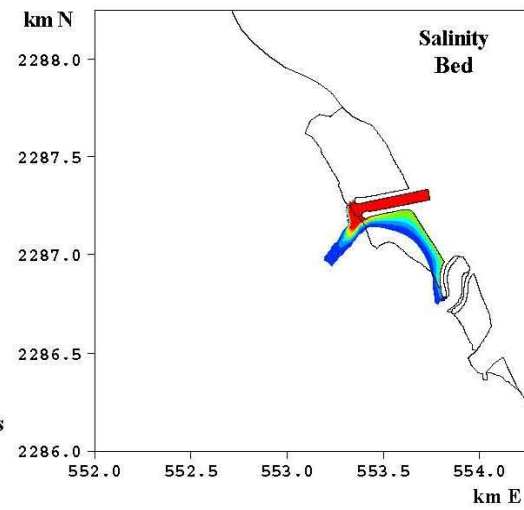
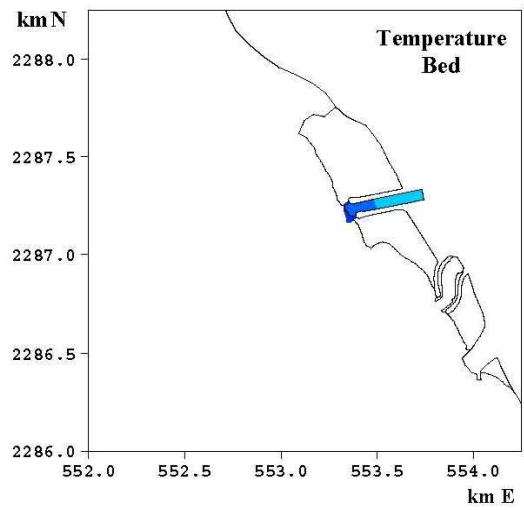
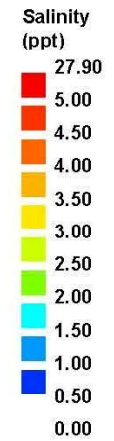
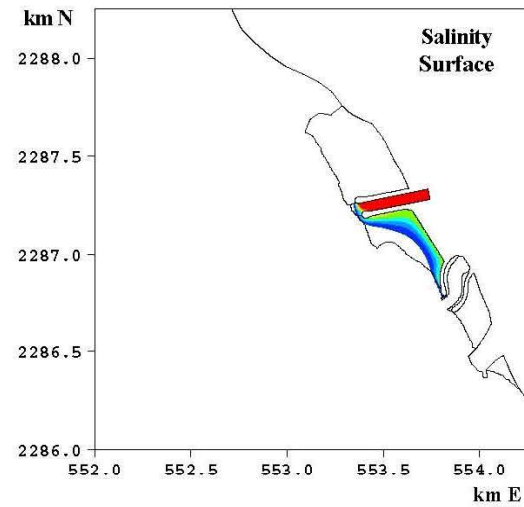
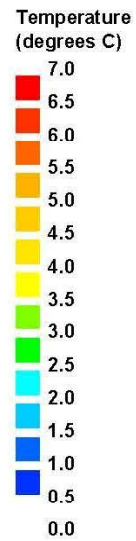
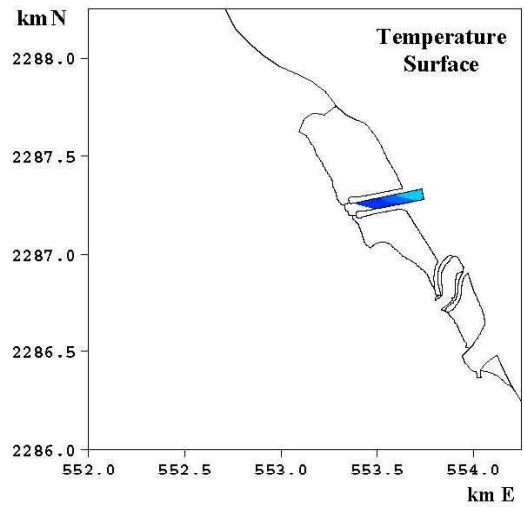
- **During Operations**

