

Government of India
Ministry of Road Transport & Highways
Regional Office, Vijayawada

Door no. 38-2-3/2, Gorledalapanna Veedhi, Near American Hospital, Punnammithota
Vijayawada-520010. Tele: 0866-2970220; Fax: 0866-2571985

Dated: 12.11.2020

Invitation of Public Comments

Sub: (R&B) NH Circle, ATP- (R&B) NH Division, ATP - Permission for laying HPCL Gas Pipeline 14" dia underground LPG pipeline along with 40mm dia HDPE duct for OFC crossing at Km 55/935 of NH 42 for Hassan to Cherlapalli LPG pipeline project

Please find enclosed herewith the proposal in accordance with Ministry's latest guidelines dated 22.11.2016 forwarded by Chief Engineer (R&B), NH & CRF, A.P vide letter dated 21.10.2020 for laying HPCL Gas Pipeline 14" dia underground LPG pipeline along with 40mm dia HDPE duct for OFC crossing at Km 55/935 of NH 42 for Hassan to Cherlapalli LPG pipeline project.

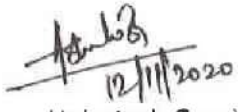
2. As per the guidelines, issued by the Ministry vide Circular No.RW/NH-33044/29/2015/S&R(R) dated 22.11.2016, the proposal for Highway crossing permission along & across National Highways shall be put out in the public domain for 30 days for seeking claims and objections on grounds of public inconvenience, safety and general public interest.

3. In view of the above, public comments on the above mentioned proposal is invited on the address mentioned below:

The Regional Officer,
Ministry of Road Transport and Highways,
Gorle Dalappana Veedhi,
Near American Hospital, Punnami Thota,
Vijayawada - 520010
Email id: romorthvijayawada@gmail.com

Yours faithfully,

Encl: As above


(Ashutosh Gaur)
Assistant Executive Engineer
For Regional Officer

Copy to:

- 1) Senior Technical Director, NIC for uploading on the Ministry's website
- 2) Chief Engineer(R&B), NH & CRF, AP for information.
- 3) The Superintending Engineer(R&B), NH Circle, Anantapur
- 4) The Executive Engineer(R&B), NH Division, Anantapur
- 5) M/s. HPCL, Hassan Cherlapalli LPG Pipeline project, Hyderabad-Telangana

Government of Andhra Pradesh
Roads & Buildings Department

From,

Sri. Y. Rajeev Reddy, M.E.,
Engineer-in-Chief(R&B),
National Highways & CRF,
Room no. 501, State HODs Offices Bldg,
MG Road, Vijayawada-520010.



To,

The Regional Officer,
MoRT&H, D.No. 38-2-3/2,
Near American Hospital,
Punnamithota,
Vijayawada.

Lr. No. 1/Road Cutting/NH 42/DCE(NH&CRF)/EE/DEE6/AEE3 dt. 23.03.2020

Sir,

Sub:- (R&B) NH Circle, ATP – (R&B) NH Division, ATP – Permission for laying HPCL Gas Pipeline 14" dia underground LPG pipeline along with 40mm dia HDPE duct for OFC crossing at Km 55/935 of NH 42 for Hassan to Cherlapalli LPG pipeline project – Proposals furnished – Permission Requested - Regarding

Ref:- 1. Ministry Circular No. RW/NH-33044/29/2015/S&R(R) dt. 22.11.2016
2. Lr. No. RO/VJA/Misc24BAccess/Utility/7 dt. 13.04.2017 of the RO, MoRT&H, Vijayawada
3. Lr. No. 01/NH-42/Road Cutting/HPCL/LPG Pipeline/JTO/2019-20 dt. 29.01.2020 of the Superintending Engineer (R&B), NH Circle, Ananthapuramu

In the reference 3rd cited, the Superintending Engineer (R&B), NH Circle, Ananthapuramu has submitted proposals for permission for laying of HPCL gas pipeline 24" dia underground LPG pipeline along with 40mm dia HDPE duct for OFC crossing at Km 55/935 of NH 42 for Hassan to Cherlapalli LPG pipeline project.

The proposal has been examined in this office as per the guidelines issued by the Ministry in the reference 1st cited and the details are as follows:

1. The total License Fee is Rs. 275.00 and the performance Bank Guarantee Fee is Rs. 11,250.00.
2. The proposed HPCL gas pipeline is crossing the NH 42 at Km 55/935.
3. Total length of the proposed road cutting is 45.00m and width of the cutting is 0.60m.

4. The firm has proposed that the pipeline shall be laid through 20" dia MS casing by Horizontal Directional Drilling (HDD) method at a depth of 4.20m from top of the road and at a depth of 1.20m from top of adjacent natural GL.

The firm has submitted the checklist and all the undertakings required to be submitted for according permission and approval for laying of the utility as stipulated in the references 1st and 2nd cited. A copy of the documents submitted by the firm is herewith furnished.

