----- Original Message -----
From: Bolarić Željko
To: Krpan Marijan ; gregor.cuzak@gmail.com ; andrej.cufer@orbipark.com
Cc: Đureković Miro ; Mlinarić Željko
Sent: Thursday, May 27, 2010 9:54 PM
Subject: RE: *To whom it may concern:*

To whom it may concern:

Letter of recommendation for)(CORSET Technology

Following the oil spill accident in GOM deep water, which became recently topic theme for technical mankind in a spirit of big challenge to be stopped, CORSET STUMP issue came out as acceptable and respectable technical solution. As a matter a fact after several unsuccessful attempts, this solution offer very good chance to stop oil blow out from the Marine Riser 21" mounted above BOP 18 ¾" stack. It means that collapsed Marine Riser should be cut at the several meters (vertical) above the BOP stack, first as adopted cut described in Step 1, applying special cut technology. Then comes final plugging of Marine Riser using special technology – explosive forming which will assure hermetic top of MR (described in Step 2) and therefore to assure oil spill at all; assumed pressure at the top of MR is about 60 bars.

This special technique is really good new challenge in a sub sea offshore well control principle application for such typical accident.
Once the CORSET SYSTEM stopped the oil spill, Kill & Choke line of BOP stack will be safety use for killing the well, applying top kill (volumetric method which has to be done using umbilical C&K lines from floating drilling platform. Those method is based on subsequently replacing well fluid (oil) with appropriate kill mud, step by step, controlling volume and pressure in/out..
Our recommendation before using CORSET STUMP system is immediate action for the offshore field approval prior to come on sub sea site. It means that it (as a representative sample prepared as "fake"BOP stack (concrete stump) and flanged piece of 21"MR) must be tested in offshore environment at least at the same depth or similar. The key point is withstanding the deep water environment at the end of applying explosive form, which means that the sample must be pull out of water and pressure test on flanged side must be done w/100 bars/30min.
If the pressure test achieved the results, the system can be successfully applied as a solution!
Technical data for the Deep Horizon Marine Riser 21" type Vetco HMF-class H" is mandatory (it will be recently found by us).
Also the check list for the offshore operation should be defined & planned in detail step by step (including all necessary materials, marine equipment and facility appliances) , certainly, leading by dedicated team of experts.
Finally, we are looking forward in a faith of success and INA Croatia can offer a technical support through their offshore experts.

Your sincerely,

Željko Bolarić, dipl.ing.
Head of INA Drilling & Well Services Management

INA OIL INDUSTRY PLC.
OIL & GAS EXPLORATION PRODUCTION
Field Engineering & Operations Sector
Drilling & Well Services Management

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HR-10 000 Zagreb
CROATIA Europe

Phone: 00 385 1 459 2484, 4592 738
Fax: 00 385 1 459 2400
Mobile: 00 385 98 262 964
E-mail: zeljko.bolaric@ina.hr

----- Original Message -----
From: Dusan Petrac
To: orbipark@gmail.com
Sent: Sunday, May 23, 2010 9:23 PM
Subject: Recommendation

Recommendation for MR. Andrej Čufer -Orbipark.

From Dušan Petrač , Ph.D

960 Linda Vista Ave.
Pasadena , 91103
California
USA

P + 001 626 304 1142 USA
M + 386 40 274 504 Slovenia

dusanpetrac@sbcglobal.net

MR.Čufer Andrej has been involved theoretically and practically with very challenging development in the safety of the tunnels and in the prevention of the spread of fire.

I am originally from the same municipality in Slovenia, EU.

His proposal for the plugging of the oil leak in the Mexican Bay drilling platform (BP) accident is excellent and has very high probability to succeed.
I understand the features of the proposed solution and recommend it highly to be considered for application.

USA should forward it urgently to Department of Homeland Security, NAVY, President Obama´s oil crises advisers and to the BP oil company emergency center.
Even if the current attempts are successful, the Čufer´s plan should be supported in the further development and refinement for helping in any future mishaps in the offshore drilling.

Dušan Petrač, Ph.D.
May 23 , 2010

P.S
I am physicist and worked over thirty years at JPL Pasadena, California for NASA projects.
My work was in the development of science experiments in zero gravity and at low temperatures on rockets and Space Shuttle.
Also, I participated in the development of IRAS, Spitzer Space Telescope, Planck and Herschel.

From: Marko Maucec
Sent: Monday, January 17, 2011 3:21 AM
To: Andrej Cufer OrbiPark ;
Subject: FW: New technology proposals for the REBOUND initiative

Dear REBOUND project members,

On Jan 13, 2011, Halliburton Global News posted the note about the Company's initiative to strengthen it industrial position to compete in the Gulf of Mexico when offshore drilling restarts. In response to one of the objectives of the project REBOUND, to look up opportunities for new processes, services and technologies, I herewith outline two technologies I trust have a significant potential to make Halliburton's deep-drilling operations safer, more efficient and more attractive for the customers and submit to the REBOUND project members for an in-depth evaluation. As follows is a brief description of the proposed technologies.

DIFIS Technology (more info: attached DIFIS.pdf)

DIFIS (Double Inverted Funnel Intervention System) has been developed as the reference method for the prompt and cost effective intervention and remediation of tanker wrecks dealing with eventual leaks and recuperation of fuel trapped in their tanks even at considerable depths. The proposed technology is of general applicability as long as the trapped pollutant does not dissolve and is of lower density than sea water. The DIFIS Technology has been conceived and patented by Dr. F. Andritos, Mr. J. Catret and Mr. D. Grosset and the European Commission has invested 3.5 million Euro of start-up R&D capital.

Highlights:

- *Represents a device for collecting fluids escaping from an underwater source by the means of a submerged buffer reservoir (i.e. a gathering siphon)*
- *The fluid collection process is only governed by the gravity.*
- *Collected fluids transferred with no need of external energy source and emptied by the shuttle ship.*
- *DIFIS can be integrated with CORSET Technology for rapid interventions with well Blowout Preventer (BOP) failures (similar to what occurred at the Deepwater Horizon); (more info: attached* **DIFIS_CORSET.pdf** *document)*

CORSET Technology (more info: attached CORSET.pdf)

The CORSET technology was for the first time introduced to Halliburton during the aftermath of Deepwater Horizon explosion, as a rapid, crisis-intervention technology to stop the escaping fluid and seal the damaged well. The main steps of this technology include:

- *Cutting the BOP at the wellhead using explosive cutting.*
- *Attaching a CORSET stump at the BOP head.*
- *Sealing the CORSET stump to the BOP via explosive forming. The exact method of liquid displacement and the consequent metal cylinder explo-forming is an entirely new approach and should be treated as "STRICTLY CONFIDENTIAL!" Its owner and inventor (Mr. Andrej Čufer from Slovenia) has manifested a clear business interest to further jointly develop and patent technology with Halliburton.*

Highlights:

- *For the minimal investment in two tests/experiments on a mock-up BOP (shallow water, pressurized water) the value of CORSET technology can be demonstrated prior to implementation on an actual BOP.*
- *CORSET technology can be made operative very shortly and, in catastrophic events, like on Deepwater Horizon, prevent at least two months of oil being released into the environment, which by itself represent an enormous environmental and cost-saving achievement.*

The CORSET was developed by Mr. Andrej Čufer from Slovenia, during the first days of Deepwater Horizon explosion aftermath. Technically, CORSET represents an upgrade of Mr. Čufer's own FireFly Technology, originally designed in 1990's to assist in the operation of extinguishing Kuwaiti oil fires, to deepwater drilling safeguard operations. During the summer of 2010, the CORSET Technology proposal has already been submitted to the Deepwater Horizon Crisis Center, set-up by BP and presented to Halliburton PSL's (Well Completions, Wire-line & Perforations). Mr. Čufer's team has a full support by Faculty of mechanical engineering, University of Ljubljana, Slovenia, the drilling experts of Croatian national oil company INA and a world-renowned physicist from NASA. I remain in permanent professional contact with Mr. Čufer's team.

Business opportunities for Halliburton:

- *significantly increase the Halliburton's market strength in terms of Oil-wellhead Control and Submerged Oil Response,*
- *add a substantial value to Halliburton's deep drilling operations in terms of safety, reliability and efficiency,*
- *deliver a clear message to our customers on the dedication of Halliburton to address the most difficult challenges of deepwater drilling with state-of-the-art technologies and as such,*
- *provide the source of additional revenue for Halliburton in terms marketed technology or services, as well as the joint ownership of industry-differentiating IP.*

Should you require any additional information, please don't hesitate to ask (contact information as below).

Sincerely,

Marko

==========
Marko Maučec, PhD
Technology Research Fellow Associate, Earth Modeling
Geological and Geophysical Technologies
HALLIBURTON / *Landmark Graphics Corporation*
1805 Shea Center Drive, Suite 400
Highlands Ranch, CO 80129 (USA)

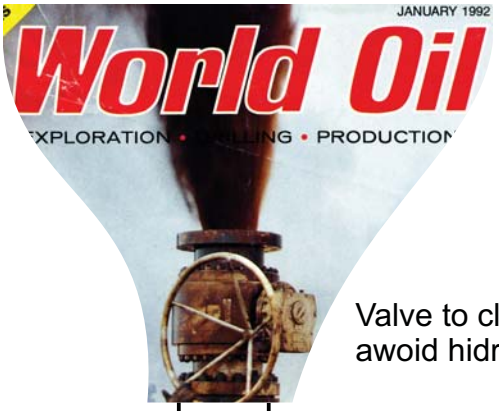
Office: +1 303 675 2440 Mobile: +1 303 803 0327
Fax: +1 303 488 3042
E-mail: *marko.maucec@halliburton.com*
URL: *www.halliburton.com/landmark*
==========

Andrej Cufer, univ.dipl.ing.arh (B. Arch.), MBA

A graduate from the Faculty of Architecture, University of Ljubljana, he started his career already during his studies as a graphic and industrial designer and photographer. He grew up in his father's workshop in the family-owned company www.AKA-PCB.com, which is now mainly active as a supplier of printed-circle boards to EU car industry. He worked in production, ecology, ISO standardization, marketing, and in the introduction of new technologies.

