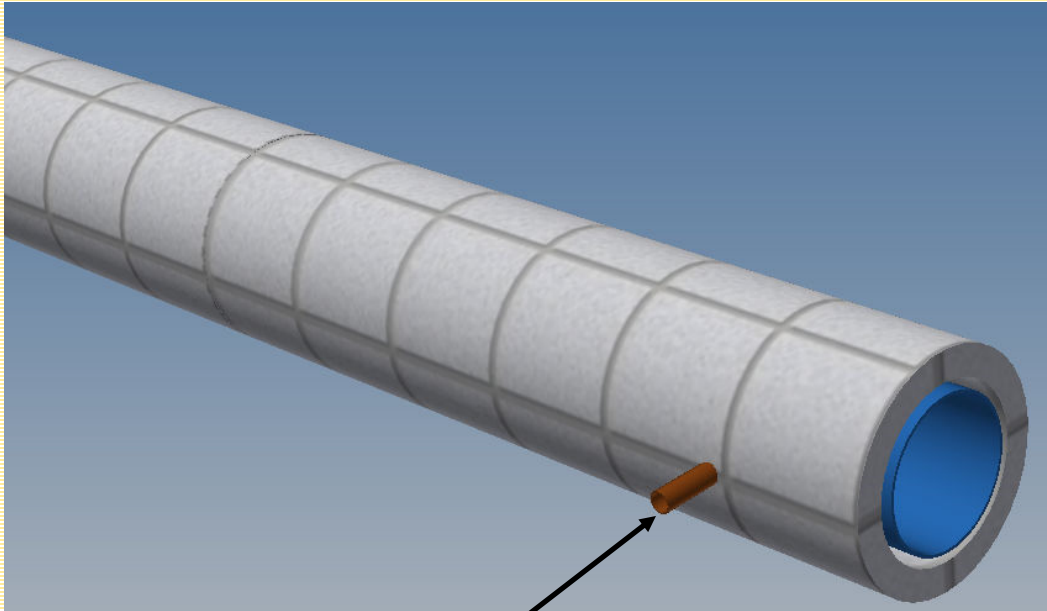


BETA SUBSEA SYSTEMS

DIV. BAUGH CONSULTING ENGINEERS, INC.

SPH-1 SURFACE PIPELINE HEATING



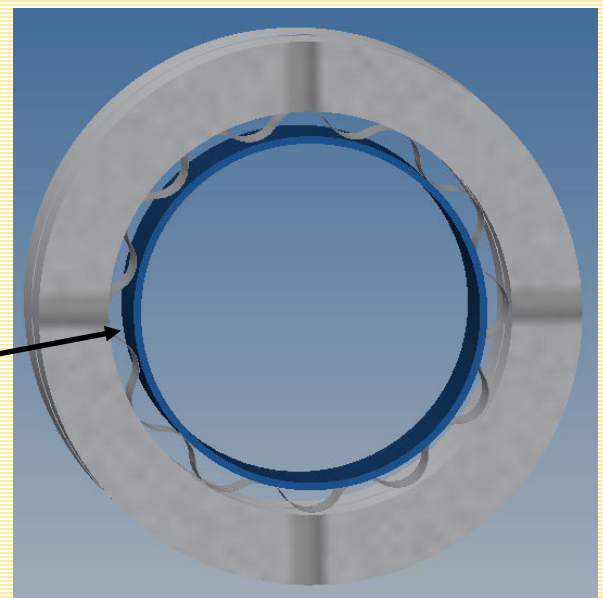
**HEAT YOUR
PIPELINE USING
FREE HEAT
FROM EXISTING
GENERATORS!**

**USING FREE
HEAT ALLOWS
YEAR ROUND
HEATING!**

**INPUT HEATED gas FROM ANY
SOURCE SUCH AS:**

**ENGINE EXHAUST
ENGINE RADIATOR COOLING
ELECTRICAL HEAT
TRUCK ENGINES**

**CHANNELS BETWEEN PIPELINE
AND INSULATION DELIVER THE
GAS ALONG THE PIPELINE, HEAT-
ING THE FULL PIPELINE**



Beta Subsea Systems offers a combination of patent licensing, engineering, manufacturing capabilities, and products to assist you grow your business.