In this regard, it is requested to accord permission for laying the HPCL Gas Pipeline 14" dia underground LPG pipeline along with 40mm dia HDPE duct for OFC crossing at Km 55/935 of NH 42 for Hassan to Cherlapalli LPG pipeline project so as to enable them to commence the laying of the gas pipeline.

Yours Sincerely,

xxx-Sd-xxx
Engineer-In-Chief (R&B),
NH & CRF, A.P., Vijayawada

Copy to:

1. The Superintending Engineer (R&B), NH Circle, Ananthapuramu for information.
2. The Executive Engineer (R&B), NH Division, Ananthapuramu for information.

//T.C.F.B.O//


Dy. Executive Engineer-6 (R&B)
NH&CRF A.P. Vijayawada

Government of Andhra Pradesh
Roads & Buildings Department

From,
Sri. V. Ramachandra, M.Tech.,
Chief Engineer (R&B),
National Highways & CRF,
Room no. 412, State HODs Offices Bldg,
MG Road, Vijayawada-520010.



To,
The Regional Officer,
MoRT&H, D.No. 38-2-3/2,
Near American Hospital,
Punnamithota,
Vijayawada.

Lr. No. 1/Road Cutting/NH 42/DCE(NH&CRF)/EE/DEE6/AEE3 dt. 21.10.2020

Sir,

Sub:- (R&B) NH Circle, ATP - (R&B) NH Division, ATP - Permission for laying HPCL Gas Pipeline 14" dia underground LPG pipeline along with 40mm dia HDPE duct for OFC crossing at Km 55/935 of NH 42 for Hassan to Cherlapalli LPG pipeline project - Applicable clearances for - Furnished - Regarding

Ref:- 1. Lr. No. RO/VJA/Misc.24/B/OFC/NH 42/S.No.66/199 dt. 19.08.2020 of the RO, MoRT&H, Vijayawada
2. Lr. No. 03/NH-42/Road Cutting/HPCL/LPG Pipeline/JTO/2020-21 dt. 25.09.2020 of the Superintending Engineer (R&B), NH Circle, Ananthapuramu

In the reference 1st cited, the RO, MoRT&H, Vijayawada has requested to furnish the applicable clearances from the respective authorities. Now, in the reference 2nd cited, the SE/NH/ATP has submitted the following permissions obtained for "Laying HPCL Gas Pipeline 14" dia underground LPG pipeline along with 40mm dia HDPE duct for OFC crossing at Km 55/935 of NH 42 for Hassan to Cherlapalli LPG pipeline project":

1. Undertaking given by the Agency for laying of the gas pipeline.
2. Permission letter from Petroleum and Natural Gas Regulatory Board vide Lr. No. PNGRB/Auth/3-PPPL(03)/2019 dt. 24.06.2019.
3. Permission GO from Energy, Infrastructure & Investment (Airports) Department of Andhra Pradesh vide GO Rt. No. 21 dt. 11.02.2019.
4. Permission letter from Andhra Pradesh State Pollution Control Board, Vijayawada vide Order No. 290/APPCB/CFE/RO-TPT&KNL/HO/2019 dt. 08.05.2019.

The aforementioned clearances are herewith forwarded for taking necessary action and it is requested to accord necessary permissions for commencing the laying of the gas pipeline at the earliest.

Yours Sincerely,

xxx-Sd-xxx
Chief Engineer (R&B),
NH & CRF, A.P., Vijayawada

Copy to:

1. The Superintending Engineer (R&B), NH Circle, Ananthapuramu for information.
2. The Executive Engineer (R&B), NH Division, Ananthapuramu for information.

//T.C.F.B.O//

Dy. Executive Engineer-6 (R&B)
NH&CRF A.P. Vijayawada

GOVERNMENT OF ANDHRA PRADESH
SUBJECT

Energy, Infrastructure & Investment Department - Constitution of Negotiation Committee to procure the private lands directly by negotiating with the private land owners who are willing to sell their lands for HPCL's Hassan Cherlapalli LPG Pipeline Project (HCPL) and formation of Task Force to oversee the progress of Project - Orders - Issued.

ENERGY, INFRASTRUCTURE & INVESTMENT (AIRPORTS) DEPARTMENT

G.O.RT.No. 21

Dated: 11-02-2019

Read:-

From the G.M, Pipeline Projects Hassan Cherlapalli LPG Pipeline, Hindustan Petroleum Corporation Ltd, Lr.No. HPCL/HCPL/IA, dated 04.02.2019.

