ERRIS INSHORE FISHERMAN'S ASSOCIATION.
Iascairí Chois Cósta Iorrais
Belmullet
Co Mayo
25 / 06 /10.

Environmental Protection Agency,
PO Box 3000,
Johnstown Castle,
Co. Wexford.

RE : Corrib gas IPPC licence application no. PO738-02 by Shell E&P Ireland Ltd.

A Chara,

Erris Inshore Fisherman's Association (EIFA) have reached an agreement with Shell E&P Ireland Ltd. (SEPIL) that treated produced water from their Ballinaboy refinery will be discharged via spare capacity in the umbilical pipe to the vicinity of the Corrib gas well. SEPIL assures us that this allows for enough spare capacity to remain to deal with any contingencies that may arise in the future. Bearing this in mind we are now responding to the above application in as much as it concerns the discharges to the marine environment.

We have studied the application and have inspected the treatment / discharge facilities in Ballinaboy for both produced and run-off waters (Copy of our engineer's report enclosed.). We are happy that they are two separate systems with no connection between them except for one valve, enclosed in a wall between the two storage tanks which SEPIL assures us has been rendered inoperable.

We are now satisfied that we can support that part of the application that deals with the treatment and discharge of produced / run-off water to the marine environment. We do, however, urge that the monitoring facilities available in the systems be checked on an ongoing basis. We also propose that the monitoring be extended to keep a check on the quality of water at the outfall location, 12.5 Km. From landfall and the surrounding areas, both inside and outside Broadhaven bay.

Beir bua agus beannacht.

Éamonn Ó Duibhir, Cathaoirleach.

Eamopn Dixon, Rúnaí

Melvin Tighe Cisteoir.

Report to Erris Inshore Fishermens Association on IPPC Application P0738-02 by Shell E&P Ireland Limited

Issued by:
Leo Corcoran CEng., MBA, FIEI.
Energy & Environmental Consultant
16th June 2010

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Background

Shell E&P Ireland Limited (SEPIL) have an agreement with Erris Inshore Fishermens Association (EIFA) to dispose of Produced Water from the Corrib Gas Project at source rather that at the entrance to Broadhaven Bay as per their IPPC Licence P0738-01 granted by the Environmental Protection Agency (EPA) in 2007. The Inshore fishing industry of Erris is the main livelihood of one hundred and fifty fishermen and their families. EIFA is the main organisation representing this fishery. A central value of this organisation is to promote the sustainability of the fishery and in particular to preserve the pristine water quality of Broadhaven Bay. The quality of the seafood from the fishery is recognised by purchasers both in Ireland and abroad. Any diminution in the brand of the Erris fishery could have long term economic and social consequences for the local area. While the Corrib gas reserve may flow for less than twenty years the Erris fishery is a sustainable resource and provides a way of life to a community which seeks to preserve its unique language culture and traditions.

Agreement

The Agreement between EIFA and SEPIL states that;
"SEPIL hereby warrants and undertakes that it will ensure that no Produced Water from the produced water treatment plant, as defined in IPPC Licence 0738-01, shall be discharged, disposed of or otherwise emitted from the currently consented outfall pipe. SEPIL shall further ensure that nothing other than treated rain water and firewater run offs from the Bellanaboy terminal site shall be disposed of to sea via the said outfall pipe or within the Irish waters up to the twelve mile limit."

Scope

A revision to the IPPC Application was submitted to the EPA by SEPIL on the 24th March 2010. This report comments on the application by SEPIL to determine if the Review Application is compliant with the above agreement. A site visit was arranged and took place on 2nd June 2010 where the water treatment systems were viewed and discussed.