- Develop an Operational Environmental Management Plan (OEMP)
- Environmental Compliance and Audit programs
- Emergency planning to minimize risk of unplanned or accidental discharge

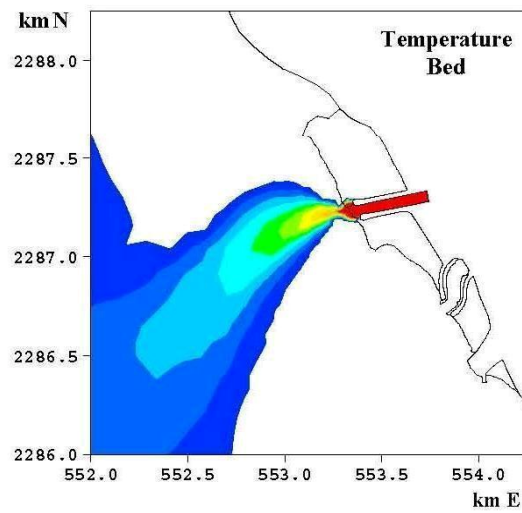
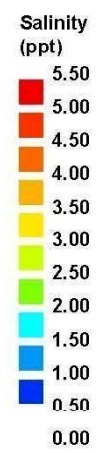
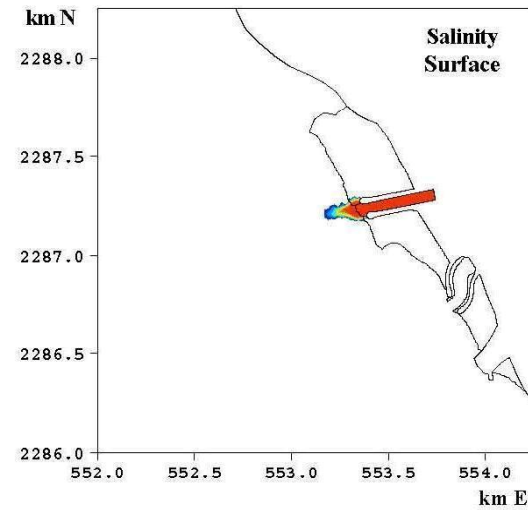
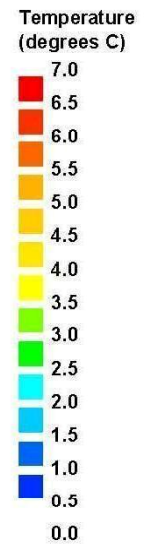
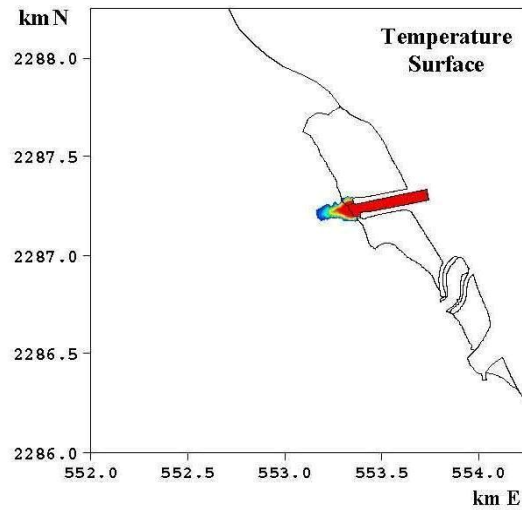