ORDER:

In the letter read above, the General Manager, Pipeline Projects Hassan Cherlapalli LPG Pipeline has informed that Hindustan Petroleum Corporation Ltd., (HPCL) has laid and commissioned LPG pipeline from Mangalore to Bangalore & Mysore via Hassan with a view to ensure continuous supply of LPG in South India. Now, it is planned to extend the pipeline from Hassan (Karnataka) to Cherlapalli, Hyderabad (Telangana) via Anantapur and Kurnool in Andhra Pradesh. As part of HCPL Project, it is required to set up Tap Off Point/Pigging stations and Pumping Stations (on need basis) & Sectionalizing valve stations enroute in the districts of Anantapur and Kurnool. The Pipeline stations of IP and TOP (provision) at Kurnool and other places (need basis) may require approximately 15 acres of land per Station and each Sectionalizing valve station will require approximately 1 acre of land at various places in AP along pipeline route. Land purchase for all the proposed stations is very critical for the project completion within stipulated timelines. For expediting the purchase of Patta lands by direct negotiations with farmers, he has requested to constitute a negotiation/facilitation committee consisting of district revenue authorities and following members from HPCL officials for direct negotiation with land owners:

- 1) Chief General Manager/GM- Projects/ Operations, HPCL
- 2) DGM - Procurement, HPCL- Pipeline Projects
- 3) GM/DGM - Finance, HPCL.

2. He has also requested to form a Task Force of Government Officials from Energy, Irrigation, R&B, PR&RD, State Electricity Department, Environment/Forest etc., and External Members of Railways, NH and other departments to conduct Monthly/Regular meeting to oversee the progress of the project.

3. After careful examination, Government hereby Constitute Negotiation Committee with the following members to procure the private lands directly by negotiating with the private land owners who are willing to sell their lands for HPCL's Hassan Cherlapalli LPG Pipeline Project (HCPL).

- | | |
|---|---------------------|
| 1. Joint Collector (concerned District) | - Chairman |
| 2. RDO of concerned Division/District | - Member & Convener |
| 3. Chief General Manager/GM- Projects/ operations, HPCL | - Member |
| 4. DGM - Procurement, HPCL- Pipeline Projects | - Member |
| 5. GM/ DGM- Finance, HPCL | - Member |

4. Government also agree to form a Task Force of Government Officials from Energy, Irrigation, TR&B, PR&RD, EFS&T Departments and External Members of Railways, National Highways to conduct Monthly/Regular meeting to oversee the progress of the project under the chairmanship of District Collectors concerned. All Departments are requested to nominate their representatives for Task Force to oversee the progress of the HPCL's Hassan Cherlapalli LPG Pipeline Project (HCPL).

5. The General Manager, Pipeline Projects Hassan Cherlapalli LPG Pipeline, HPCL is requested to coordinate with Railways and National Highways Authority of India to nominate their representatives for the Task Force.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

AJAY JAIN
PRINCIPAL SECRETARY TO GOVERNMENT

To
The District Collector, Ananthapur District.
The District Collector, Kurnool District.
The General Manager, Pipeline Projects Hassan Cherlapalli LPG Pipeline, HPCL.
The Deputy General Manager, HPCL.
The Energy, I&I Department.
The Water Resources Department.
The TR&B Department.
The PR&RD Department.
The EFS&T Department.

Copy to:
The Prl. Secretary to Chief Minister.
The Revenue (LA) Department.
(C.No. ENE01-APGD/3/2019)

//Forwarded:: By Order//


SECTION OFFICER




ANDHRA PRADESH POLLUTION CONTROL BOARD
D.No. 33-26-14 D/2, Near Sunrise Hospital, Pushpa Hotel Centre,
Chalamalavari Street, Kasturibaipet, Vijayawada – 520010.

Website : www.appcb.ap.nic.in

CONSENT ORDER FOR ESTABLISHMENT

Order No. 290 /APPCB/CFE/RO-TPT & KNL/HO/2019

Dt: 08.05.2019

Sub: APPCB – CFE - M/s. Hindustan Petroleum Corporation Ltd., (Hassan to Cherlapally LPG Pipeline) – CFE for laying pipeline in Anantapuram and Kurnool Districts of Andhra Pradesh to transport LPG – Consent for Establishment of the Board under Sec.25 of Water (P & C of P) Act, 1974 and Under Sec.21 of Air (P&C of P) Act, 1981 - Issued - Reg.

- Ref: 1) Proponent's CFE application received through AP OCMMS on 10.04.2019.
2) R.O: Anantapuram and Kurnool reports dt. 16.04.2019 and 24.04.2019.
3) CFE Committee meeting held on 02.05.2019.
4) Proponent's lr. dt. 02.05.2019.

1. M/s. Hindustan Petroleum Corporation Limited has proposed to lay the pipeline from Hassan, Karnataka State to Cherlapally, Telangana State to transport Liquefied Petroleum Gas (LPG). The total length of the pipeline is 667.56 km. Out of that about 251.29 km length of pipeline passing through Andhra Pradesh. In the reference 1st cited, an application was submitted to the Board by M/s. HPCL seeking Consent for Establishment (CFE) to lay the pipeline in Andhra Pradesh with throughput as mentioned below with a project cost of **Rs. 715.35 Crores**.

Anantapuram District:

Activity	Capacity
Laying of Underground pipeline of diameter 14" for transportation of LPG & also installation of Sectionalizing Valve Stations – 13 No's and intermediate Pigging cum Tap off station with hook up to their existing LPG Bottling Plant in Anantapuram District. Length of the pipeline - 157.646 km.	LPG @ 3.1 Million MTPA in Two Phases.