Scope of Revised Application

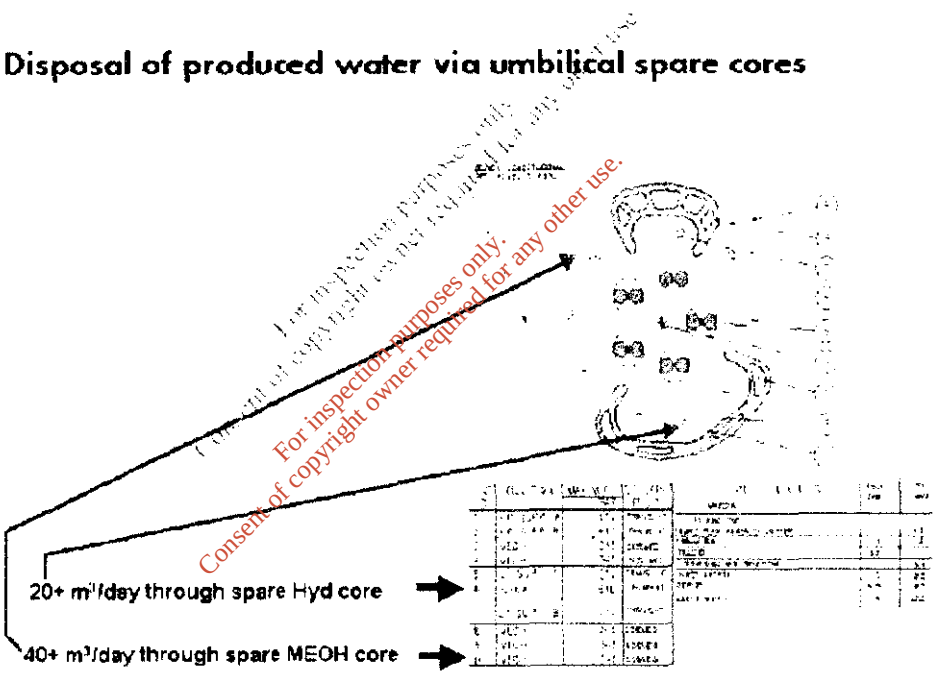
The scope of the revised application includes;

- Discharging the majority of the Produced Water via the umbilical to source.
- Discharging the remainder of the Produced Water via road tankers.
- Separation of Surface Water and Produced Water Systems

Discharge of Produced Water

The Application proposes discharging up to 80 m3/day of Produced Water. This will be achieved by utilising spare cores in the umbilical, Spare Core number 6 will have a capacity of up to 20 m3/day and Spare Core 10 will have a capacity of 40 m3/day, with the remainder 20m3/day being removed by road tanker. Due to the decline of Produced Water during the life of the field it is estimated by SEPIL that the removal of PW by road tanker will not be required after year 4 and that only one core will be required to discharge PW after year 6.

