

# Presentation for Posco-Daewoo Pipeline Joined with Chinese Pipelines Across Myanmar

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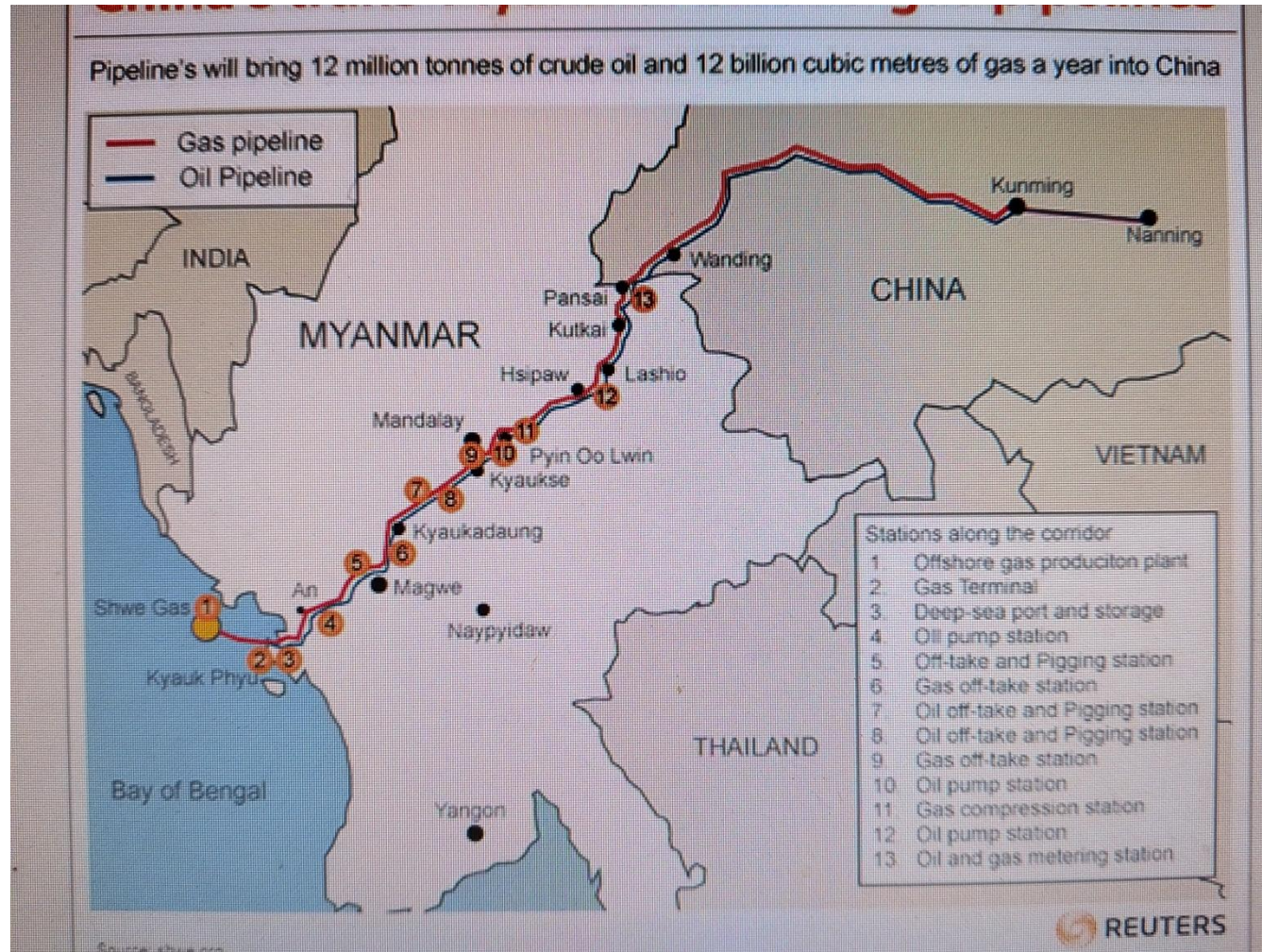
# MAIN PHRASES OF PIPELINE PROJECT

- 1) Site Survey and Key Design (Company)
- 2) Detailed Drawing Issued for Construction (Contractor's Designer)
- 3) Procurement of Material (MR, PO, by Contractor)
- 4) Logistic- Camp, Work areas, Transport, Equipment set up (Contractor/ Company)
- 5) HR/ Planning/ Construction/ Safety/ Quality Document Submission/ Approval (Contractor)
- 6) Manpower& Resources Mobilization (Contractor)
- 7) Construction Activities:
  - a) Right of way
  - b) Trench excavation
  - c) Line pipe stringing & receiving inspection
  - d) Welding & NDT
  - e) Lowering & Tie in Welding
  - f) Full Thrust Anchor (FTA) Installation
  - g) Pipe Cold Bending
  - h) Temperature Tie in Welding
  - i) Backfilling and Berming
  - j) Hydrotest (Internal Cleaning/ Gauging, Caliper Survey, Hydrotest, Dewatering, Lay up with Air or N2, Chemical Cleaning)
  - k) Piping/ Electrical/ Instrumentation/ Telecom work completion
  - l) Cathodic Protection (Temporary followed by permanent)
  - m) Complete Painting Coating Stenciling completion
  - n) Project Mechanical Completion (PMCC) reinstatement.