Kurnool District:

Activity	Capacity
Laying of Underground pipeline of diameter 14" for transportation of LPG & also installation of Sectionalizing Valve Stations – 07 No's and intermediate Pigging cum Tap off station with hook up to M/s. BPCL LPG bottling unit existing in Kurnool District. Length of the pipeline - 93.644 km.	LPG @ 3.1 Million MTPA in Two Phases.

तारना "विस्फोटक", नागपूर
Telegram: "EXPLOSIVES", Nagpur
Website: <http://peso.gov.in>
Email: explosives@explosives.gov.in

दूरभाष/ Telephone : 0712-2510248

फैक्स/ FAX : 2510577

कार्यालयीन उद्देश्य के सभी पत्रादि
"मुख्य विस्फोटक नियंत्रक" के पदनाम से
भेजे जाए उनके व्यक्तिगत नाम से नहीं।
All communications intended for
this Office should be addressed to the
"Chief Controller of Explosives" and
NOT to him by name.



भारत सरकार

GOVERNMENT OF INDIA

पेट्रोलियम तथा विस्फोटक सुरक्षा संयोजन

Petroleum and Explosives Safety Organisation

(पूर्व नाम - विस्फोटक विभाग)

(Formerly- Department of Explosives)

"ए-ब्लॉक" में, पाँचवा तल, केन्द्रीय कार्यालय विस्फोटक सुरक्षा संयोजन

"A" Block, 5th Floor, CGO Complex,

सेमिनरी हिल्स, नागपूर - 440 006 (महाराष्ट्र)

Seminary Hills, Nagpur- 440006

संख्या /No.: A/M/HQ/KA/PL/2(P466240)

P2(4)1266

दिनांक /Nagpur, dated: 11/08/2020

To,

M/s. Hindustan Petroleum Corporation Limited,
Hassan Cherlapalli LPG Pipeline Project, Module No. 202,
Second Floor, NSIC-EMDBP Building, Kamalanagar,
Dr. A.S. Rao Nagar, ECIL(P.O.),
Hyderabad-500062.

18 AUG 2020

Sub: -Approval for laying of 14" x 649.182 Km long LPG Pipeline, from Hassan, Karnataka and Cherlapalli, Telangana under Manufacture, Storage & Import of Hazardous Chemicals (MSIHC) Rules, 1989.-regarding

Dear Sirs,

Please refer to your application No. HPCL/ASA/PESO/011 dated 11/01/2020.

Your above proposal of laying of subject pipeline meets with the approval of this office and copies of the drawing are returned herewith duly endorsed in token of approval with the following condition:-

1. Detailed S.O.Ps, Scheme of patrolling of ROU and systems of continuous monitoring of pipeline is submitted for perusal and record of this office.
2. Precommissioning safety Audit shall be carried out by any reputed external agency and compliance of the recommendations made there under shall be furnished.
3. HAZOP Study, QRA Close Out report.
4. Electrical fittings / equipments installed in the hazardous area shall be of CCE approved type and the list thereof with CCE approval details shall be furnished.
5. Right of way, NOC from railway, Road and other concerned authorities, for various crossings junctions in the pipeline route shall be obtained prior to laying of the pipeline and details thereof shall be submitted.
6. After completion of the laying of entire stretch of pipeline and all associated facilities the same should be hydro tested according to the applicable code.
7. Licence for LPG storage in pressure vessels in IP stations shall be obtained in LS-I under SMPV(U) Rules, 2016.

Please also note that prior to commencing of laying of the pipeline the Right of way shall have to be obtained by you. After installation, detailed drawing showing various segment of pipeline crossing, Surge Analysis Report, Risk Analysis Report, Clearance from Environment Ministry, ROW Notification, NOC/Permissions from NHAI, Railways and other agencies etc. & Hydrotest Report shall be forwarded to this office along with as built drawings, alignment sheets (without any ink/hand corrections) to enable it to accord permission to commission the pipeline.

P.T.O

You may also approach, Dy. Chief Controller of Explosives, Hyderabad & Dy. Chief Controller of Explosives, Mangalore for inspection of the subject facilities after completion of the laying.

This approval/permission does not absolve you from obtaining necessary permission/clearances from other authorities or under other statutes as applicable.

Yours faithfully

(K.S.Rao)
Controller of Explosives
for Chief Controller of Explosives

Copy forwarded to :

- 1) The Jt. Chief Controller of Explosives, South Circle, Chennai.
- 2) The Dy. Chief Controller of Explosives, Hyderabad. He is requested to inspect the above facility as and when approached by the applicant and forward the inspection report with recommendation for commissioning of the pipeline.
- 3) The Dy. Chief Controller of Explosives, Mangalore. He is requested to inspect the above facility as and when approached by the applicant and forward the inspection report with recommendation for commissioning of the pipeline

Chief Controller of Explosives



Worley



HINDUSTAN PETROLEUM
CORPORATION LTD.