Fig. F.1 Umbilical Cores



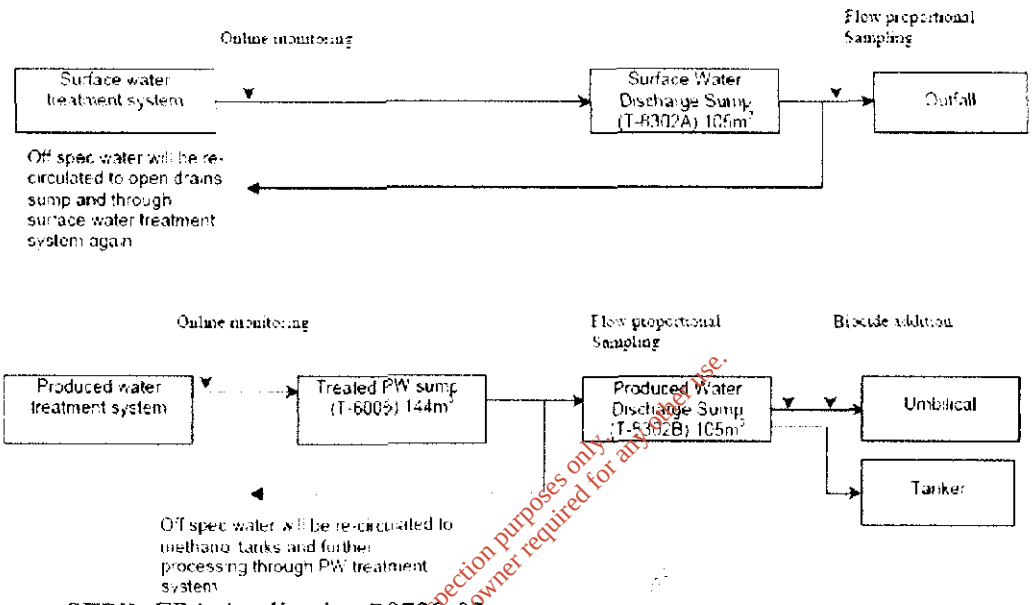
Source: SEPIL EPA Application P0738-02

Produced Water Shipped via Road Tanker

No details are provided in the application on the discharge location of Produced Water shipped via road tankers. There should be full transparency on the final transportation treatment and discharge of PW shipped via tankers.

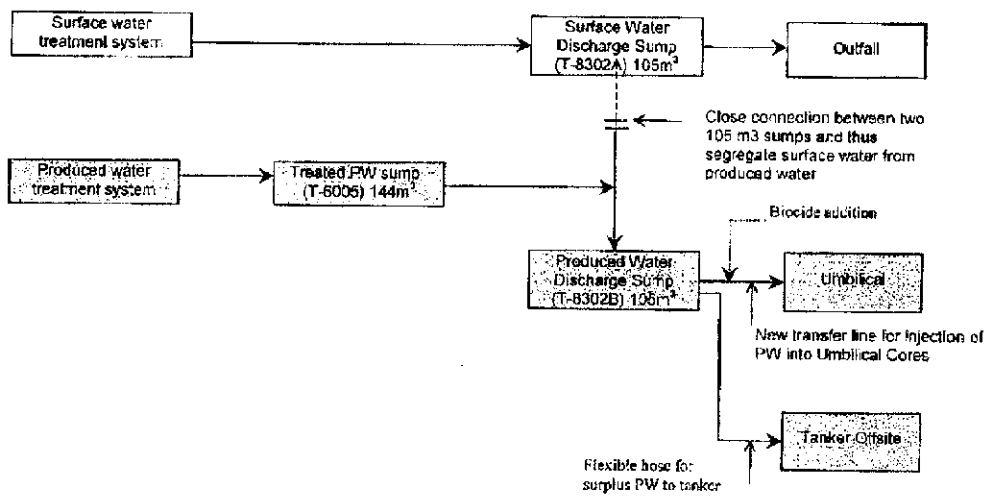
Separation of Surface Water and Produced Water Systems

The application details the process flow of the Surface Water and Produced Water



Source: SEPIL EPA Application P0738-02

The current application indicates that there is complete separation between the two systems. The initial application to the EPA indicated that there is a closed connection between the two systems.



Source: SEPIL EPA Application P0738-01 proposed technical amendment

It was not possible to view the connection between the Surface Water Discharge Sump and the Produced Water Discharge Sump as this would require entry into a confined space. SEPIL provided a diagram of the interconnection indicating a valve with a blind flange at one end and spool piece terminating in a blind flange. SEPIL stated that the two systems had been completely separated by welding a spade internally on the spool piece. Additionally the hand wheel of the valve has been removed. It was further stated that it was not possible to remove the valve as it had been partially encased in the concrete structure of the of the sump wall.
It is unusual to encase a valve in concrete by design. It is unclear if this was an oversight during construction or if there was some other reason for constructing the connection between the two sumps in this manner.

Water Treatment System and Environmental Management
The Produced Water and the Surface Water are treated in separate process lines with similar technology employed The processes includes:

- a Corrugated Plate Interceptor,
- Ultrafiltration,
- Nano Filtration,
- Granular Activated Carbon Bed
- Ion-Exchange Units
- pH adjustment.

During the Site visit SEPIL confirmed that none of their other refineries is currently operational with a similar system although an equivalent system is currently being built in India. A key factor in successfully treating and discharging water form the Corrib Refinery will be the skill and training of

operators and ensuring that the vendor operational procedures and EPA limits are being adhered to.