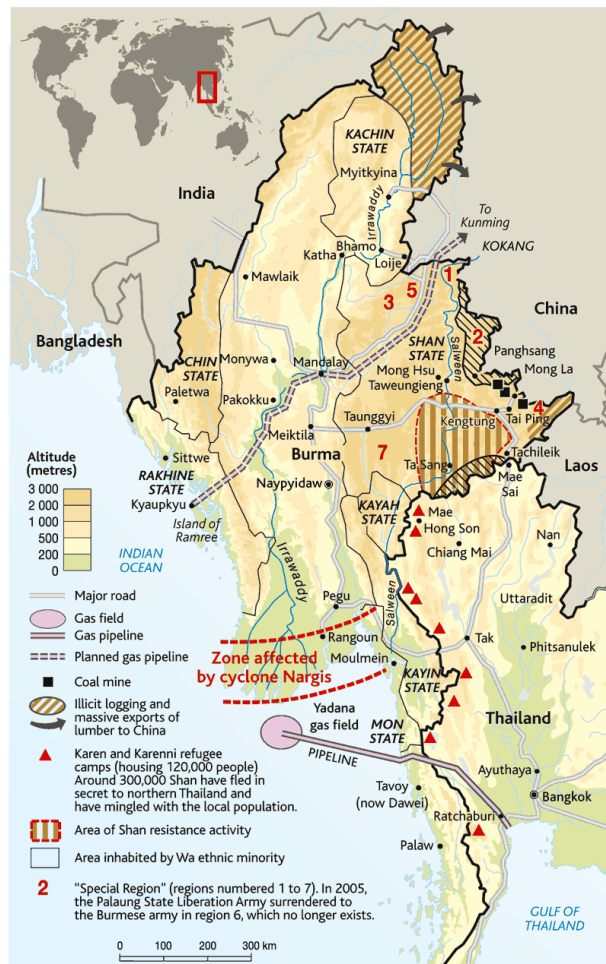
# SAFETY GUIDELINES

- SAFETY GUIDELINES
- FOR
- INTERNATIONAL ONSHORE
- PIPELINE CONSTRUCTION
- INDEX
- INTRODUCTION
- THE WORLD FEDERATION SAFETY POLICY
- PART 1 BASIC SAFETY GUIDELINES
  - A Safety Responsibilities
  - B Overall Safety Guidelines
  - C Pipeline Construction Operational Safety
  - D Safety Guidelines for Specific Pipeline Operations
  - E General Safety Guidelines
  - F Sample Safety & Accident Forms
  - G Useful Information
- PART 2 ASSOCIATION SPECIFIC GUIDELINES
- PART 3 COUNTRY SPECIFIC GUIDELINES
- PART 4 PROJECT SPECIFIC GUIDELINES
- PART 5 ADDENDA