His fire-safety career started in 1990 with the **FireFly** project – an innovative way of tackling Kuwaiti oil-field fires in collaboration with Litostroj concern, Ljubljana.
In 1995, he visited the site of a gas blow-out in India and acted as a consultant to **ONGC**. Later, he worked on the development of **CoolBomb** aerosol – an ultra dynamic extinguishing tool for bush fires.
In 1997 he was invited to India to form an estimate on how to put out fires in coal mines for the **Tata Steel and Coal India**. His field of expertise are innovative new technologies for fire control and fire fighting. He has gathered more then 12 years of experience in the field of tunnel safety. In 1997 he performed the first water-mist tunnel test in EU. As there were no suitable nozzles on the market for tunnels, he developed his own self-cleaning high-volume and high-pressure nozzle for tunnels.
In 2003 he upgraded his technical education with a degree of MBA at IEDC Bled.
With a consortium of European companies he designed a concept for fire-safe **Shuttle HGV** trains in the Eurotunnel. In the beginning of 2009 he focused on further development of the CoolBomb fire control and fire-safe buildings concepts for countries like Australia. He is active in Slovenia and internationally, has contributed at various national and international seminars and conferences.
He is active as a consultant to various companies in the field of fire safety of underground transport facilities. In 2008 he publicly called on the Slovenian transportation minister to stop traffic in an unsafe road tunnel. He predicted the fire insulation in that tunnel would fall off, and organized an expert group to investigate this particular case and recommend solutions.
In 2010 with his team of colleagues he developed **)(Corset**, an upgrade of his FireFly technology, which applied tromblon cutting and metal implosion to attach a new marine riser as the solution for the **Macondo blowout**. Unfortunately, this technology did not reach BP implementation stage.

He is currently head of Orbipark engineering, an architecture and innovation company.
OrbiPark is since 2011 active as the sole representative of http://www.haus.rubner.com, the leader of modern prefabricated building construction in the Alps region.
He designed a series of innovative furniture and lighting based on halogen, fluorescent, and recently LED technology.
With the Croatian construction company VIJADUKT and BASF he is developing an alternative fire-proof suspension ceiling for upgrading longitudinally ventilated Croatian road tunnels with a modern 2x3K ventilation system.

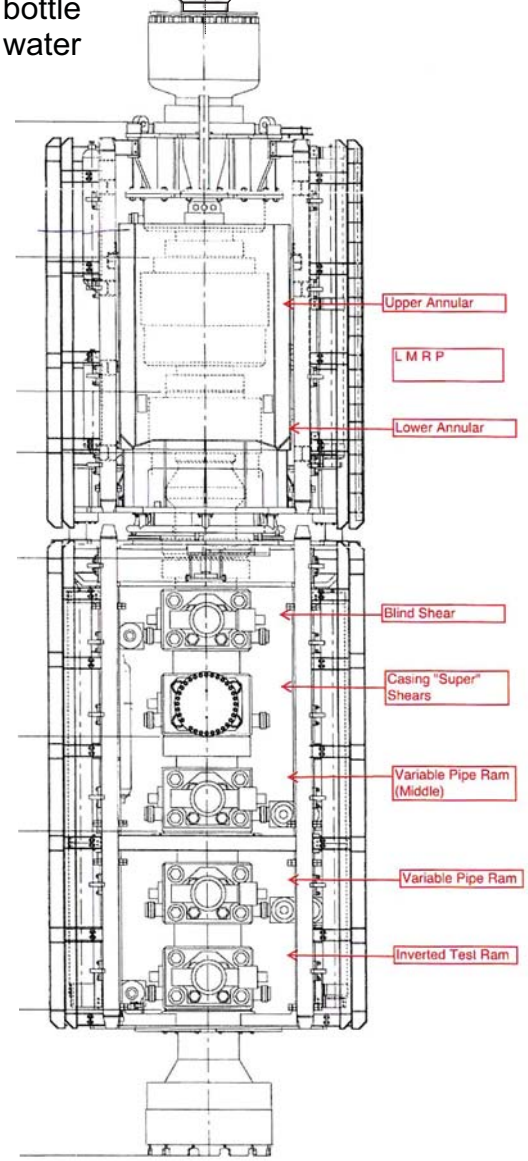


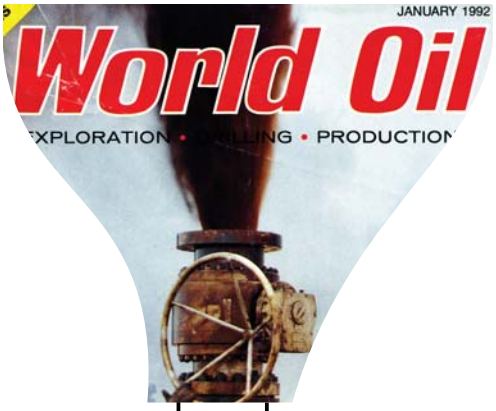
Valve to close slowley to awoid hidravlic hamer

STUMP

Four open tubs of choke and kill tubes need to be pluged before)(Corset Stump conection. Simpel conus Titanium plug

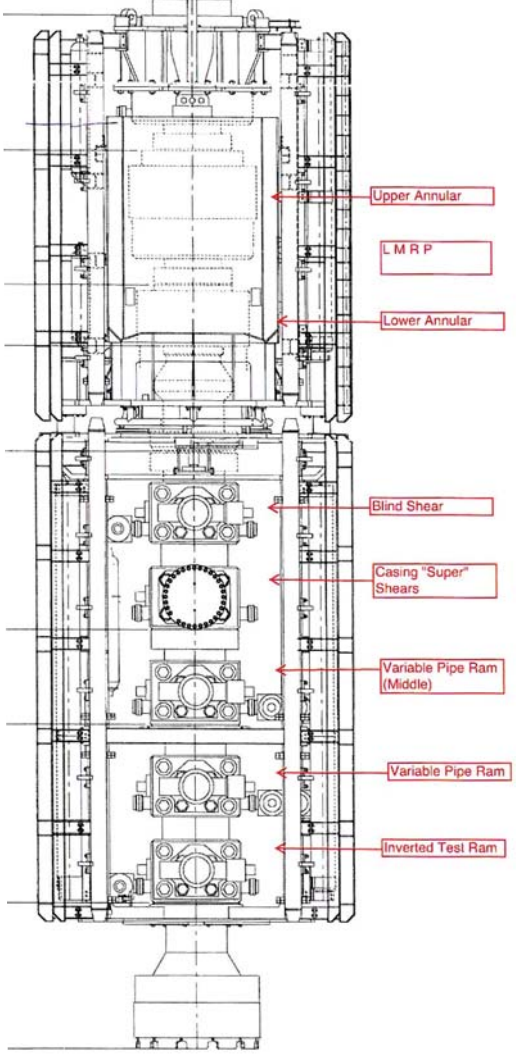
Top flnge joint
The Stump conection by)(Corset Technology
Explozive metal forming
Much like metal glass bottle cap of a beer or mineral water