Worley

Index Map



Index Map



Sr. No.	Chainage	Village	Taluka	Dist
SV-01	11395	YODAPALI	HASSAN	HASSAN
SV-02	3078	CHILU BAHALI	ARABERE	HASSAN
SV-03	5135	CHILU BAHALI	ARABERE	HASSAN
SV-04	8115	CHILU BAHALI	ARABERE	HASSAN
SV-05	34112	CHILU BAHALI	ARABERE	HASSAN
SV-06	10022	CHILU BAHALI	ARABERE	HASSAN
SV-07	11617	CHILU BAHALI	ARABERE	HASSAN
SV-08	13875	CHILU BAHALI	ARABERE	HASSAN
SV-09	15213	CHILU BAHALI	ARABERE	HASSAN
SV-10	298100	CHILU BAHALI	ARABERE	HASSAN
SV-11	23509	CHILU BAHALI	ARABERE	HASSAN
SV-12	37764	CHILU BAHALI	ARABERE	HASSAN
SV-13	28164	CHILU BAHALI	ARABERE	HASSAN
SV-14	28152	CHILU BAHALI	ARABERE	HASSAN
SV-15	29632	CHILU BAHALI	ARABERE	HASSAN
SV-16	247	CHILU BAHALI	ARABERE	HASSAN
SV-17	32177	CHILU BAHALI	ARABERE	HASSAN
SV-18	31214	CHILU BAHALI	ARABERE	HASSAN
SV-19	38318	CHILU BAHALI	ARABERE	HASSAN
SV-20	193258	CHILU BAHALI	ARABERE	HASSAN
SV-21	416333	CHILU BAHALI	ARABERE	HASSAN
SV-22	621081	CHILU BAHALI	ARABERE	HASSAN
SV-23	511658	CHILU BAHALI	ARABERE	HASSAN
SV-24	491044	CHILU BAHALI	ARABERE	HASSAN
SV-25	421756	CHILU BAHALI	ARABERE	HASSAN
SV-26	401158	CHILU BAHALI	ARABERE	HASSAN
SV-27	521010	CHILU BAHALI	ARABERE	HASSAN
SV-28	556453	CHILU BAHALI	ARABERE	HASSAN
SV-29	546724	CHILU BAHALI	ARABERE	HASSAN
SV-30	571044	CHILU BAHALI	ARABERE	HASSAN
SV-31	565107	CHILU BAHALI	ARABERE	HASSAN
SV-32	591260	CHILU BAHALI	ARABERE	HASSAN
SV-33	616157	CHILU BAHALI	ARABERE	HASSAN
SV-34	620165	CHILU BAHALI	ARABERE	HASSAN
SV-35	631151	CHILU BAHALI	ARABERE	HASSAN
SV-36	641150	CHILU BAHALI	ARABERE	HASSAN



S.N.P. PROJECTS LTD.