# CNPC trans-Myanmar Oil & Gas Pipeline



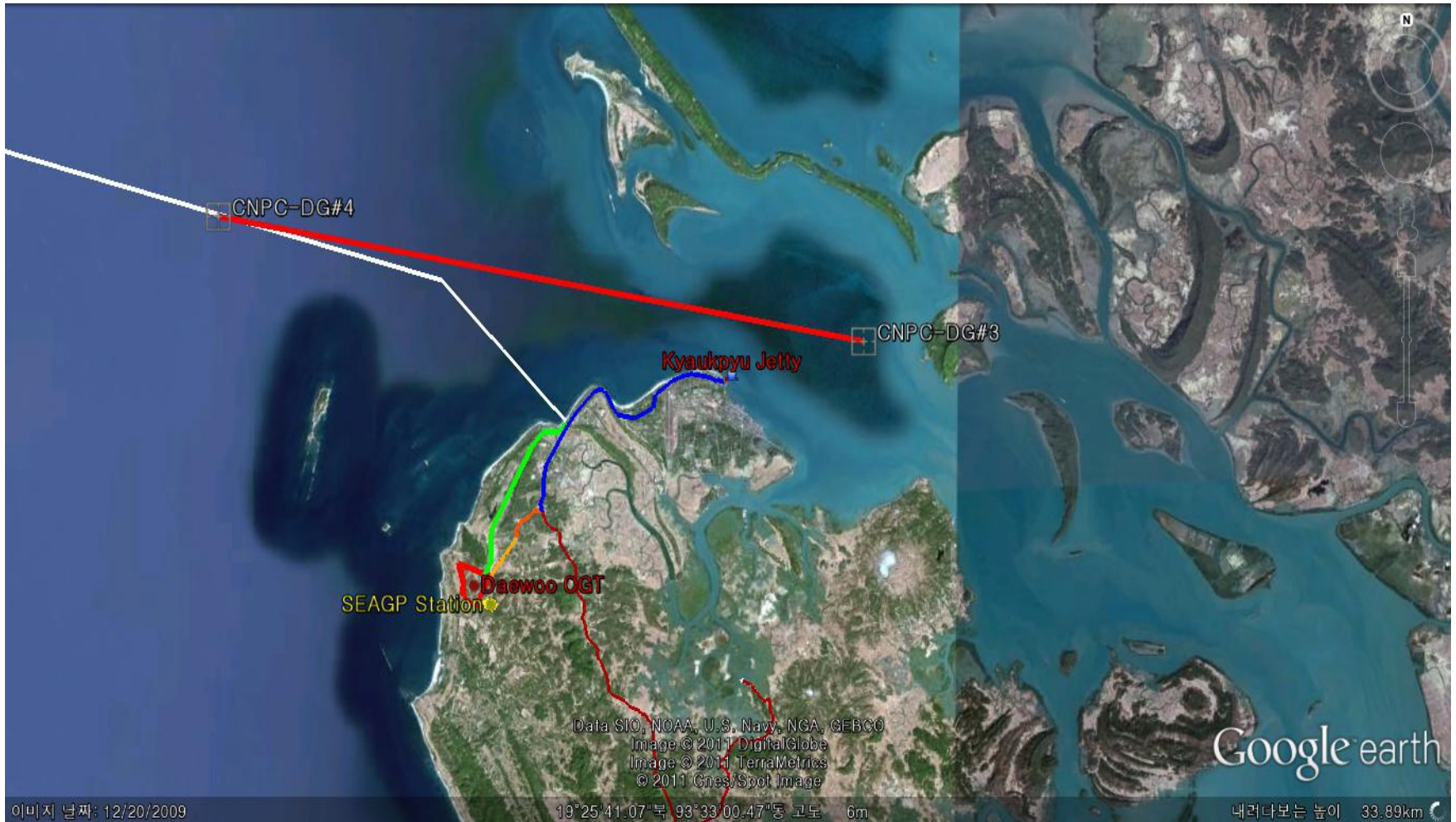
# Major Pipeline Map in Myanmar 2019



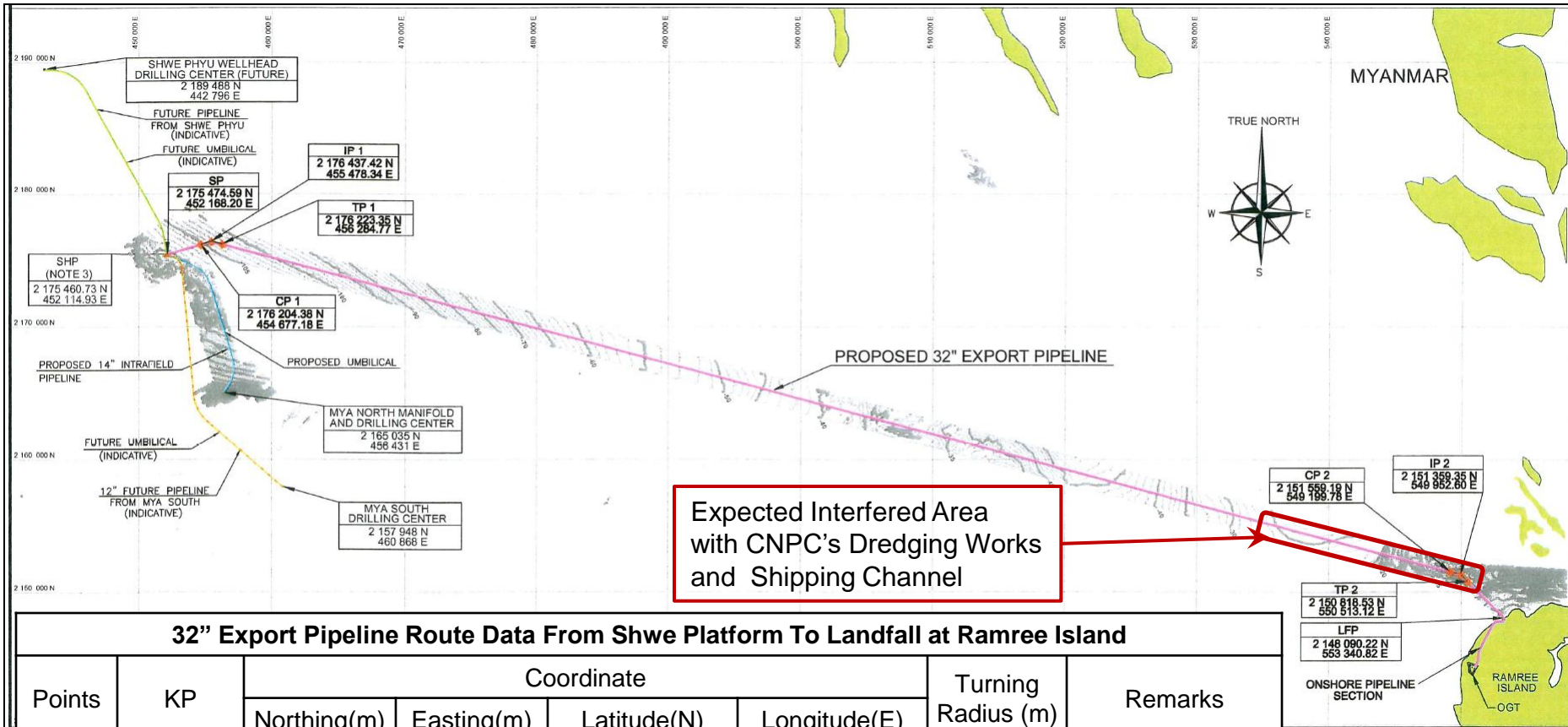
Sources: André and Louis Boucaud; United Nations High Commission for Refugees PHILIPPE REKACEWICZ  
 United Nations High Commission for Refugees; BBC; Human Rights Watch;  
 Norwegian Refugee Council Internal Displacement Monitoring Centre



# PIPELINE MAP FOR CNPC & DAEWOO



# 32" Export Pipeline Route for SHWE Project and Dredging Works Area for CNPC

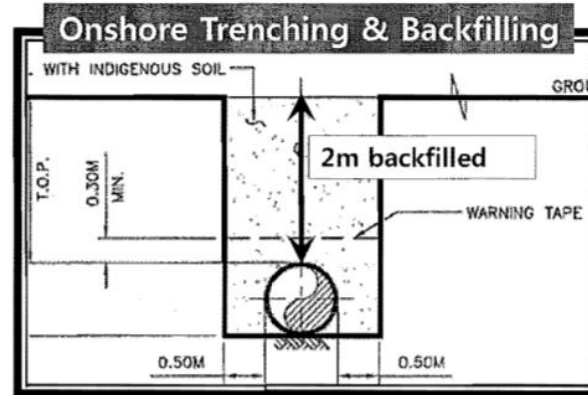
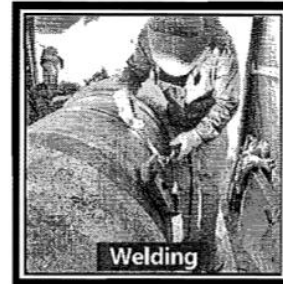
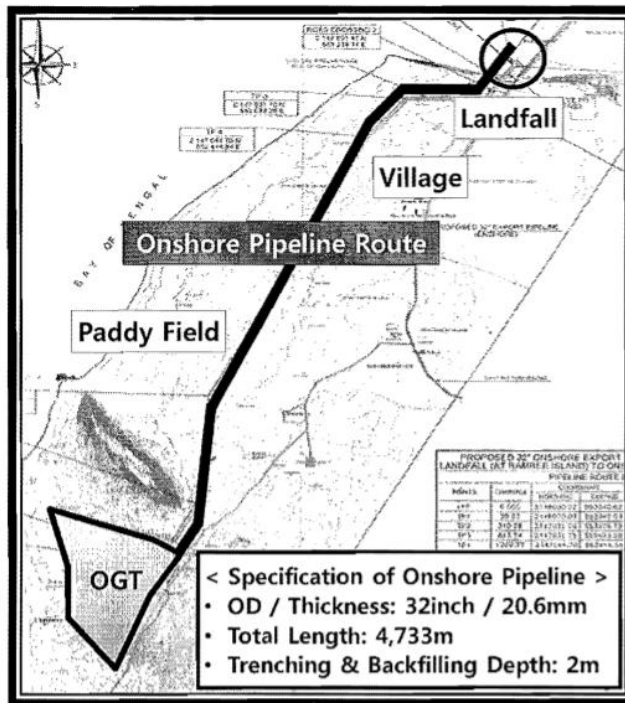


**32" Export Pipeline Route Data From Shwe Platform To Landfall at Ramree Island**

Points	KP	Coordinate				Turning Radius (m)	Remarks
		Northing(m)	Easting(m)	Latitude(N)	Longitude(E)		
SP	0+000	2175474.59	452168.20	19° 40' 26.519"	92° 32' 37.232"	-	At Shwe Platform
CP1	2+613	2176204.38	454677.18	19° 40' 50.474"	92° 34' 03.337"	-	
IP1	-	2176437.42	455478.34	19° 40' 58.121"	92° 34' 30.833"	3000	
TP1	4+241	2176223.35	456284.77	19° 40' 51.221"	92° 34' 58.548"	-	
CP2	100+373	2151559.19	549199.78	19° 27' 28.369"	93° 28' 07.499"	-	
IP2	-	2151359.35	549952.60	19° 27' 21.800"	93° 28' 33.300"	3000	
TP2	101+898	2150818.53	550513.12	19° 27' 04.155"	93° 28' 52.473"	-	
LFP	105+827	2148090.22	553340.82	19° 25' 35.131"	93° 30' 29.177"	-	At Ramree Island