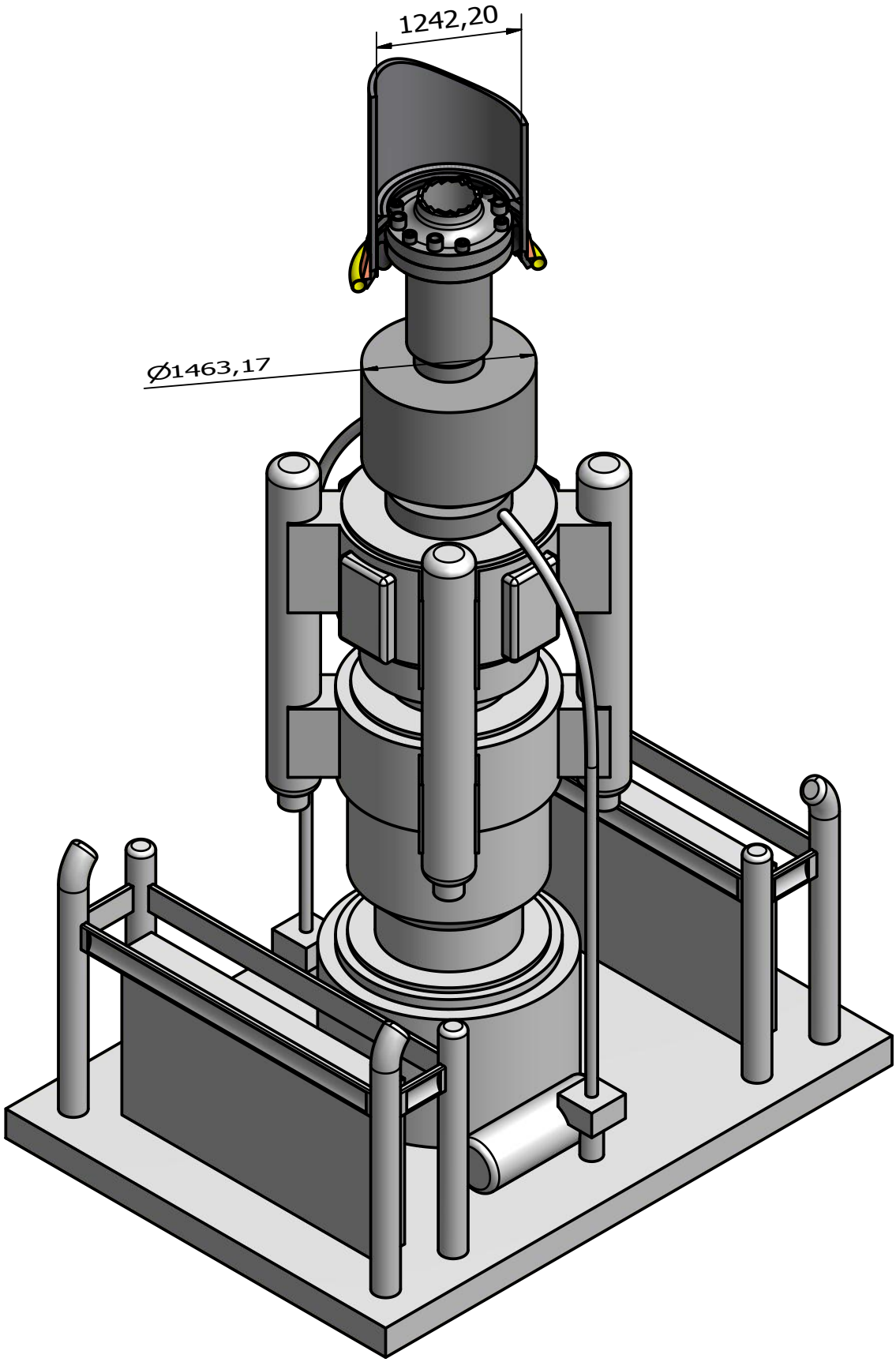




STUMP

Flex joint & Top flnge joint
The Stump conection by
)(Corset Technology
Explozive metal forming
Much like corset squeeze
ladys bodys

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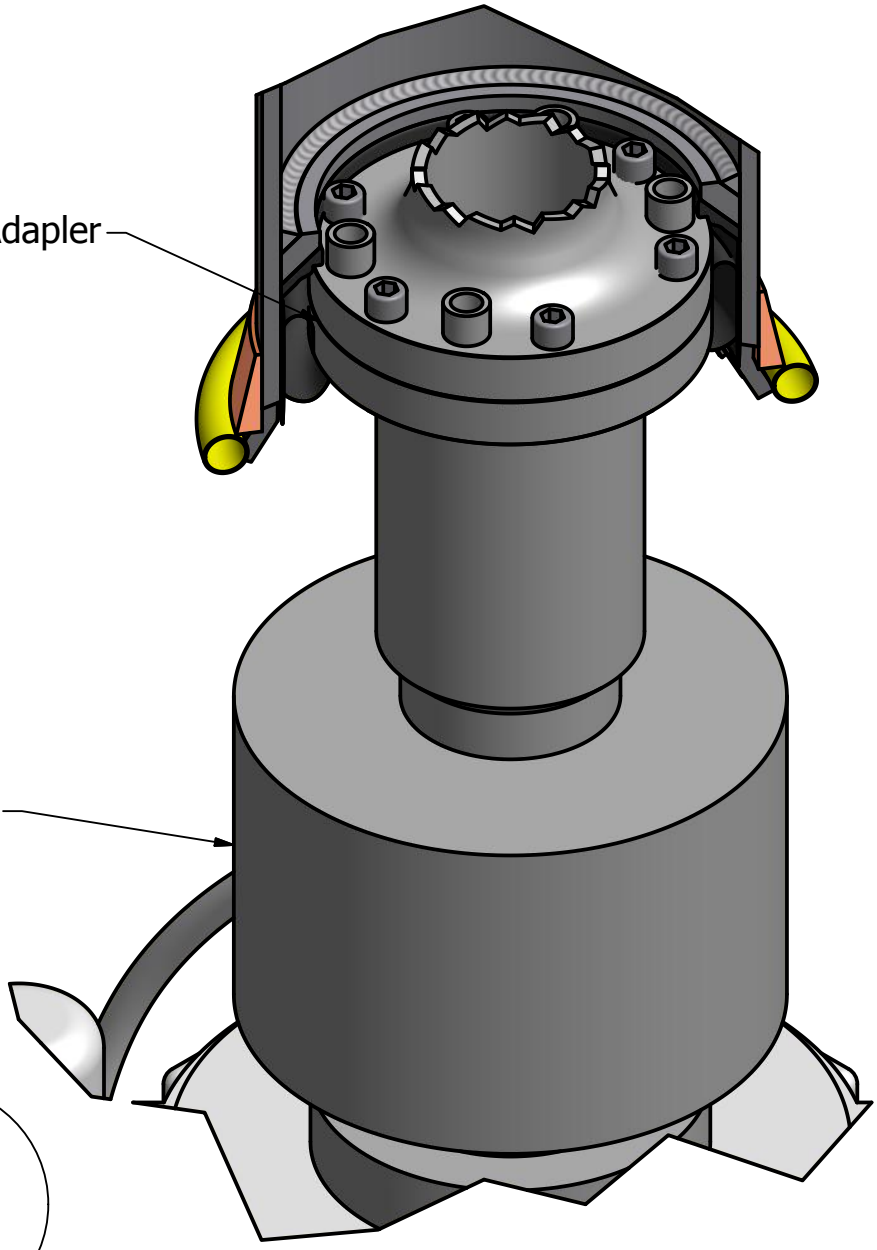