Legend
Bathymetry (m PD)
172800

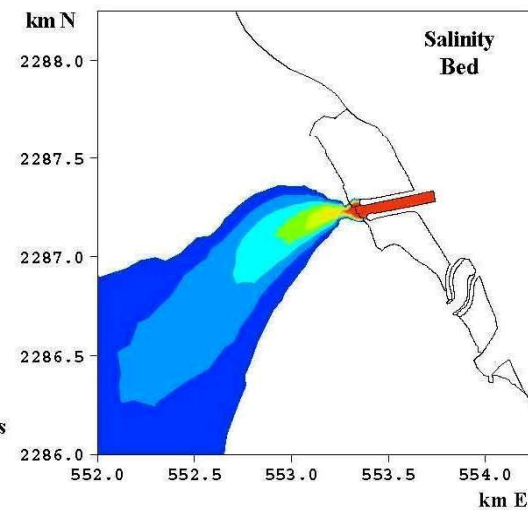
■	-55 to -50
■	-50 to -45
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■	-40 to -35
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■	-15 to -10
■	-10 to -5
■	-5 to 0
■	0 to 5

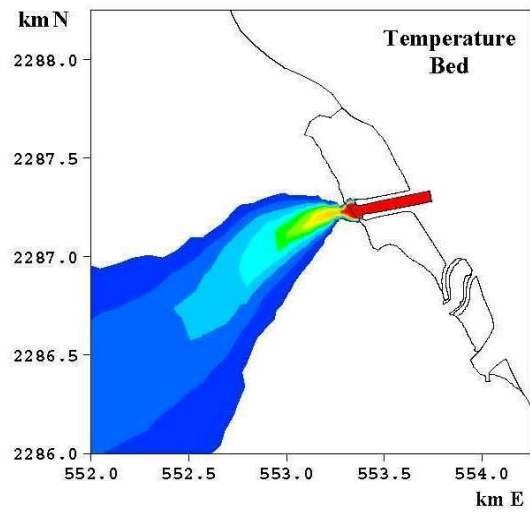
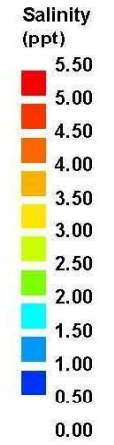
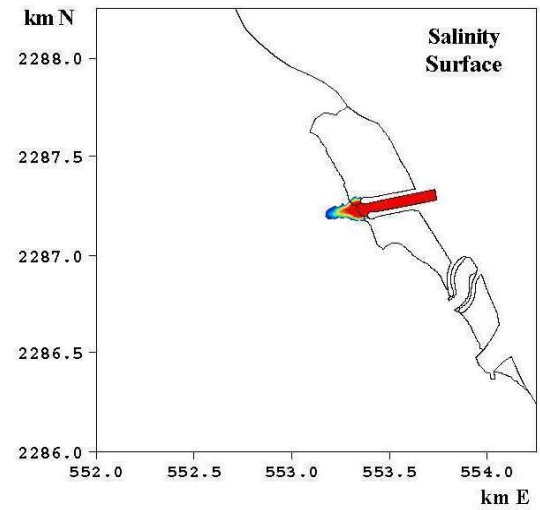
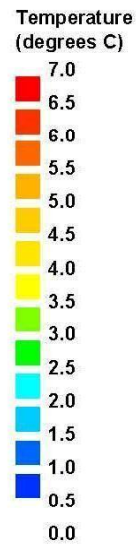
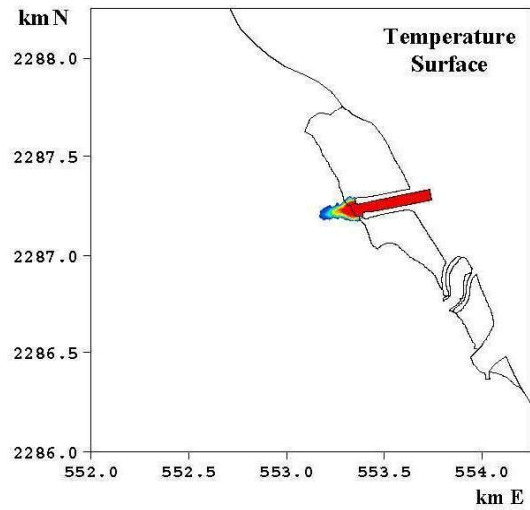