# DAEWOO Onshore Pipeline

## ◆ 32" Onshore Pipeline ◆



✓ Installation Completed in May 2012



# PREPARATION OF SHORE PULL OPERATION



Offshore Pipe Lay Barge near Shore



Winches Applied for Pulling Subsea Pipeline



Winch ropes at shore pull operation



Preparation for Shore Pull Operation



Pipeline at Shore approach



Onshore pipes ready at shore pull area



# SHORE APPROACH PREPARATIONS



Pouring Concrete for Footing of Pipe Support



Installation of Wire Mesh for Footing at V Ditch



Pouring Concrete for Wall of V-Ditch



Installation of Rebar for U Ditch



Installation of Rebar for Ground Slab



Laying Geo-membrane for Cable Tray Supports



# DEP PIPELINE PRESENTATION TO AUTHORITIES



UKL on Hyundai Clyde for Offshore Pipeline



Hyundai Clyde for Offshore Pipeline



DEP Persons checking Welding & Inspection



UKL Presentation for DEP Pipeline to Authorities

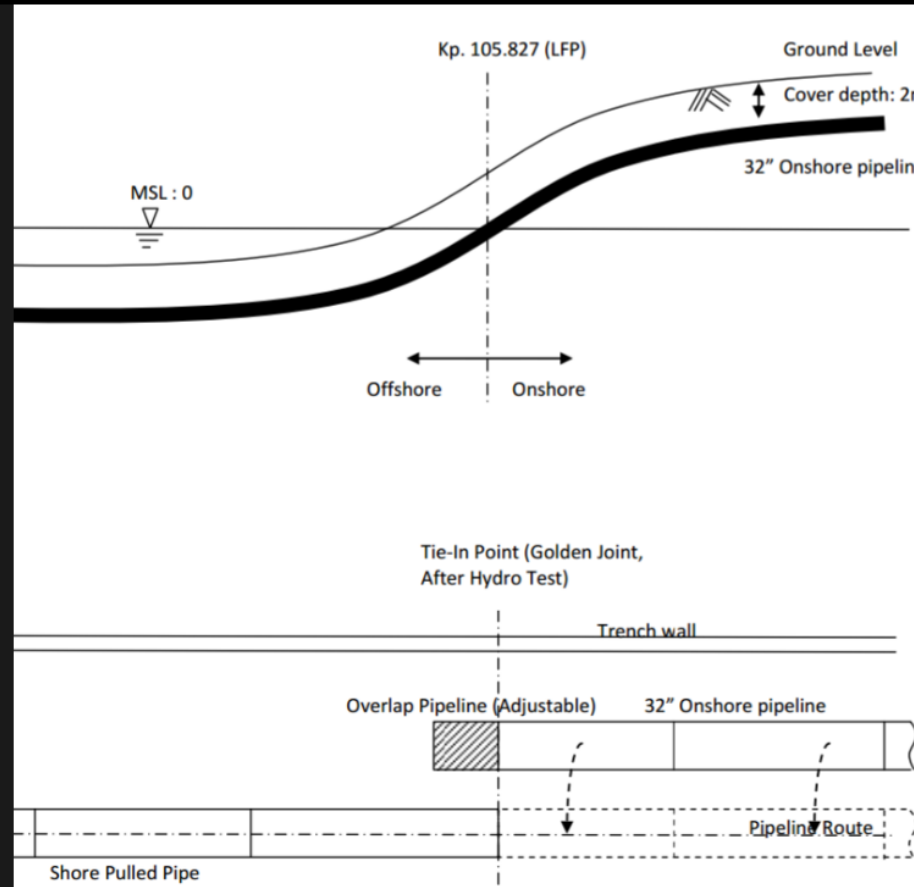


DEP Persons checking Pipeline welding



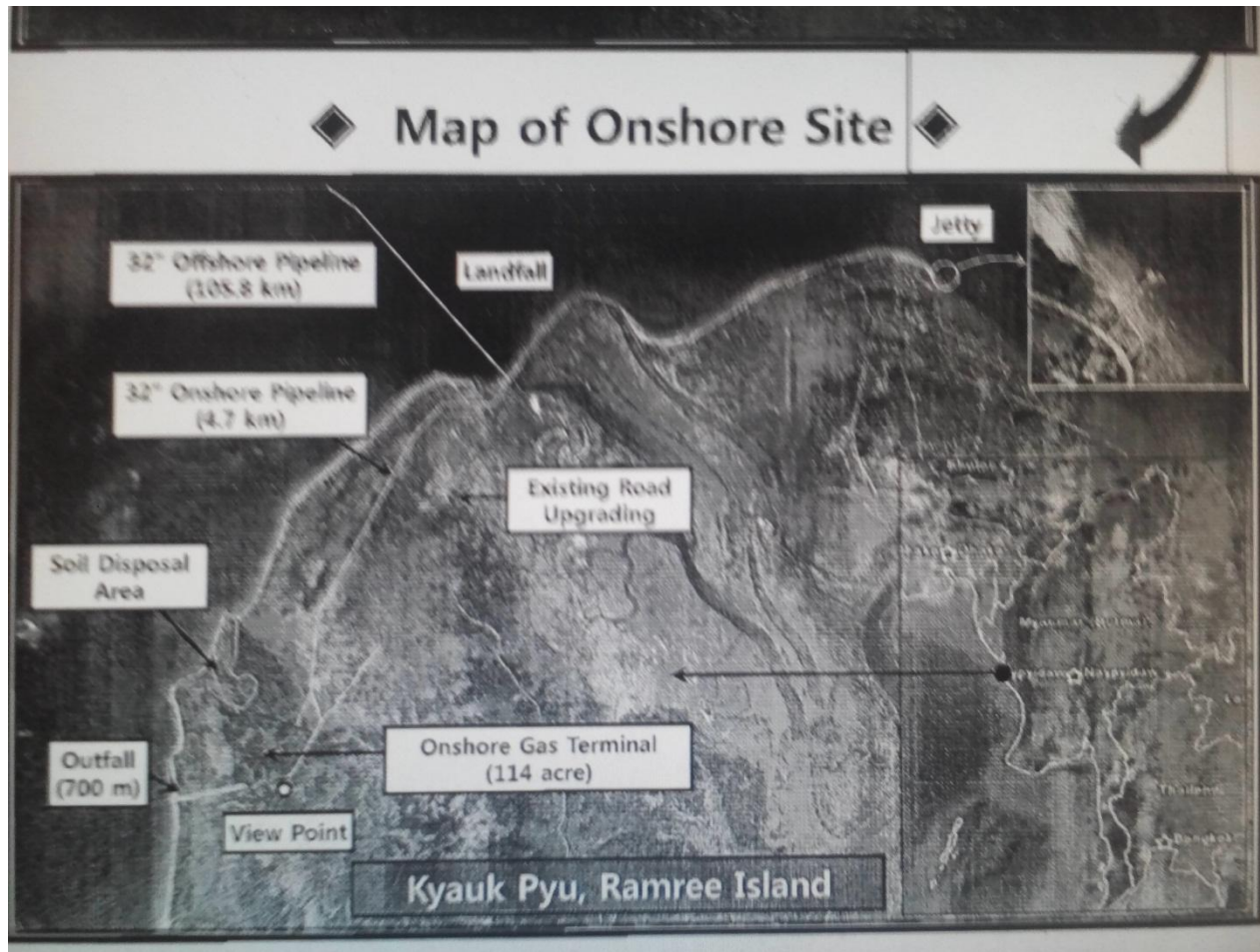
DEP Persons checking Pipeline welding

# Onshore Pipe Tie-In at Landfall





# Map Of Onshore Site

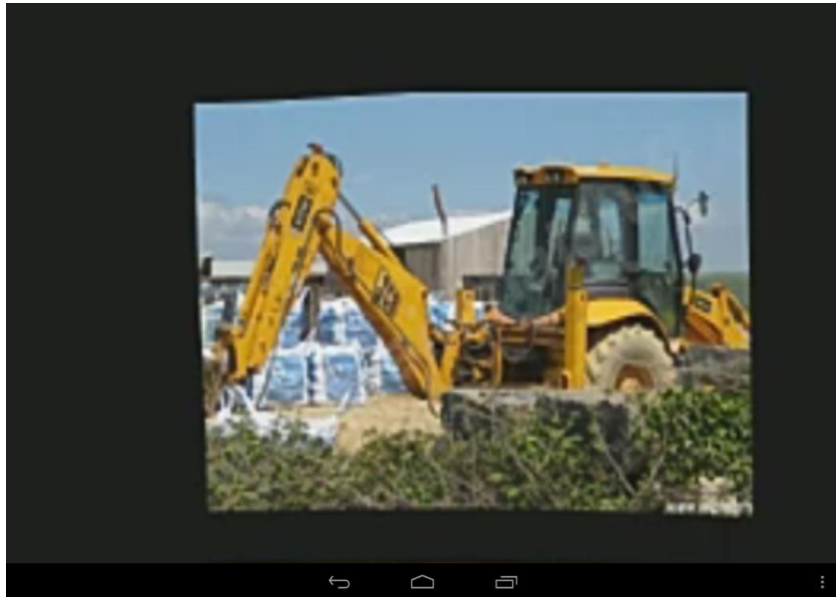


# ROW (RIGHT OF WAY) SURVEY



- Centerline of Pipeline shall be established between one TP to the next TP (Turning point) and shall be demarcated by staking of wooden pegs at an interval of 100 m for straight sections of ROW and 10, for turning points.
- Wooden pegs shall be painted in red color & are staked at every 100m on either side of ROW.