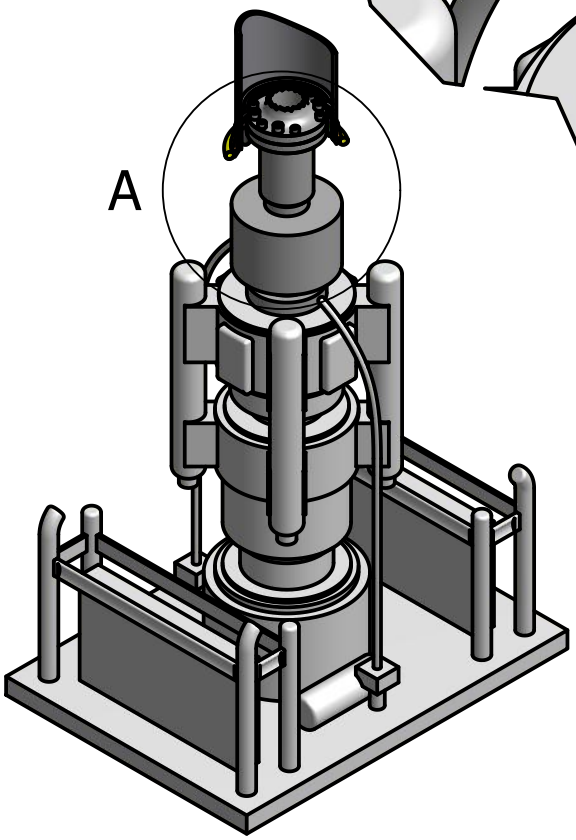

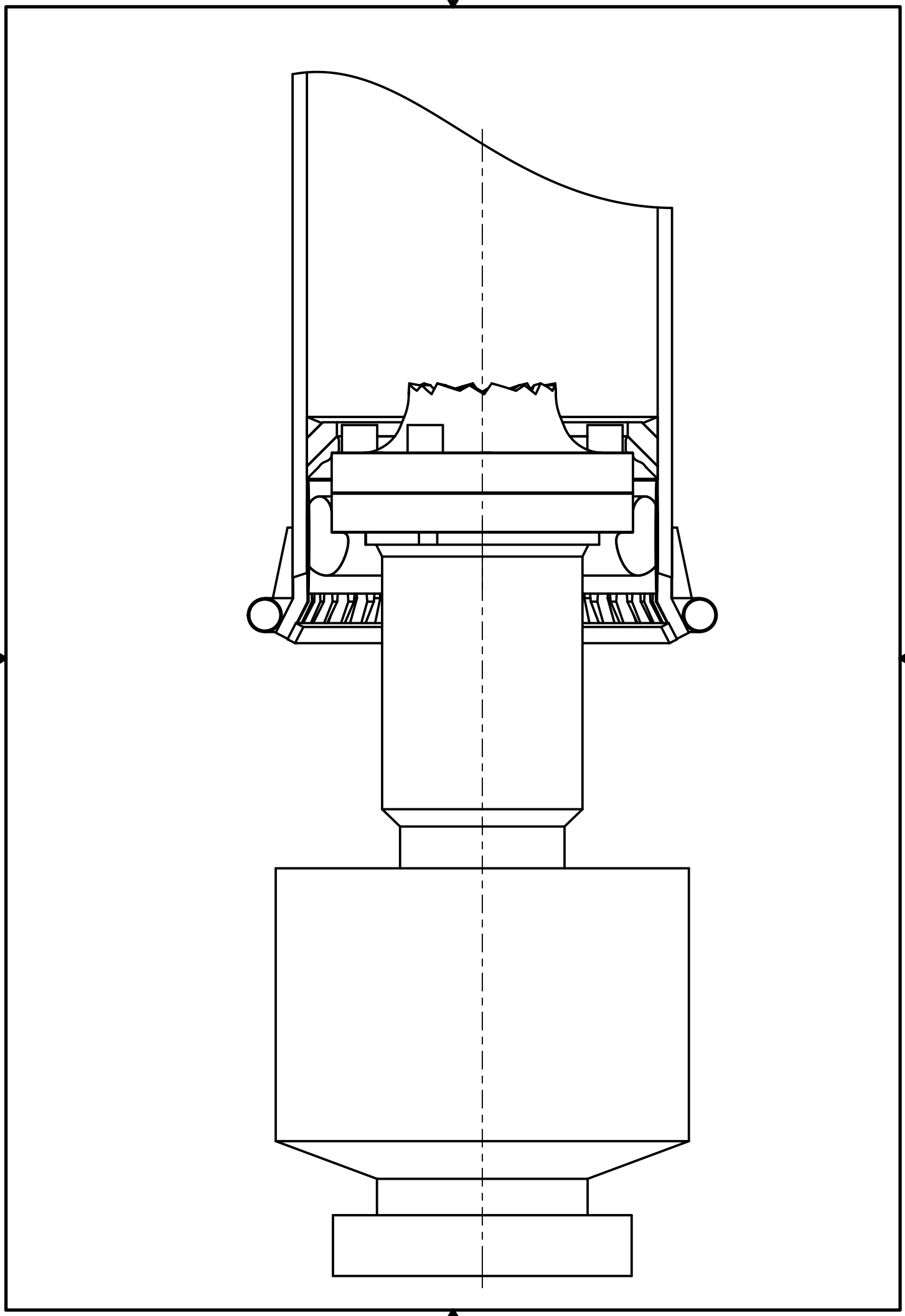

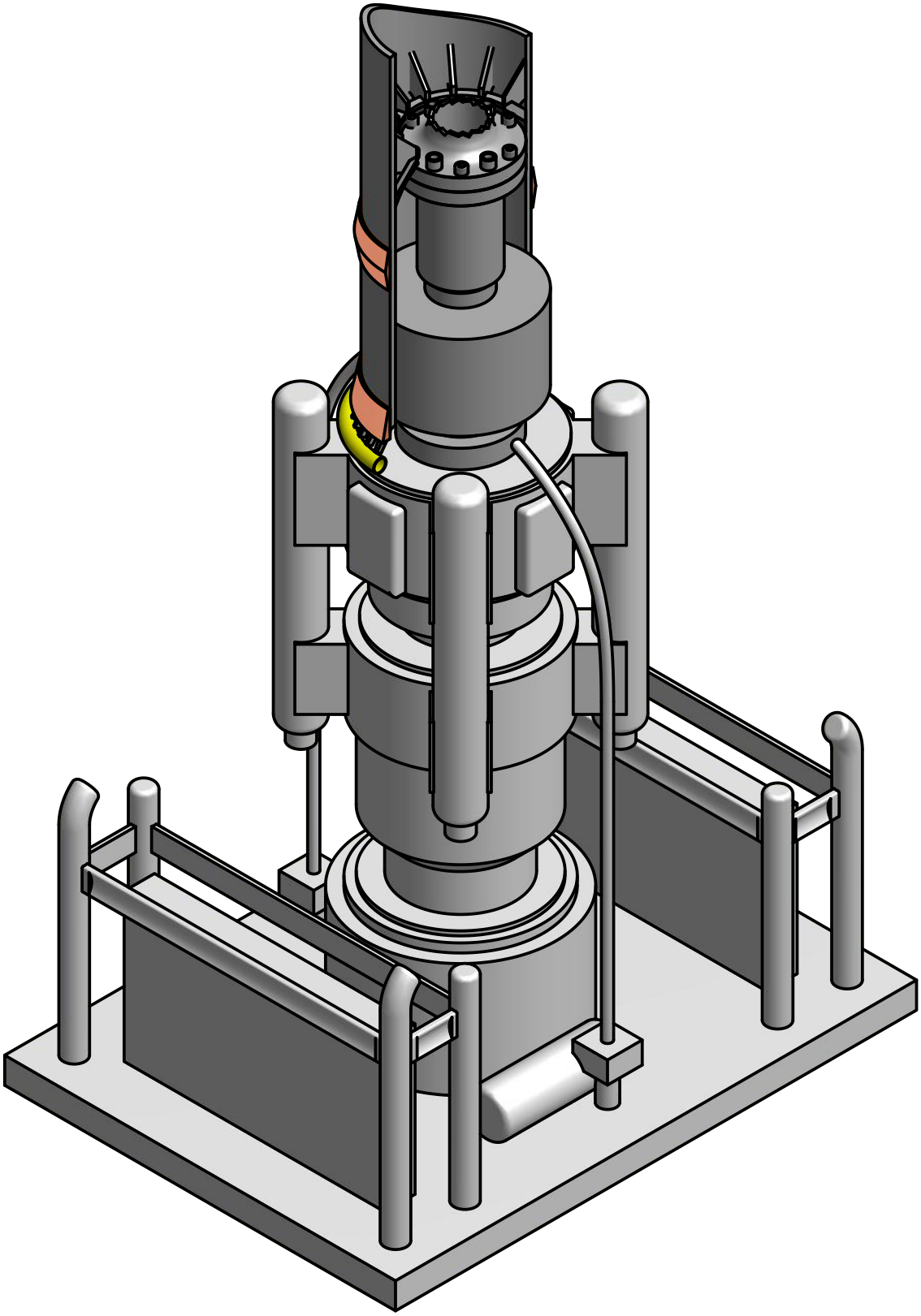

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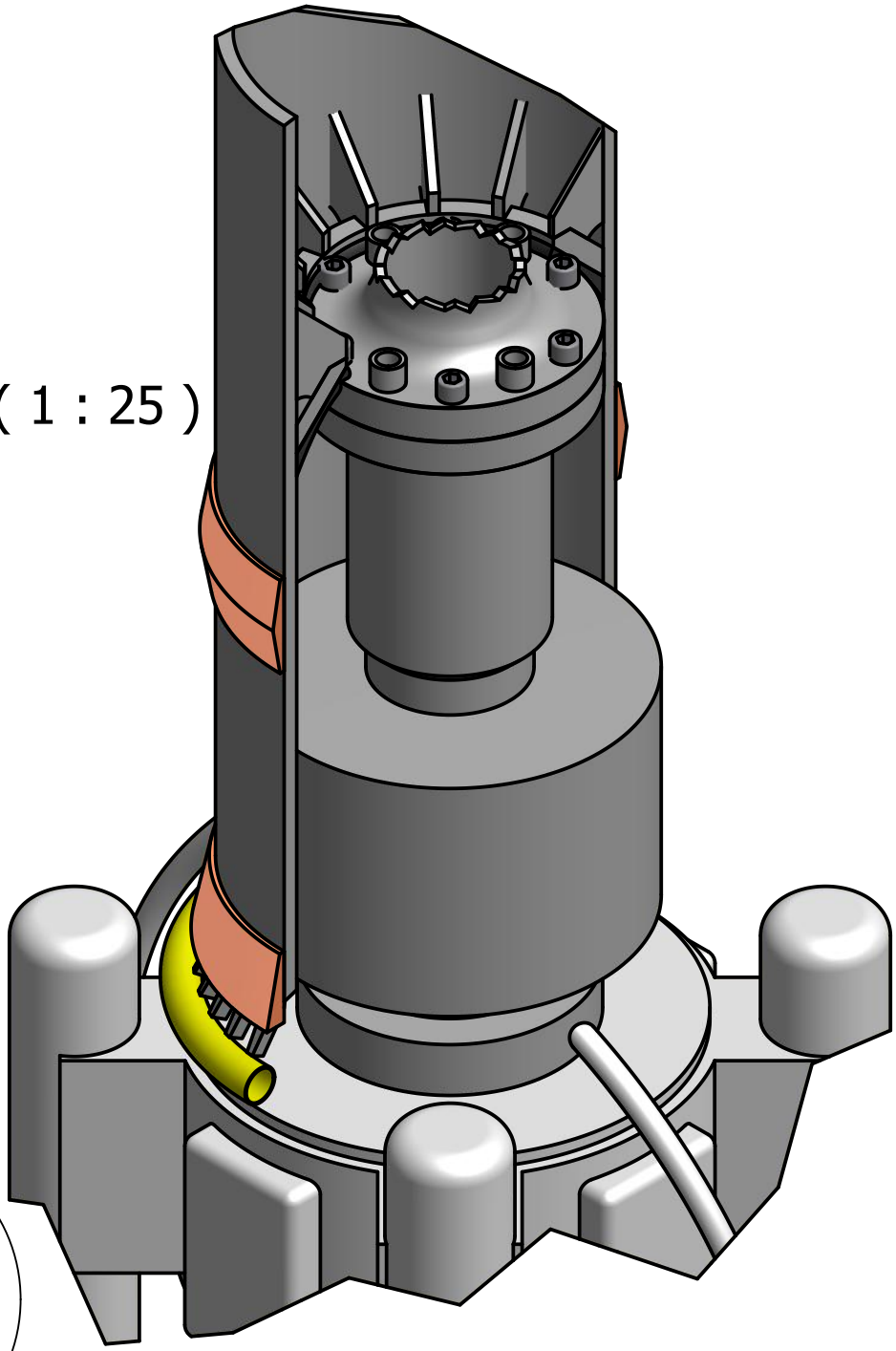