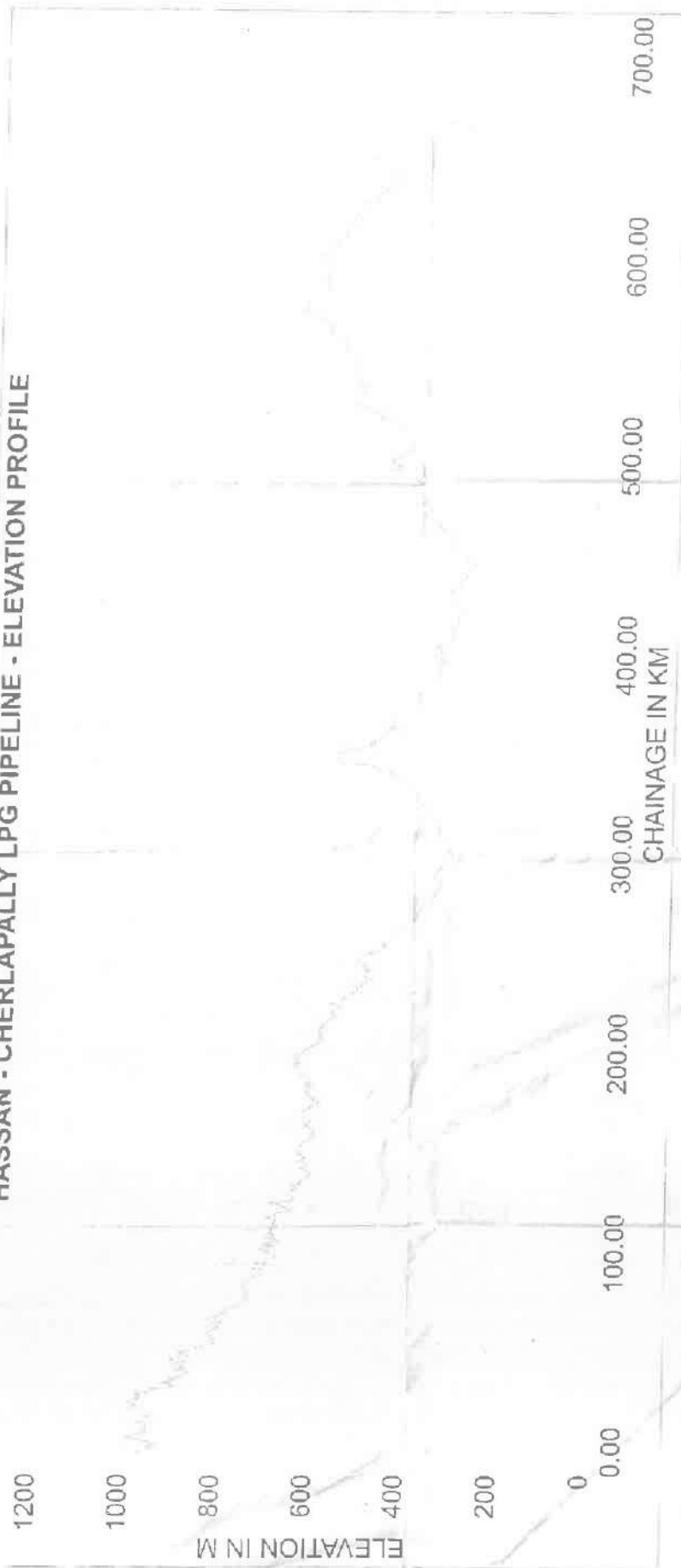
HASSAN CHEMICALS & PIPELINE PROJECT

INDUSTRIAL PETROLEUM
CORPORATION LIMITED

PROJECT MAP

HASSAN - CHERLAPALLY LPG PIPELINE - ELEVATION PROFILE
 Date: 10/11/2017
 Drawn by: [Signature]
 Checked by: [Signature]
 Approved by: [Signature]

HASSAN - CHERLAPALLY LPG PIPELINE - ELEVATION PROFILE



Station	10+00	20+00	30+00	40+00	50+00	60+00	70+00	80+00	90+00	100+00	110+00	120+00	130+00	140+00	150+00	160+00	170+00	180+00	190+00	200+00	210+00	220+00	230+00	240+00	250+00	260+00	270+00	280+00	290+00	300+00	310+00	320+00	330+00	340+00	350+00	360+00	370+00	380+00	390+00	400+00	410+00	420+00	430+00	440+00	450+00	460+00	470+00	480+00	490+00	500+00	510+00	520+00	530+00	540+00	550+00	560+00	570+00	580+00	590+00	600+00	610+00	620+00	630+00	640+00	650+00	660+00	670+00	680+00	690+00	700+00											
Elevation (m)	400	450	500	550	600	650	700	750	800	850	900	950	1000	950	900	850	800	750	700	650	600	550	500	450	400	350	300	250	200	150	100	50	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1150	1100	1050	1000	950	900	850	800	750	700	650	600	550	500	450	400	350	300	250	200	150	100	50	0

HASSAN - CHERLAPALLY LPG PIPELINE - ELEVATION PROFILE
 Date: 10/11/2017
 Drawn by: [Signature]
 Checked by: [Signature]
 Approved by: [Signature]

HORIZONTAL DIRECTIONAL DRILLING

GENERAL

Horizontal Directional Drilling or HDD is a steerable trenchless method of installing underground pipes, conduits and cables in a shallow arc along a prescribed bore path by using a surface launched drilling rig, with minimal impact on the surrounding area. HDD is used when trenching or open excavation is not possible / practical. Directional boring minimizes environmental disruption. It is suitable for a variety of soil conditions and jobs including road, landscape and river crossings. Pipes can be made of materials such as Steel, PVC, etc. if the pipes can be pulled through the drilled hole.

Technique

Directional boring is used for installing infrastructure such as telecommunications and power cable conduits, water lines, sewer lines, gas lines, oil lines, product pipelines and environmental remediation casings. It is used for crossing waterways, roadways, shore approaches, congested areas, environmentally sensitive areas, and areas where other methods are costlier. It is used instead of other techniques to provide less traffic disruption, lower cost, deeper and/or longer installation, no access pit, shorter completion times, directional capabilities, and environmental safety. The technique has extensive use in urban areas for developing subsurface utilities as it helps in avoiding extensive open cut trenches.

The method comprises a three stage process wherein first stage drills a pilot hole on the designed path and the second stage enlarges the hole by passing a larger cutting tool known as the back reamer. The third stage places the product or casing pipe in the enlarged hole. The directional control capabilities assist the rig operator in making necessary changes in the directions of the drilling head.

Horizontal directional drilling is done with the help of a viscous fluid known as drilling fluid. It is a mixture of water and, usually, bentonite or polymer continuously pumped to the cutting head or drill bit to facilitate the removal of cuttings, stabilize the bore hole, cool the cutting head, and lubricate the passage of the product pipe.

Location and guidance of the drilling is a very important part of the drilling operation, as the drilling head is under the ground while drilling and, in most cases, not visible from the ground surface.