# CLEANING AND GRADING THE ROW



- All obstacles causing hindrance in construction/ laying pipeline are removed.
- Entire ROW (Right of Way) is graded for movement of equipment and pipe vehicles.
- Temporary approaches/ bridges, if required, are constructed for movement of equipment, vehicles & personnel.

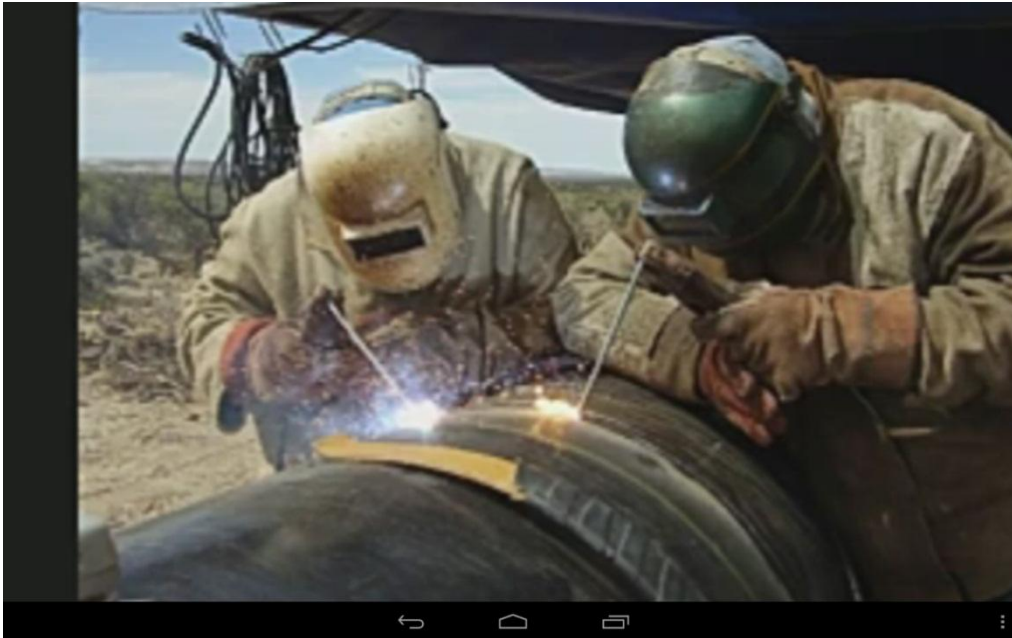
# PIPE STRINGING



- Coated Pipes shall be supported with Concave shaped padded wooded skid/ sand filled bag and wedge in such a way that bottom of coated pipe remain above ground.
- Pipes shall be supported at minimum two locations.
- Pipe number, Heat number, Coat number & length shall be transferred and recorded in serial order.



# FITUP AND MAINLINE WELDING



- Each Pipe shall be thoroughly checked internally & externally for visual defect/ damage.
- Use of internal clamp is mandatory for pipe dia > 10". except tie in joints, fitting etc. in such case external clamps are used.
- The details of welding such as the weld No., Pipe No., Heat No., Length, Welder's No., Fit up Date and welding date shall be marked on the pipes.

# Full Trust Anchor (FTA)



# PREPARATION FOR WELDING NEARSHORE





# PIPE FIT UP PREPARATION





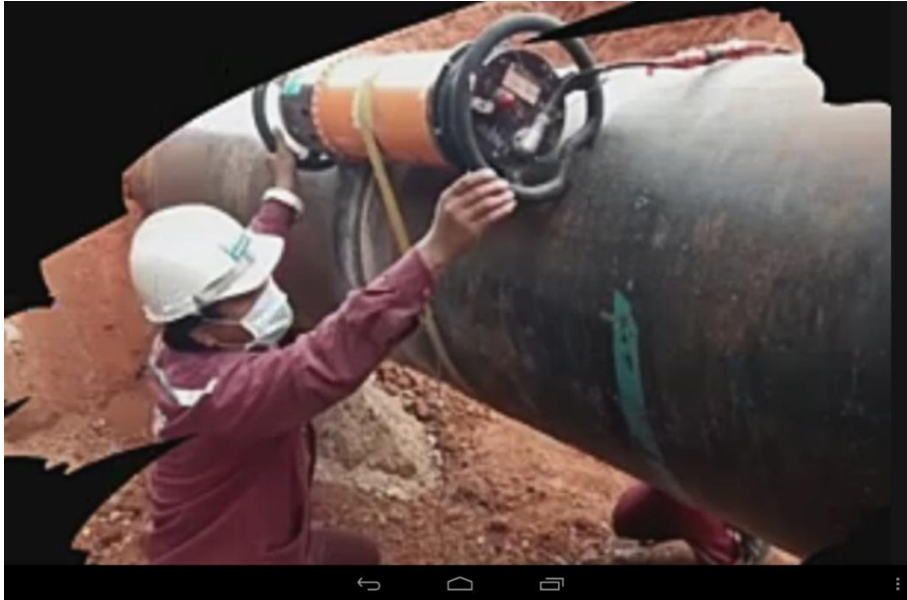
# PREPARATION FOR NDT



# PREPARATION FOR PIPE FIT UP



# RADIOGRAPHY



- Radiographic testing of welds using X-ray generators for detecting the discontinuities in the welded joints of pipeline.
- Each radiographic area shall be barricaded off and warning signs placed around the perimeter.
- Only experienced crawler Radiography Technicians shall carry out the job.