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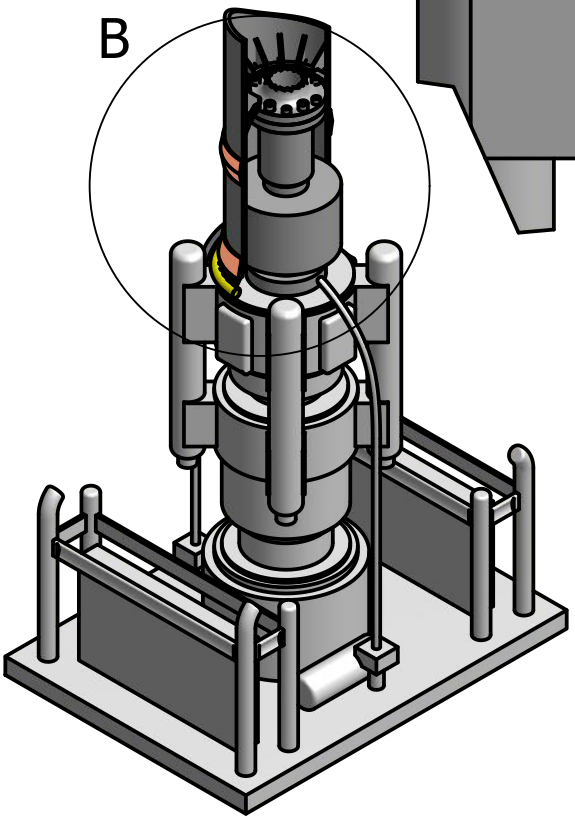
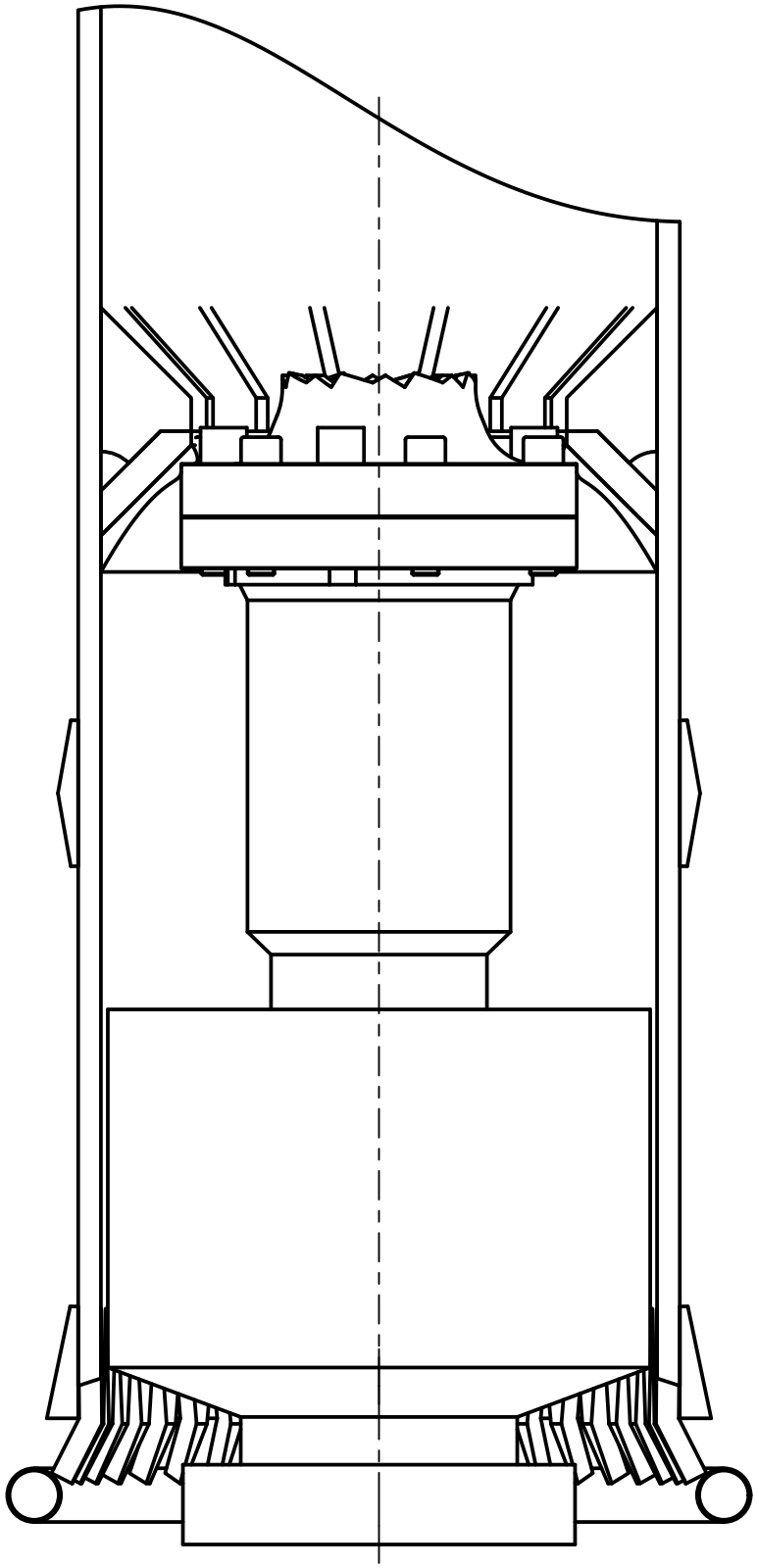


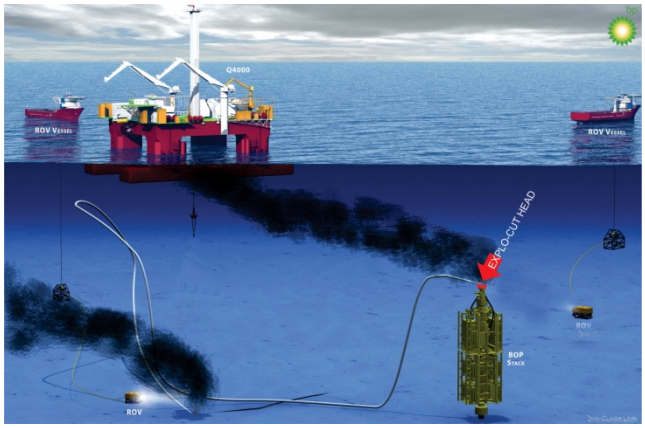


)(Corset® Technology
Whitepaper

)(Corset® Technology gives companies performing deepwater oil exploration the necessary margin of safety and the ability to do repairs in case of well failure, especially failures like the one at Deepwater Horizon in April 2010.

Step 1 - Cut the BOP (blowout preventer) at head by using explosive cutting.

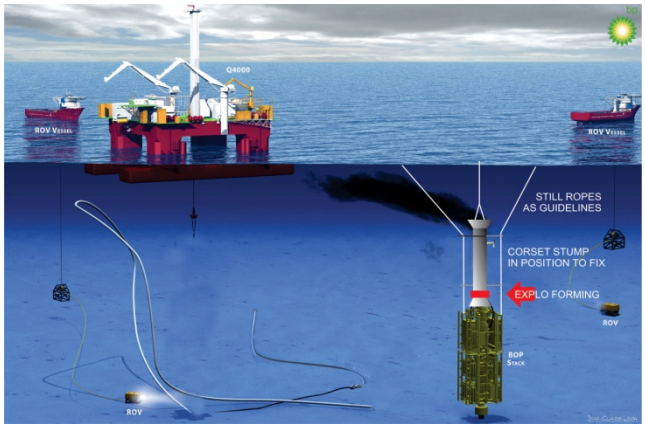
We would attach a ring around the riser pipe at BOP head. The ring would be a sandwiched construction of shielding, explosive and copper. At ignition the explosive would change solid copper into plasma. This plasmatic hit-wave would cut through the pipe, leaving it ready for step 2.



Step 2 – Attach a)(Corset® stump at BOP head

We would attach four steel ropes on four opposite sides of BOP, i.e. frame of BOP. The four ropes could alternatively (if BOP were not structurally strong enough) be fixed to concrete blocks lowered to the ocean floor near the BOP.

The ropes would run to the sea surface, to the deck of a boat. On the boat we would lead the rope ends through earholes on the **)(Corset® stump**, a preconstructed 12m long cylindrical device, equipped with **)(Corset® joint**, hydraulic guidance, oxygen nozzles and valve.



The **)(Corset® stump** would be pushed down to BOP by pulling the steel ropes apart. Additional fine-tune positioning of the **)(Corset® stump** is done by the water hydraulic guidance system with automatic manoeuvrable controls (standard in satellite manoeuvring). Oxygen nozzles are used for heating up of methane hydrates.

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andrej.cufer@orbipark.com

ORBIPARK

Step 3 - Seal the)(Corset® to the BOP via explosive forming

When the **)(Corset® stump** would arrive to BOP head, an implosion at the foot of the **)(Corset® stump** would tighten the device over the flange of BOP. After this the valve would be shut slowly, and hence the oil spill stopped completely.

The specialty of the **)(Corset® Technology** lies in how this explosive forming is done in order to assure secure and non-destructive forming on a submerged cylindrical structure.

Explo-welding technology requires clean surfaces in air.
Explo-forming can be done with water on one side and air on the other.
)(Corset® Technology works with water on both sides. It also works in deep water.

The problem under water is that when the outer cylinder starts moving towards the inner one, there's water caught in between. Water has very low compressibility. The outer shell moves so quickly in an explosion, that the water can't get out, which in effect causes it to behave as a solid material, it acts as an anvil. Furthermore, the water that escapes on the sides creates shockwaves travelling outwards possibly causing unwanted damage on the underlying structure.

)(Corset® Technology solves the water problem by displacing the water prior to igniting the explosion. When the water inside is displaced, the outer explosion can safely and securely close the gap and create a strong, durable and watertight mechanical joint between the outer and the inner tubing, i.e. the **)(Corset® stump** and the BOP flange.