Advantages

HDD offers several advantages when compared to other trenchless construction methods:

- (a) Complicated crossings can be quickly and economically accomplished with a great degree of accuracy since it is possible to monitor and control the drilling operation.
- (b) Sufficient depth can be accomplished to avoid other utilities.
- (c) In river crossing applications, danger of river bed erosion and possible damage from river traffic is eliminated.
- (d) Requires only a small construction footprint.
- (e) The significant factors are no additional expense, high installation execution, minimal reclamation costs, higher speed on operation and etc. The HDD potentially make many utilities which don't operate by trench method. It is able to install underground pipes with minimum impact on society and the environment.

Disadvantages

There are several advantages and disadvantages to use HDD at the field activities.

- (a) It also has disadvantages to operate such as taking time, provided solid control and need to estimate of mud flow that can decrease by making an acceptable guide book. The guide book is a kind of manual to predict and decline of operation problems.
- (b) One of the disadvantages of horizontal directional drilling is that large amounts of slurry are produced and have to be tankered away from the drilling site to landfill sites incurring significant costs for transport and landfill tax.
- (c) The directional drilling process is a surface-launched method; therefore, it usually does not require access pits or exit pits. If utility installation is being undertaken, pits may be required to make connection with the existing utility. The rig working area should be reasonable level, firm, and suitable for movement of rig.
- (d) Clay is considered ideal for HDD methods. Cohesion less fine sand and silt generally behave in a fluid manner and stay suspended in the drill fluid for sufficient amount of time; therefore, they are also suitable for HDD. Generally, mechanical drilling systems can be applied in a wide range of soil conditions. A pilot hole can be drilled through soil particles ranging from sand and clay to gravel, and even in continuous rock information, by using suitable drill bits.

The Horizontal Directional Drilling Process

The tools and techniques used in the horizontal directional drilling (HDD) process are an outgrowth of the oil well drilling industry. The components of a horizontal drilling rig used for pipeline construction are similar to those of an oil well drilling rig with the major exception being that a horizontal drilling rig is equipped with an inclined ramp as opposed to a vertical mast. HDD pilot hole operations are not unlike those involved in drilling a directional oil well. Drill pipe and down hole tools are generally interchangeable and drilling fluid is used throughout the operation to transport drilled spoil, reduce friction, stabilize the hole, etc. Because of these similarities, the process is generally referred to as drilling as opposed to boring.

Installation of a pipeline by HDD is generally accomplished in three stages as illustrated in Figure 1. The first stage consists of directionally drilling a small diameter pilot hole along a designed directional path. The second stage involves enlarging this pilot hole to a diameter suitable for installation of the pipeline. The third stage consists of pulling the pipeline back into the enlarged hole.

Pilot Hole Directional Drilling

Pilot hole directional control is achieved by using a non-rotating drill string with an asymmetrical leading edge.

It is common in soft soils to achieve drilling progress by hydraulic cutting with a jet nozzle. In this case, the direction of flow from the nozzle can be offset from the central axis of the drill string thereby creating a steering bias. This may be accomplished by blocking selected nozzles on a standard roller cone bit or by custom fabricating a jet deflection bit. If hard spots are encountered, the drill string may be rotated to drill without directional control until the hard spot has been penetrated.

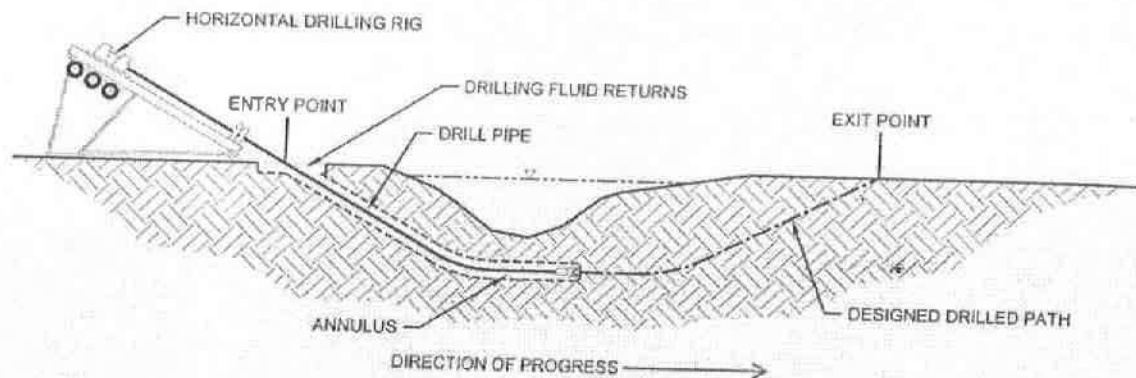
Pre-reaming

For a pre-reaming pass, reamers attached to the drill string at the exit point are rotated and drawn to the drilling rig thus enlarging the pilot hole. Drill pipe is added behind the reamers as they progress toward the drill rig. This insures that a string of pipe is always maintained in the drilled hole.