# TRENCHING



- Trial Pit (If required) shall be carried out every appropriate interval adjacent to the trench to find and uncover the existing facilities e.g pipes, underground cables etc.
- Trench excavation is carried out along staked centerline of pipeline.
- The width of excavation for trench shall be minimum (Pipe diameter plus 200mm either side).
- Excavated materials shall be deposited at sufficient distance (Approx.: 2m) away from the edge of excavation.



# LOWERING



- The Trench shall be maintained in a dry condition just before lowering.
- Pipes shall be lowered into the trench by using a crane or a side boom whereas pipes of multiple lengths (pipe section) made ready for lowering along the side of the trench shall be lowered into the trench using as many as three cranes.
- The pipeline must be laid without interruption for the whole or the length of section available

# LEVELLING & PADDING



- To take levels as soon as the lowering activity is completed.
- Post Padding of 300mm minimum thick layer of soil is put over and all around the pipe immediately after lowering.
- Trench should be dry prior to padding.

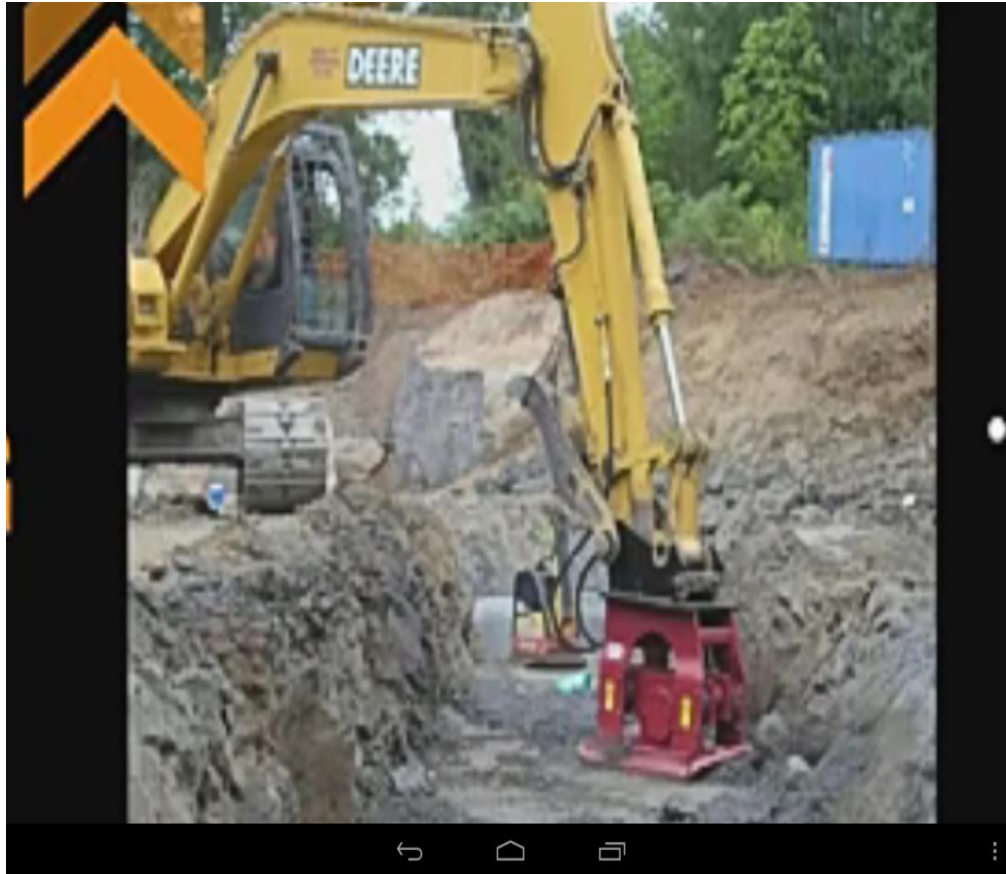
# FIELD JOINT COATING



- The cut-back areas of coated pipes where weld joints are made are to be coated by field joint coating.
- Field joint coating material is heat shrinkable wrap around sleeve used as anticorrosion coating of buried onshore pipeline.
- Each sleeve joint is inspected by means of a full circle Holiday-Detector.
- Holiday examination of the entire pipe coating shall be carried out before the pipe is lowered into the trench.