The exact method of displacement of water and the consequent explo-forming of the **)(Corset® stump** is a new technology, patent pending.

STRICTLY CONFIDENTIAL – liquid displacement and metal cylinder explo-forming

Water (water-oil-gas mixture works also) displacement can be done in three variants.

Variant A – airbag explosion
Small airbag-like explosion on the inner side of the **)(Corset® stump** is used to displace the water. This explosion is too weak to cause structural damage, however strong enough to remove water at 150 bar. The time of removal of water is synchronized with the second explosion that form **)(Corset® stump** around

Variant B – titanium torus
The inside of the **)(Corset® stump** is equipped with a flattened titanium torus, protected under a sheet of metal for protection. When the **)(Corset® stump** is placed over the BOP flange, we start inflating the titanium torus in order to create a donut like shape, that would fill the gap between the outer and inner tubes, thus displacing water temporarily. We then trigger the explosion to form the **)(Corset® stump** onto the BOP flange. The incoming outer tube breaks the titanium torus and squeezes the titanium walls into the **)(Corset® joint**.

Variant C – gas injection
A torroidaly shaped nozzle tube positioned on the bottom edge of the **)(Corset® stump**. When the **)(Corset® stump** is placed over the BOP flange, we inject the gas into the gap between the **)(Corset® stump** and the BOP flange. This creates a gas bubble that allows explo-forming. The latter follows in sync. The nozzles have to be specially designed to avoid freezing.

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)(Corset® joint disables the formation of methane hydrates because it completely excludes water mixing with oil.

After we create the **)(Corset® joint** we start with a slow process of closing of the valve that is a part of the **)(Corset® stump**. It is important to do this slowly in order to avoid hydraulic hammer. The process of valve closing also further tightens the **)(Corset® joint**.

After the valve is closed and the oil spill is stopped, it is possible to connect a new marine riser over the **)(Corset® stump**. This will enable the oil company to:

- temporary and secure production of oil until relief well killing
- pump mud to enable BOP removal and replacement
- cementation to close the well permanently

Proof of)(Corset® technology

)(Corset® technology would be demonstrated prior to implementation on actual oil spill. Two tests would be done on a mock-up BOP, first in shallow water and second in pressurised water at same depth as the real BOP.

Our offer:

- Concept idea
- Design
- Engineering and construction
- Proof of technology / demonstrations
- Explosive cutting
- Explosive forming
- Expert team (Orbipark Begunje, University of Ljubljana, Turboinsitut Ljubljana, Litostroj Ljubljana)

)(Corset Technology® allows us to:

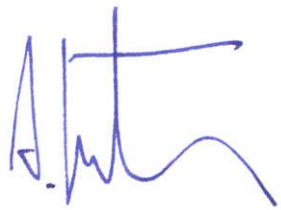
- save the well
- remove BOP
- continue production

In case you are interested in our offer please inform/contact us.

Best regards,

Andrej Čufer, u.d.i.a. MBA

Begunje, Slovenia, June 6, 2010



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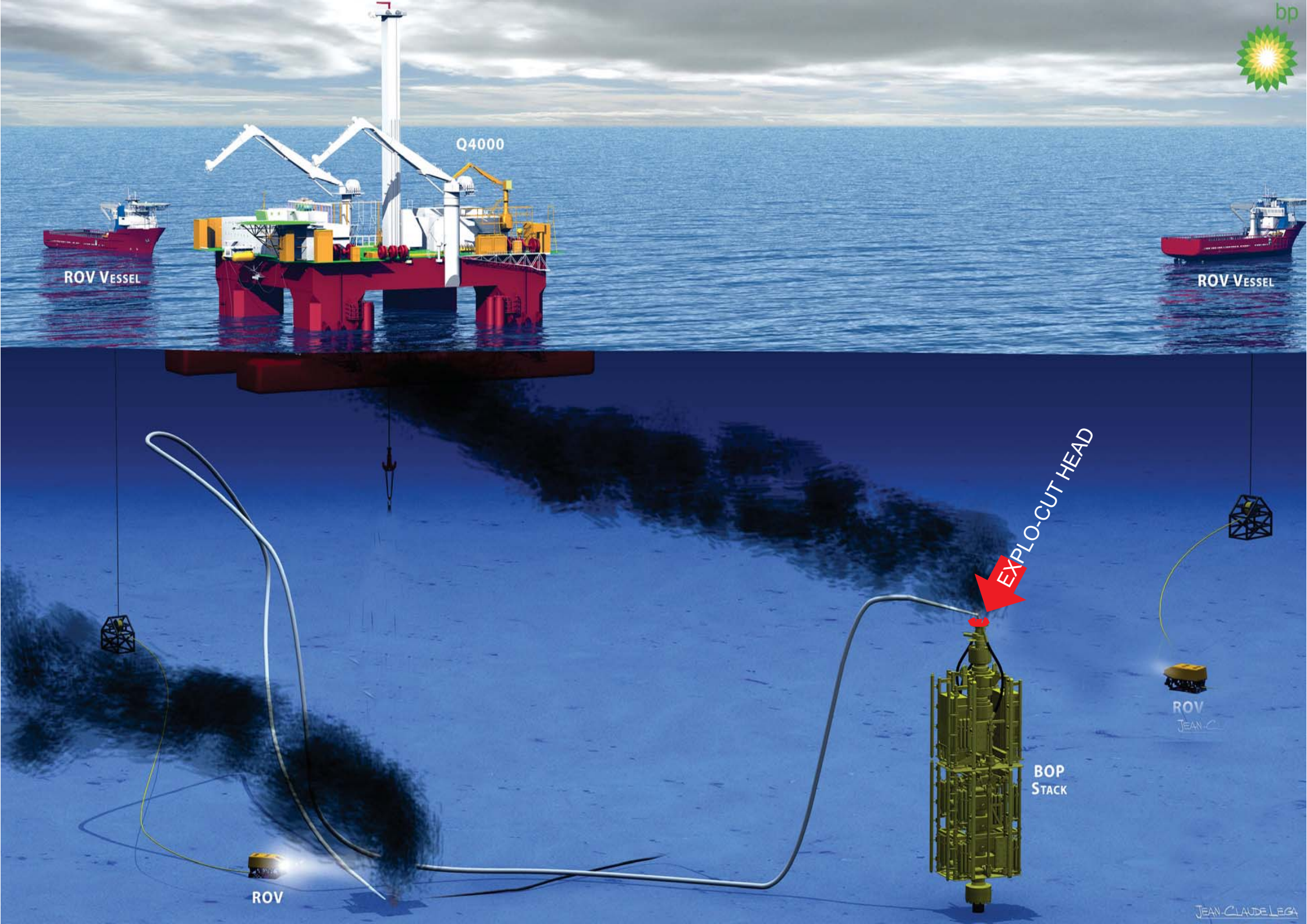
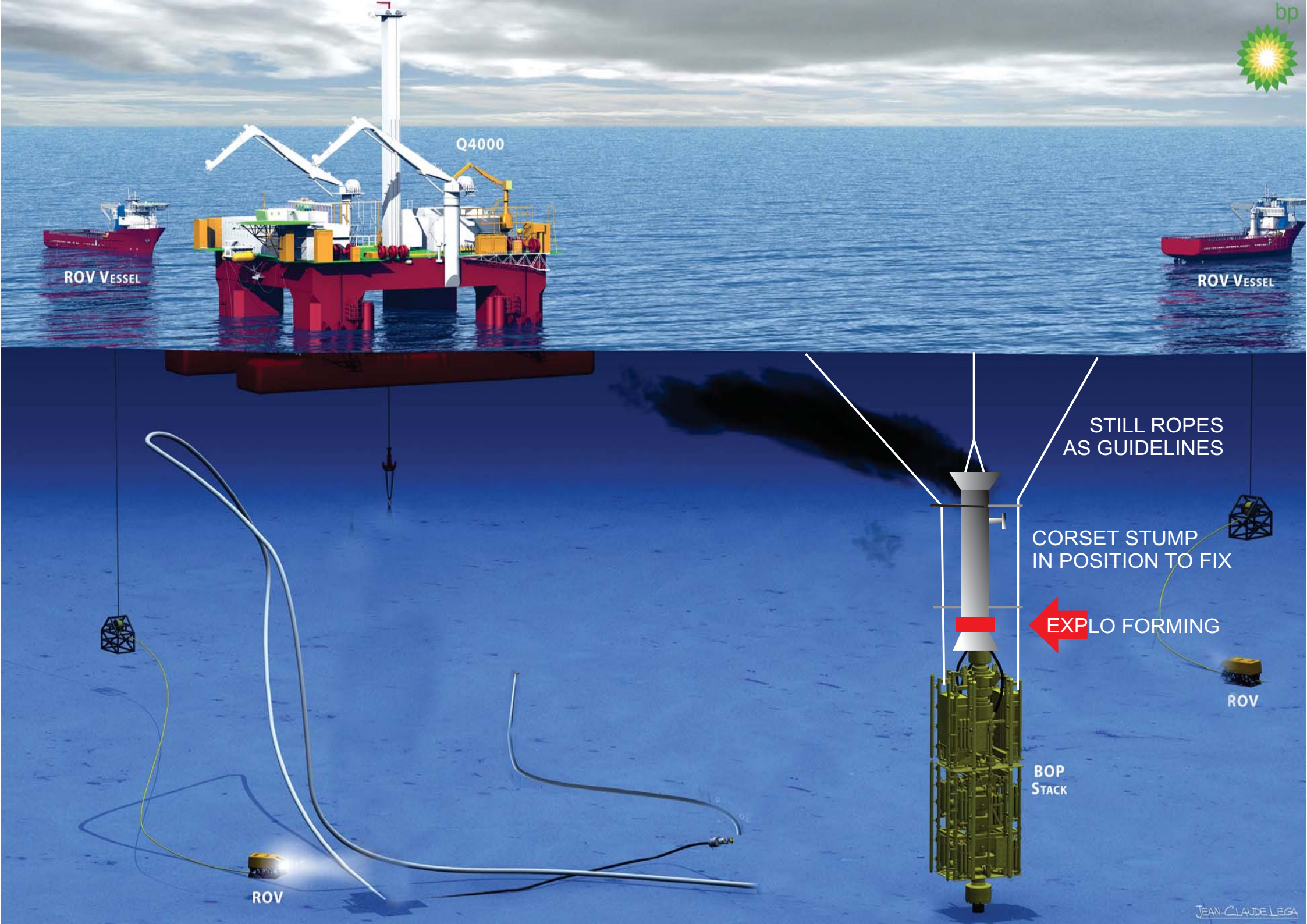
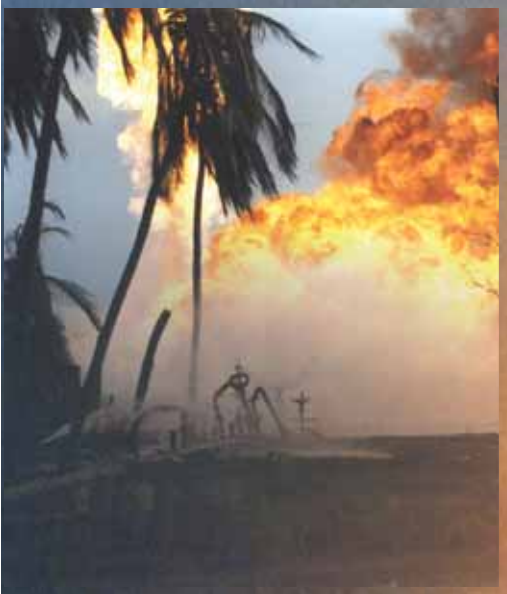