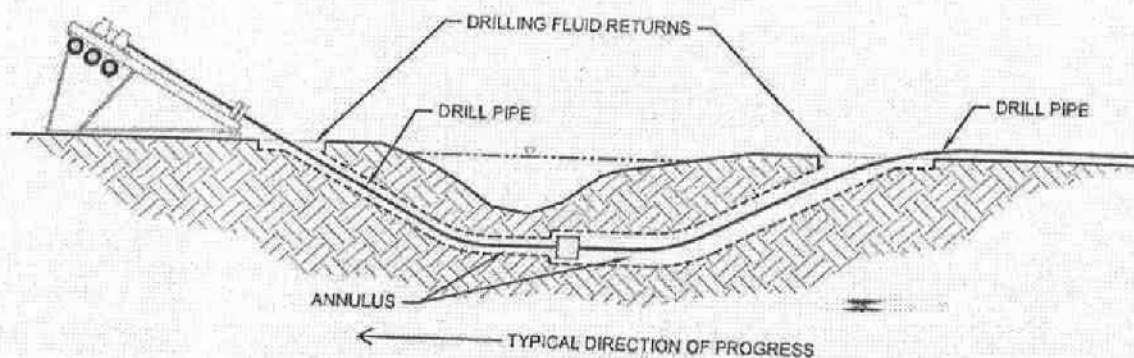
Pullback

Pipe installation is accomplished by attaching the prefabricated pipeline pull section behind a reaming assembly at the exit point and pulling the reaming assembly and pull section back to the drilling rig. This is undertaken after completion of pre-reaming or, for smaller diameter lines in soft soils, directly after completion of the pilot hole. A swivel is utilized to connect the pull section to the leading reaming assembly to minimize torsion trans

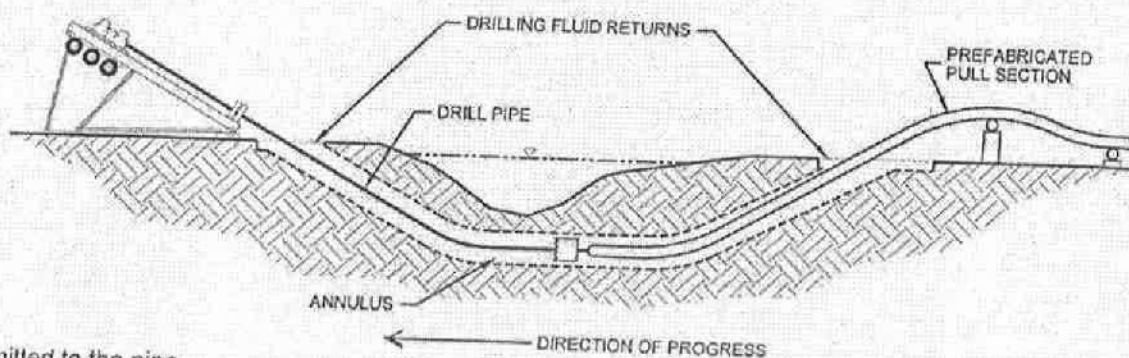
PILOT HOLE



PREREAMING



PULLBACK



milled to the pipe.

Figure 1

DISCUSSION

HDD has shown as a new method technology for installing sewer and water pipes, electronic cables gas pipe line, telecommunication and other utility lines under waterways, highways and ancient places to minimize environmental impacts. HDD increases in usage as a less environmentally-damaging alternative to traditional open-trench excavations. It should focus on the applications, limitations and potential environmental implications of HDD, along with construction and environmental.

For improving this method, need to plan a guide book focus on situations. The guide book is intended to minimize environmental impacts from installation within rights-of-way. It has been prepared in a menu format with an emphasis on the ability for the user. In this menu, there are details such as field inspectors (operation zone), environmental situations and soil conditions. Considerably, the guide can have positive effects to decrease of problems of HDD operation.

MUD RECYCLING

One of the disadvantages of horizontal directional drilling is that large amounts of slurry are produced and have to be tankered away from the drilling site to landfill sites incurring significant costs for transport and landfill tax.

To solve this problem, we invested in a mud recycling unit which works alongside the drilling rig throughout the drilling process. The MCM-2000 Drill Fluid Cleaning System recycles mud by separating solids from drilling fluids.

- Solids can be reused onsite or taken to conventional landfill sites for disposal
- Drill fluids are cleaned and can be reused again and again throughout the drilling process

The benefits of mud recycling are:

- Reduced disposal costs
- Lower landfill costs
- Lower transportation costs
- Reduced environmental impact
- Less pollution from reduced vehicle journeys
- Less material to landfill
- Solids not classified as hazardous waste

CONCLUSIONS

- HDD has been utilized primarily for the installation of services pipes, and more recently for utility activities such as telecommunication and electronic industry. The main features on selection of HDD equipment are factors such as the diameter range depth of installation, drive length, type of casing, required working space, soil conditions, producing, etc. There are several advantages and disadvantages to use HDD at the field activities. The significant factors are no additional expense, high installation execution, minimal reclamation costs, higher speed on operation and etc. The HDD potentially make many utilities which don't operate by trench method. It is able to install underground pipes with minimum impact on society and the environment. It also has disadvantages to operate such as taking time, provided solid control and need to estimate of mud flow that can decrease by making an acceptable guide book. The guide book is a kind of manual to predict and decline of operation problems.

The End of HDD Process.