Environmental Monitoring

Continuous monitoring of TC/TOC (Total Carbon/Total Organic Carbon) is recorded locally on the control panel within the water treatment building with backup monitoring at Central Control on site. Additionally frequent sampling is carried out during the process to determine the concentration of heavy metals and other contaminants.

SEPIL and the EPA should consider publishing a comprehensive range of environmental data and making it available on a public web based format to provide transparency and access to environmental data. This would be consistent with EU and EPA policies and in line with Shell's Policy on Health, Security, Safety, the Environment and Social Performance.

Impact of Using Spare Cores

In the previous IPPC application it was considered necessary to include spare cores presumable to provide redundancy and capacity in the event of a failure of a service cores.

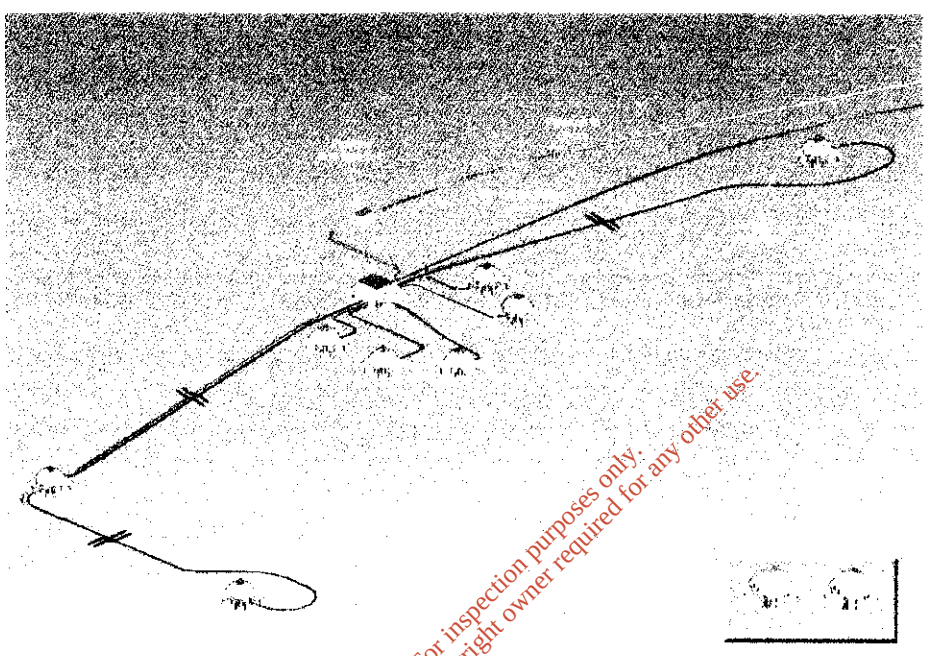
Since these cores are now allocated to the discharge of Produced Water some risk will be transferred from the environmental risks of discharging PW to Broadhaven Bay to the integrity and security of the umbilical, the subsea modules and the wellhead valves. A Risk Assessment will be required to determine these risks and to assess if they are acceptable. These risks fall into two categories;

1 Safety of the subsea production system
2 Security of Supply

Safety of the Subsea System

The safety of the subsea system will be evaluated in a Safety Case to be submitted by SEPIL to the Commission of Energy Regulation (CER) under section 13 of the Petroleum (Exploration and Extraction) Safety Act 2010 (PEESA). This Act will require SEPIL to hold a Safety Permit before production commences. During the review of this IPPC licence application the EPA should refer the use of spare cores for the purpose of which they were not originally designed to the CER. While the EPA will consider the use of these cores from an environmental perspective the CER will evaluate their use by considering the Safety Case to be submitted by SEPIL and by determining if the revised design is acceptable from a safety perspective. Considering that the subsea infrastructure will be installed at a dept of 350m beyond the safe limit of divers any future physical modifications or alterations would have to be carried out using Remotely Operated Vehicles (ROVs). SEPIL have stated in their submission to the EPA that the cores are

entirely reversible should "the cores be required for chemical or hydrate duty". No details are provided on what processes and procedures would be deployed in such a scenario and in particular how the SEPIL/EIFA agreement would be maintained in the event that the cores were reversed.
It should be demonstrated by SEPIL in their Safety Case that the revised design does not compromise the integrity and safety of the subsea infrastructure.