bp
Q4000
ROV Vessel
ROV Vessel
EXPLO-CUT HEAD
BOP
Stack
ROV
ROV
Jean-Claude Lega


bp
Q4000
ROV Vessel
ROV Vessel
STILL ROPES
AS GUIDELINES
CORSET STUMP
IN POSITION TO FIX
EXPLO FORMING
ROV
BOP
Stack
ROV
Jean-Claude Lega

FIREFLY PROJECT
EXPLOZION
FORMING AND WELDING
FIRST TEST IN 1991

EXPLOZION
CUTING
US AIR BOMB

FIREFLY PROJECT



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Indian Express

Thousands killed in Japan quake

SC stays Sesha order on I-D ca

ONGC begins relief-well plan

Kotla elected CLP leader

Slovanians offer help

EXPRESS NEWS SERVICE

AMALAPURAM – Even when the American blowout hero, Mr. Neal Adams, himself hinted the possibility of taking more than 60 days for controlling the blowout at the Pasarlapudi-19 drilling site of the ONGC near here, two engineers from Slovania (for Yugoslavia) have come forward to control the blowout within half of the time envisaged by others. The two Slovanians who have come here on hearing about the fire are hanging around the ONGC offices at Rajahmundry and also at the drill site accommodation centre here from Monday.

"We came on our own to

plans, on the basis of the scale and the dimension of the blowout well. What we need is some explosives, a caterpillar or a military tank. The cost of the arrangements are my travel costs and lodging. After the completion of the operation, a reward from the ONGC is of their choice, but not more than one day's production of the well so saved", he added.

Mr. Andrej is basically an architect, but has patented several heavy machinery designs, graphic designs, construction of computer designs. The Kuwait oil well fires control inspired him to develop a new system for closing oil-well fires. The technology developed by him is 'fire play' coupling techni-

tested by the Slovania's heavy equipment manufacturing company, Litostroj, in 1:1 scale. He is confident that within three weeks the blowout could be controlled, if his conditions are accepted.

Explaining how and why he is interested in the blowout control, Mr. Andrej said he heard about the blowout on a radio at his native place Ljubljana, Slovenia within 12 hours of the occurrance. Since he has conducted some experiments in fire-fighting, he wants to make available his technical knowhow for controlling the blowout. He had immediately contacted Dr. B. Balakrishnan of the Indian Embassy in Vienna, Austria and offered his readiness to help the ONGC control the blowout.

Petrovic, an explosive expert, who are behind Mr. Andrej in developing the technique.

When told that they might not have taken him seriously, as he was an architect but not an engineer, Mr. Andrej said it was a mistake to think that engineers alone could do well. "It will be proved beyond doubt if one comes to know that the majority of experts in 'NASA' are only architects.

Mr. Andrej appears to be unhappy over the cool response from the ONGC. "I and explosive expert Blaz Miheic (40) had come to Rajahmundry on Sunday and in the flight itself we worked out plans for controlling the blowout early. We showed the ONGC authorities our plans but their response was lukewarm

Slovanians offer help

EXPRESS NEWS SERVICE

AMALAPURAM – Even when the American blowout hero, Mr. Neal Adams, himself hinted the possibility of taking more than 60 days for controlling the blowout at the Pasarlapudi-19 drilling site of the ONGC near here, two engineers from Slovania (for Yugoslavia) have come forward to control the blowout within half of the time envisaged by others. The two Slovanians who have come here on hearing about the fire are hanging around the ONGC offices at Rajahmundry and also at the drill site accommodation centre here from Monday.

"We came on our own to show our expertise and to help the ONGC save the well and the valuable resources. The ONGC need not pay to us in advance. It is upto them to make best use of our latest technical knowhow" said Mr. Andrej Cufer (32) with confidence.

In an interview to ENS at Thenperucu drilling site accommodation centre, near here on Tuesday, he said the equipment needed for the "blowout control" operation could be assembled in India in hours with his plans, on the basis of the scale and the dimension of the blowout well. What we need is some explosives, a caterpillar or a military tank. The cost of the arrangements are my travel costs and lodging. After the completion of the operation, a reward from the ONGC is of their choice, but not more than one day's production of the well so saved", he added.

Mr. Andrej is basically an architect, but has patented several heavy machinery designs, graphic designs, construction of computer designs. The Kuwait oil well fires control inspired him to develop a new system for closing oil-well fires. The technology developed by him is 'fire play' coupling technique. He said the technique could be performed by remote control, without involving any risk to the personnel. It also needs no complicated equipment and allows for an adoption and reduction of the tube diametre from 100 per cent to a 20 per cent of the original diametre.

Mr. Andrej said he had tried his idea in extinguishing the oil fires in Kuwait in 1991. The system of stump-welding was tested by the Slovania's heavy equipment manufacturing company, Litostroj, in 1:1 scale. He is confident that within three weeks the blowout could be controlled, if his conditions are accepted.

Explaining how and why he is interested in the blowout control, Mr. Andrej said he heard about the blowout on a radio at his native place Ljublijana, Slovenia within 12 hours of the occurrance. Since he has conducted some experiments in fire-fighting, he wants to make available his technical knowhow for controlling the blowout. He had immediately contacted Dr. B. Balakrishnan of the Indian Embassy in Vienna, Austria and offered his readiness to help the ONGC control the blowout.

The Ministry of Science and Technology, Republic of Slovania, has extended support to him to visit India and also recommended to the centre that his services could be utilised. The letter signed by Prof. Rad Bohinic also gave out the names of two experts, Prof. Joze Duhonvnik, Chairman of Litostroj, experts in production of heavy machinery and Dr. Stozadin Petrovic, an explosive expert, who are behind Mr. Andrej in developing the technique.

When told that they might not have taken him seriously, as he was an architect but not an engineer, Mr. Andrej said it was a mistake to think that engineers alone could do well. "It will be proved beyond doubt if one comes to know that the majority of experts in 'NASA' are only architects.

Mr. Andrej appears to be unhappy over the cool response from the ONGC. "I and explosive expert Blaz Mihelic (40) had come to Rajahmundry on Sunday and in the flight itself we worked out plans for controlling the blowout early. We showed the ONGC authorities our plans but their response was indifferent. They could have decided then and there whether our services could be accepted or not as all the top brass including the Chairman, Mr. Manglik, and the Joint Secretary, the Union Ministry of Petroleum and Natural Gas, were present. "Instead they asked us to go over to the blowout spot and discuss with the engineers there."