1 day 18 hours

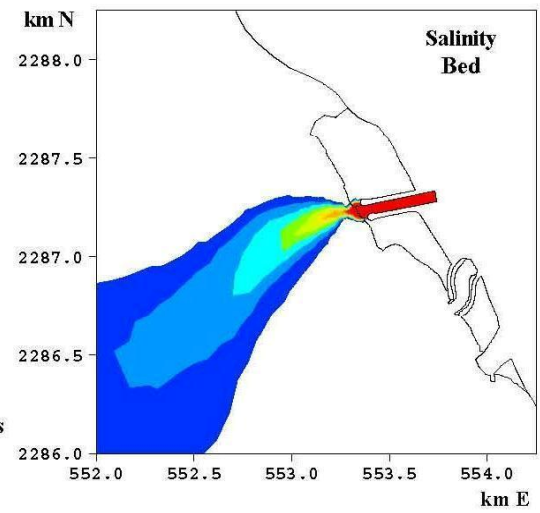


1 day 18 hours





1 day 18 hours





Noise Abatement

Noise Assessment Survey

















(during construction & Operations)

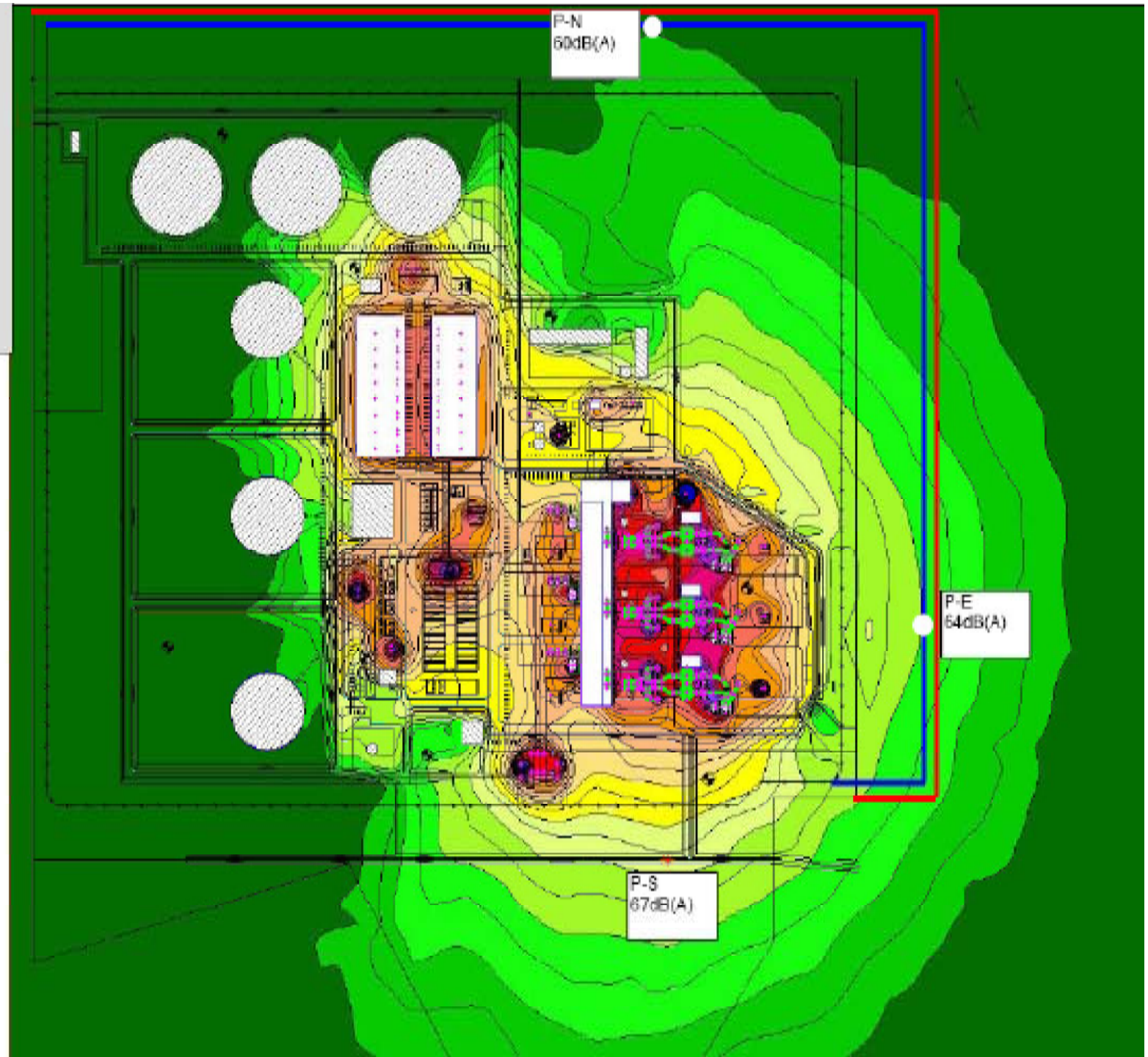
- Baseline Conditions
- Superimpose noise from Machinery
- Develop a noise propagation chart
- Develop mitigation measures