Offshore Field Facilities layout Source: Corrib Offshore EIS

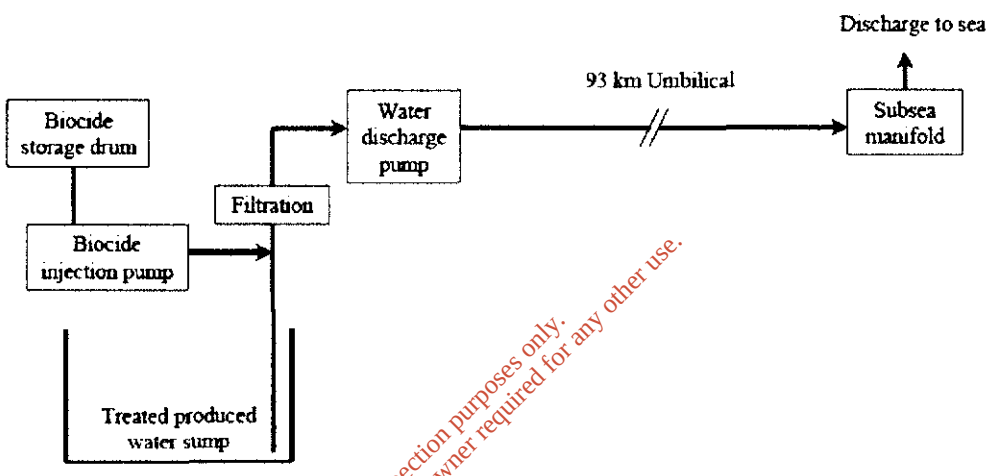
Security of Supply

While a Safety Permit may be issued by the CER under the PEESA an additional concern is how the use of spare cores for Produced Water discharge could impact upon security of gas supply. This issue may not come under the remit of the CER under the PEESA however the design modification will be of concern to the Minister of Communications, Energy and Natural Resources to determine that this modification does not compromise a strategic goal of government policy to ensure physical security and reliability of gas supplies to Ireland. For this reason the EPA should refer this design change to the Minister for Communication Energy and Natural Resources as the design is a variation of the original approved by the minister in his role as the regulator. Under the Petroleum and other Minerals Act 1960-1995, SEPIL are required to develop the lease in accordance with the approved "plan of development" and to seek approval from the minister to any changes already approved.

Biological Treatment of Produced Water

An analysis of the treated produced water discharge system has shown that a change of core surface roughness or reduction of internal diameter, due to biological growth will significantly reduce the discharge capacity of the system. Biological growth can also induce pitting corrosion which can rapidly penetrate pipe walls. SEPIL proposes treating produce water by dosing with biocide compound DBNPA.

Figure F.1.5.1: Schematic of the Biocide Dosing of the Treated Produced Water Discharge System.



Source: SEPIL EPA Application P0738-02

SEPIL have estimated that DBNPA will degrade at the discharge point and will not bio accumulate in the marine environment.

Surface Water Treatment

Surface water run off from process areas on site will be treated and discharged via the permitted outfall at Broadhaven Bay in line with the existing IPPC licence.

Summary

The revised IPPC application addresses the concerns of EIFA in relation to the discharge of Produced Water at Broadhaven Bay however a number of issued raised in this report should be address by SEPIL in particular;

Discharges via Road Tanker,

Management and operation of water treatment systems,

Public availability of environmental information,

Risk assessment of reallocating cores including impact on safety of subsea system,

Impact on security of supply,

Reversibility of core change and impact on the SEPIL/EIFA agreement.

Leo Corcoran
16th June 2010