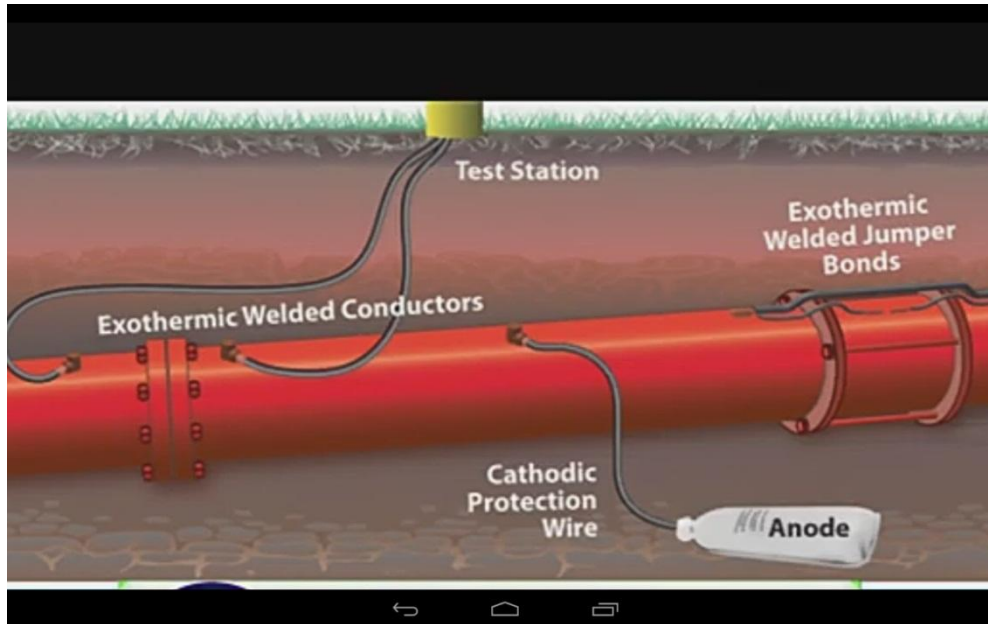


# BACKFILLING



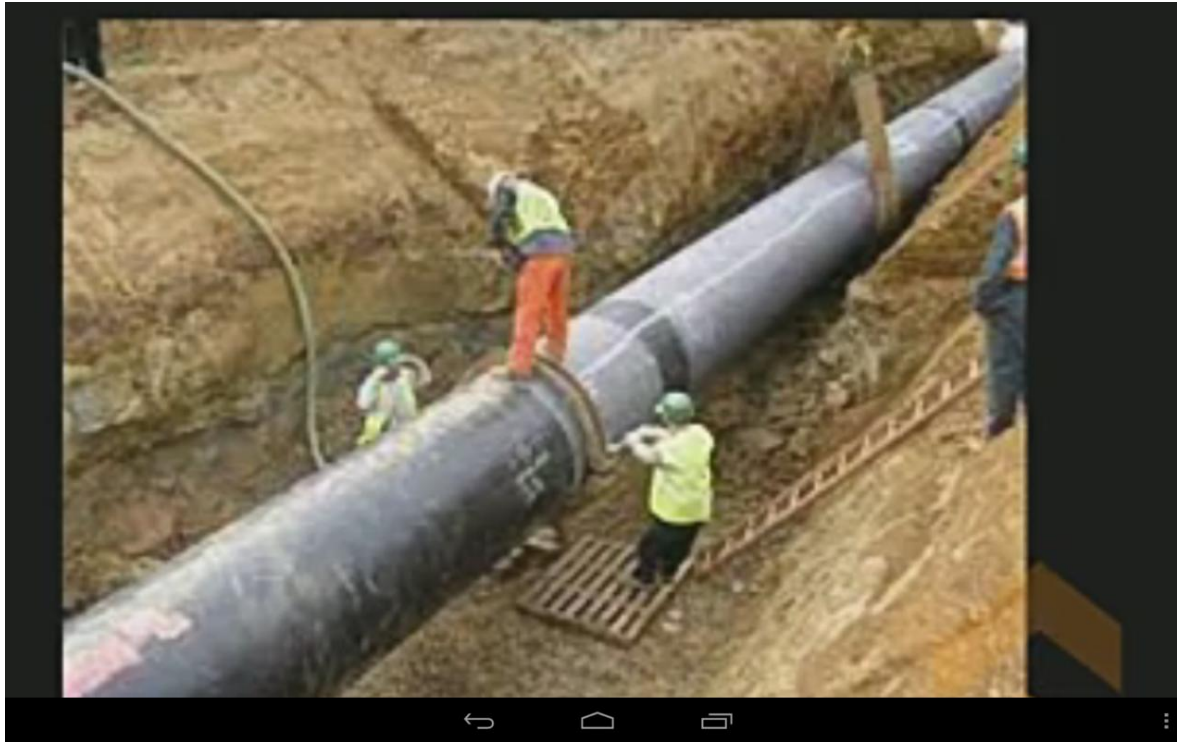
- The cut-back areas of coated pipes where weld joints are made are to be coated by field joint coating.
- Field joint coating material is heat shrinkable wrap around sleeve used as anticorrosion coating of buried onshore pipeline.
- Each sleeve joint is inspected by means of a full circle Holiday- Detector.
- Holiday examination of the entire pipe coating shall be carried out before the pipe is lowered into the trench.

# CATHODIC PROTECTION



Cathodic Protection is a method used to prevent corrosion on pipelines and other metal structures by making the structure the cathode in an electrochemical cell. This is typically achieved by applying a direct current (DC) to the pipeline from an external source, which shifts the pipeline's potential to a non-corroding state.

# TIE IN JOINTS



- The connected sections of the lowered pipelines sections at various locations have to be welded, coated and backfilled to make the sections ready for post installation hydro test.

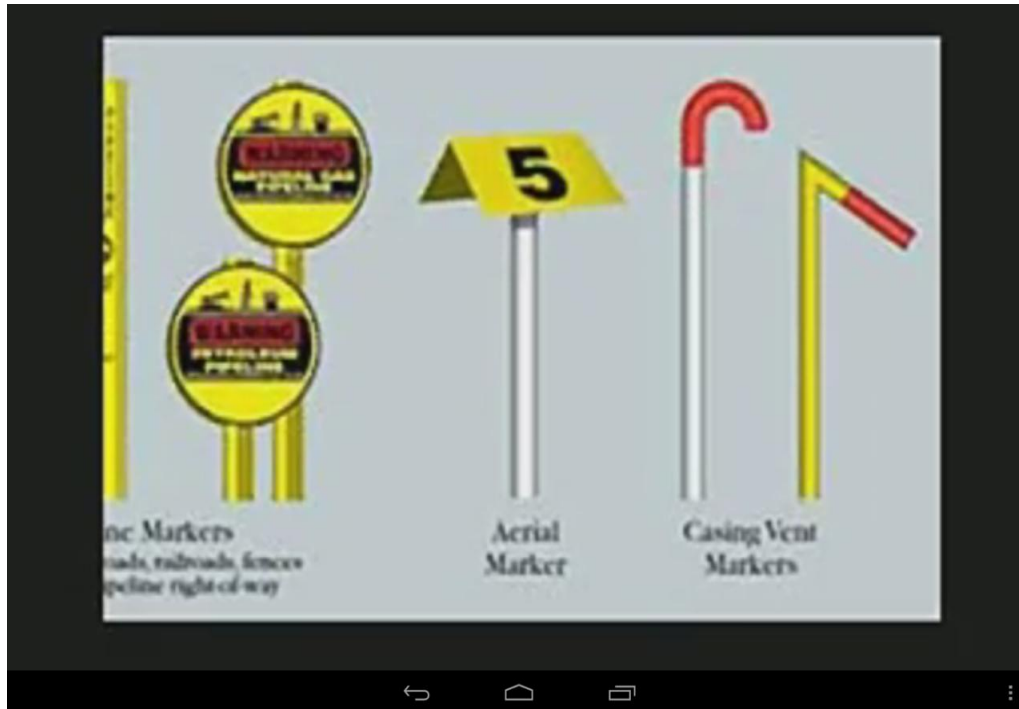


# HYDROTESTING



- Hydrostatic test is performed on entire length of pipeline.
- Hydrostatic test diagram indicating number of test sections minimum and test section test pressure in each test section are prepared before performing hydrostatic test.
- Before water filling, pipeline shall be cleaned with air driven pigs with spring loaded brushes and chiseled to remove all scale, rust, sand etc. from the internal pipe.
- The pipeline shall be depressurized at constant rate. Dewatering shall be carried out by using four cup pigs driven by compressed air. Foam pigs shall be passed to complete the dewatering.

# Pipeline Markers, Clean-up & Restoration



- Following type of markers shall be fabricated and installed along the pipeline route such that they do not cause any hindrance to the regular land user or traffic.
- Aerial markers, Pipeline warning Markers, kilometer Markers Direction Markers.
- Damage to roads, bridges, fences etc., damaged during construction shall be restored to original.