Firefighter in trouble

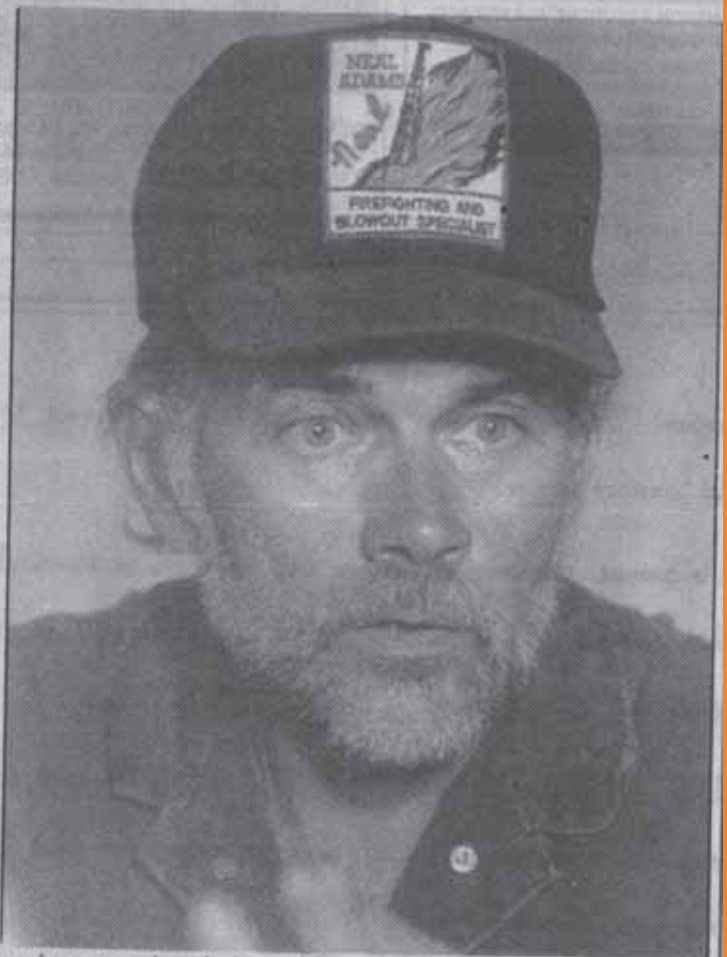
Blow-out specialist Neal Adams has been battling blazes for 22 years. But Pasarlpudi proved to be too hot for the hardy veteran, says **Vishal Thapar.**

FIREMEN keep their cool when things get hot. Playing with fire is second nature to them. But for the much-acclaimed Neal Adams, waging a vigorous battle simultaneously on two fronts — the gigantic flame at the Pasarlapudi oil well and the intransigent bureaucracy at the Oil and Natural Gas Corporation (ONGC) — proved too hot to handle. And he ended up burning his fingers, perhaps for the first time in his distinguished career.

The legendary American called it quits on Friday when differences with the ONGC, which hired his services, over the strategy to cap the burning oil well reached a flashpoint. Though it was apparent that the arrival of representatives of Red Adair Inc., a rival firm, for a second opinion was the last straw, "personal reasons" were officially cited as the reason for his "withdrawal" from the capping operations.

Neal Adams' arrival in India more than a month ago was a celebrated one. Fawning natives and an indulgent Press virtually sung paens, expecting him to perform a quick miracle.

Now that the chips are down, sceptics there are aplenty. Critics say that Adams is using the ONGC as a scapegoat to answer



equipment and explosives, risk-

for advising and $ 50,000 a day

в пластичных породах на небольшом расстоянии от аварийной скважины. В результате смещения пород, вызванного взрывом, ствол аварийной скважины перекрывается, а залежь надежно изолируется от залегающих выше проницаемых пород и земной поверхности.

Этим методом ликвидированы аварийные фонтаны на двух газовых месторождениях в СССР. При разведке месторождения скважиной *2* на глубине 2748 м была вскрыта газоконденсатная залежь (рис. 57). Через эту скважину произошел выброс промывочного раствора, в результате чего возник открытый газовый фонтан. Его дебит составлял 1—1,5 млн. м³ в сутки. Через полтора месяца фонтанирования произошел обвал стенок скважины с образованием мощной породной пробки. Но началось сильное газовыделение через соседние менее глубокие скважины и особенно через скважину *6*. В ней возник открытый фонтан. Это означало, что газы из скважины *2* перетекают в соседние скважины. После изучения обстановки было принято решение пережать скважину *2* на глубине 2440 м в кровле солевых отложений под пластом глин. В соответствии с проектом пробурили скважину *10*, которая на заданной глубине приблизилась к аварийной скважине на 35 м. Взрывом ядерного заряда скважина *2* была пережата на участке длиной 60 м и газовый фонтан ликвидирован.

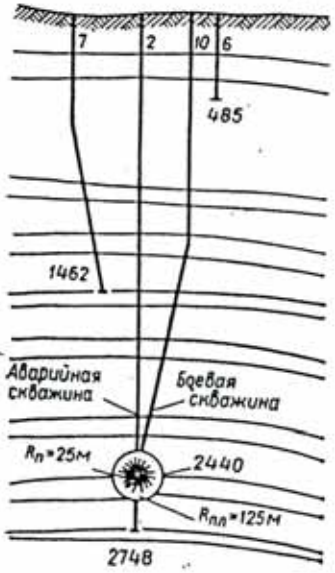


Рис. 57. Схема ликвидации газового фонтана.
7, 2, 10, 6 — скважины.

ПОД ЗЕМЛЕЙ И В ВОЗДУХЕ

Опасные аварийные ситуации возможны в угольных шахтах (взрывы метана и угольной пыли, горные удары, внезапные выбросы угля, газа и породы,

подземные пожары). О взрывах метана и угольной пыли мы уже рассказывали.

Горные удары — это внезапное массовое обрушение пород кровли в подземных выработках. Они сопровождаются сильным звуковым эффектом, разрушением крепи, завалом выработок и всего, что в них в этот момент находится. Горные удары происходят не всегда. Например, если породы кровли угольного пласта не очень прочные, то их обрушение в выработанное пространство происходит самопроизвольно по мере продвижения добычного забоя. Обрушенные породы, занимая больший объем, чем в ненарушенном состоянии, воспринимают давление вышележащей толщи пород. В тех случаях, когда породы кровли представлены крепким монолитным слоем большой мощности, они не обрушаются по мере передвижения забоя, а нависают сплошной плитой над выработанным пространством. Такие породы так и называют — труднообрушаемые. И в один далеко не прекрасный момент происходит мгновенное обрушение пород кровли на большой площади. Это и есть горный удар. Последствия его, как правило, ужасны.

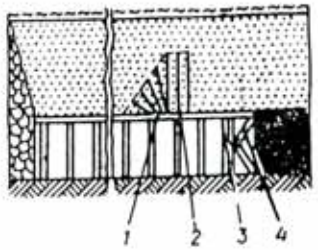


Рис. 58. Расположение шпуровых зарядов при посадке труднообрушаемой кровли.
1 — врубовые шпуры; *2* — отбойные шпуры; *3* — посадочная крепь; *4* — распорная стропильная крепь.

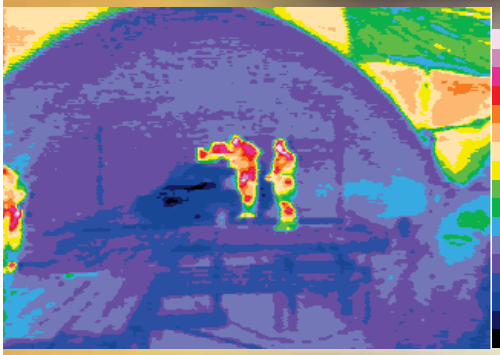
В борьбе с горными ударами прибегают к принудительному обрушению (посадке) кровли сравнительно небольшими объемами. Для этого применяют шпуровые заряды (рис. 58).

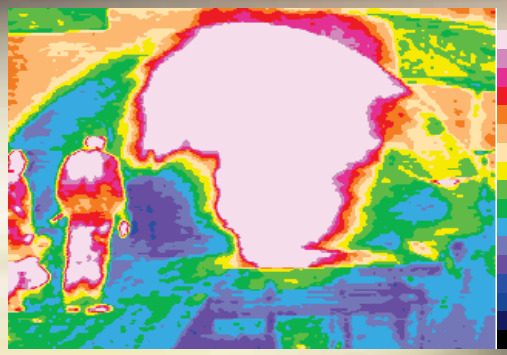
В результате взрывов горный удар заменяется рядом последовательных управляемых обрушений кровли.

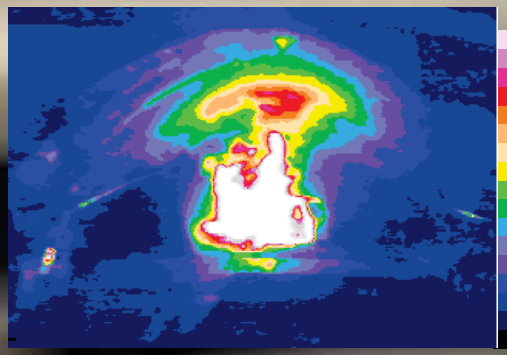
Способы борьбы с внезапными выбросами, о которых кратко рассказано выше, основаны на искусственном их провоцировании или на снижении напряжения в массиве и его дегазации. И то и другое возможно с помощью энергии взрыва.

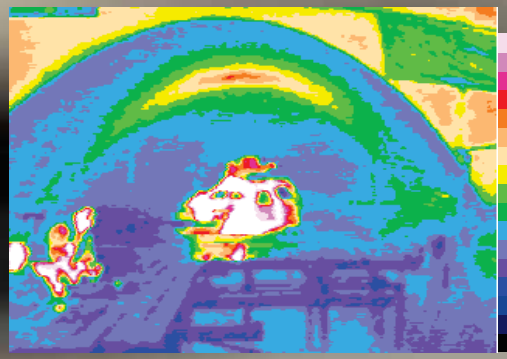
Искусственное вызывание внезапного выброса предусматривается при сотрясательном взрывании. Пример расположения шпуров при вскрытии крутопадающего угольного пласта, опасного по внезапным выбросам, спо-

FIELD EXPERIMENTS FOR EXTINGUISHING „COOLBOMB“









1997 FIRST EXTINGUISHING TEST WITH WATER MIST IN TUNNEL

SAFETUNNEL CONCEPT INCLUDING EXTINGUSING, VENTILATION