Legend

- Industrial sources point
- Industrial sources area
- Building
- Screening edge
- Floating Screen
- Ground effects
- Elevation line
- Industrial building
- Plant sources in room
- Receiver
- Calculation area

Noise Level LrD in dB(A)

	≤ 58
	$58 < \leq 60$
	$60 < \leq 62$
	$62 < \leq 64$
	$64 < \leq 66$
	$66 < \leq 68$
	$68 < \leq 70$
	$70 < \leq 72$
	$72 < \leq 74$
	$74 < \leq 76$
	$76 < \leq 78$
	$78 < \leq 80$
	$80 < \leq 82$
	$82 < \leq 84$
	$84 < \leq 86$
	$86 <$





Typical Permissible Noise Levels

Location	Permissible Noise Level
At 1m outside the plant fence	Max. 60 dB
At 1m away from open air installations	Max. 85 dB
Within CCR	Max. 50 dB
Within turbine hall	Max. 90 dB
Inside offices	Max. 55 dB





Mitigation Measures

- Manipulate plant design & orientation to minimize impact on accommodations
- Limit Noisiest activities to daytime
- Equip noisy machinery with silencers
- Proper construction material Selection
- Utilize acoustic enclosures



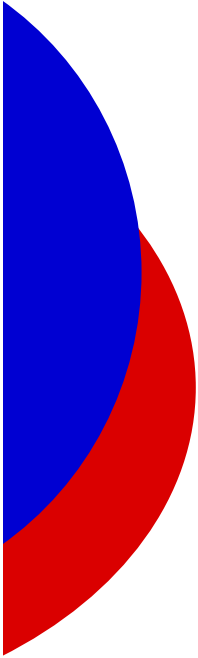
Social Impact Mitigation not left behind

- Consideration of social impact is an integral part of environmental impact assessment.
- Thus now it is explicitly recognized even through the title of the reports: Social & Environmental Assessment (SEA)
- Evaluation includes impact on the local economy and community including impact on tradition, custom & livelihood.
- Labor movement, employment creation and creation of value to the local community.
- Much of the identified measures are usually implemented through adoption of appropriate operating policies and procedures.



Commitment to Protecting the Environment

- Recognizing the significance of this issue significant investment is being made in promoting technical innovation to reduce impacts.
- Typically 15 to 20% of the capital cost and 10% of operating cost is being spent on mitigating environmental impact.
- Kingdom of Saudi Arabia has a well structured regulatory regime.
- PME is continually being strengthened to closely monitor compliance.
- The adoption of Equator Principles by the Financing Community is also ensuring that privately financed infrastructure development and operation rigorously mitigates environmental impact.



Thank you for your attention

Contact Details:

Hesham Alghamdi

hesham@acwapower.com

+966 55 22 00 192