# Commissioning of the Pipeline

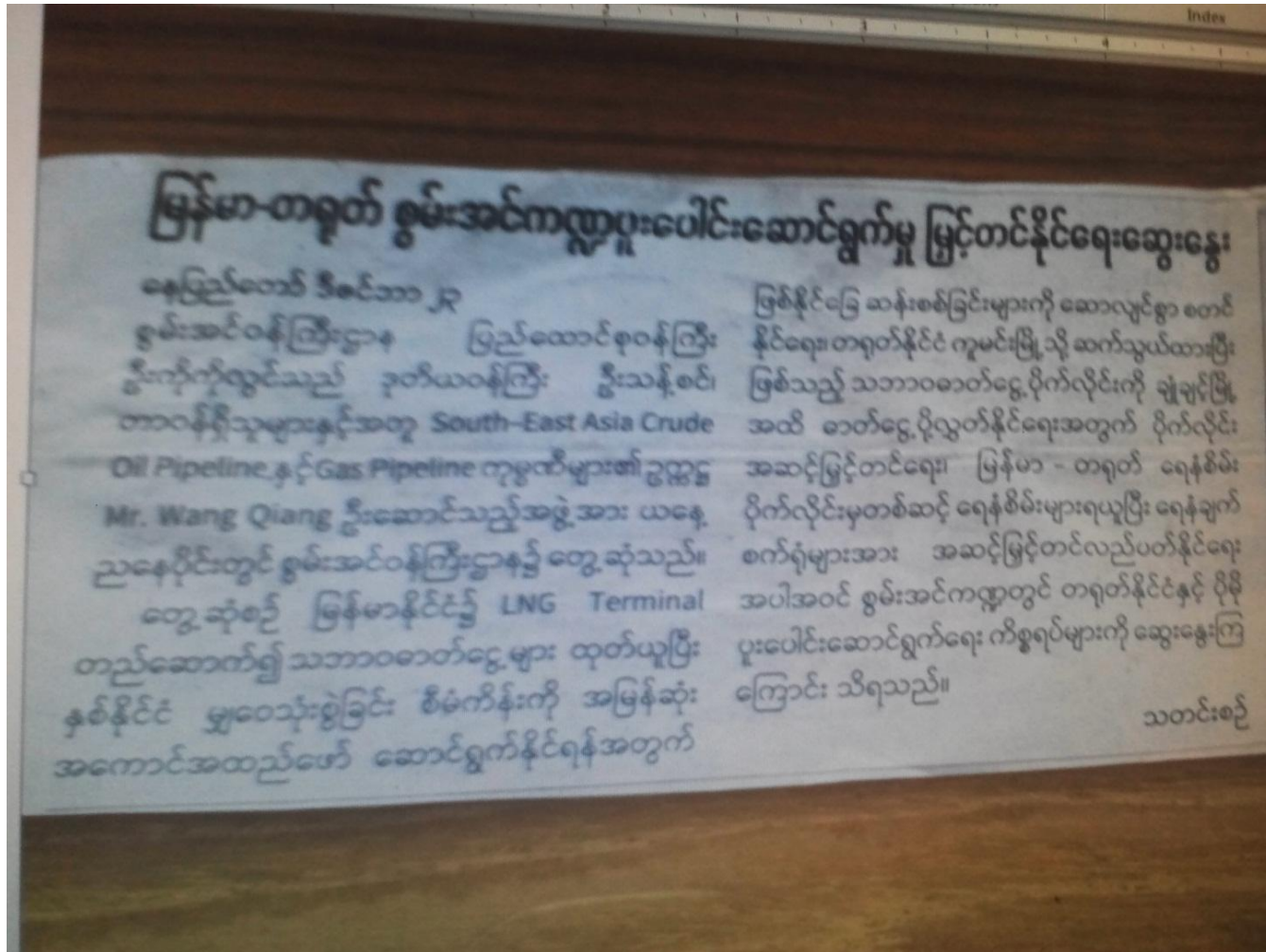
- Commissioning is the process of verifying proper operation in the pipeline. The process checks the installation and ensures control and communication systems are in place and functioning properly. Once the pipeline is deemed ready for service, the line is purged of air and loaded with natural gas.



# Restoration

- Once the actual pipeline construction ends and the pipeline is operational, the clean-up process for the construction right-of-way begins. The goal of this final step is to restore the land to its original condition, as if no construction happened. Crews try to have the land cleaned up and restored **within 20 days of backfilling the pipeline trench**. Weather and site conditions sometimes delay the efforts, but the crew works hard to get the ground back to normal as quickly as possible

# LNG Project from Chinese Pipeline



# Question and Answer for DEP Pipeline

- **Question & Answer**
- **\* What is the size of pipe and how long is the Posco Daewoo pipeline?**
- The Diameter of the Pipeline is 32 inch, wall thickness is 20.6mm and the length of onshore pipeline is 4.733 KM connection with offshore Pipeline 105.827 KM from Shwe Platform.
- **\* From where Chinese pipelines started for exporting Gas & Crude Oil?**
- Chinese gas pipeline 40inch diameter was started from Kyauk- Phyu (KPU) Posco Daewoo OGT/ SEAGP (joint venture between CNPC-SEAP) Camp area. Crude oil pipeline 30inch diameter is started from Madae Island near KPU.
- **\* How many Stations along the Corridor for the pipelines?**
- 13 Stations along the Corridor for the Gas as well as the Crude oil.
- **\* What is ROW and how wide for Posco Daewoo Pipeline 32inch Pipeline ROW?**
- ROW Is Right Of Way. The average width is about 50feet along the land area. Pipeline center is at about one third of the ROW Width for easy transportation of Pipes and materials.
- **\* What is Cleaning and Grading the ROW?**
- Cleaning and Grading the ROW means removing all obstacles hindering in construction and pipeline laying and entire ROW is graded for movement of equipment and vehicles and also construction of Temporary approaches/ bridges if required.
- **\* What is the meaning of Pipe stringing?**
- Coated Pipes shall be supported with Concave shaped padded wooded skid/ sand filled bag and wedge in such a way that bottom of coated pipe remain above ground. Pipes shall be supported at minimum two locations.
- **\* What is Fit-up and mainline welding?**
- Each Pipe shall be thoroughly checked internally & externally for visual defect/ damage.
- Use of internal clamp is mandatory for pipe dia> 10".except tie in joints, fitting etc. in such case
- External clamps are used. The details of welding such as the weld No., Pipe No., Heat No.,
- Length, Welder's No., Fit up Date and welding date shall be marked on the pipes.
- **\* What is Radiography?**
- Radiographic testing of welds using X-ray generators for detecting the discontinuities in the
- Welded joints of pipeline.
- **\* What is Leveling & Padding?**
- To take levels as soon as the lowering activity is completed. Post Padding of 300mm minimum thick layer of soil is put over and all around the pipe Immediately after lowering. Trench should be dry prior to padding. Warning mat shall be kept 500cm below from the ground level.
- **\* Any advantages for pipeline with cathodic protection?**
- Cathodic Protection is a method used to prevent corrosion on pipelines and other metal structures by making the structure the cathode in an electrochemical cell. This is typically achieved by applying a direct current (DC) to the pipeline from an external source, which shifts the pipeline's potential to a non-corroding state.