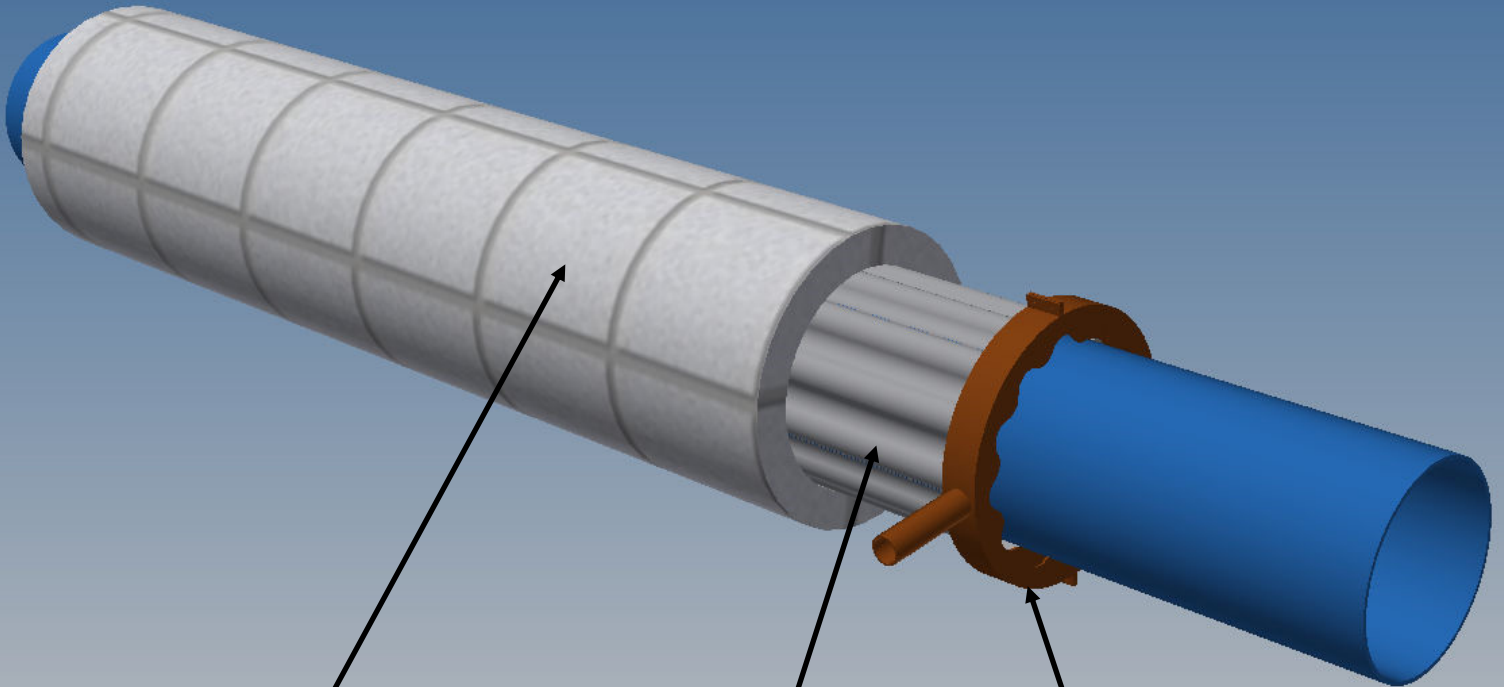
Primary Contacts: Benton F. Baugh, Ph.D., P.E., 713-419-8683, bbaugh@baughengrs.com
James R. Crawford, 337-344-0289, jimbobcrawford@gmail.com
www.betasubsea.com

PATENT PENDING

BETA SUBSEA SYSTEMS

DIV. BAUGH CONSULTING ENGINEERS, INC.

SPH-1 SURFACE PIPELINE HEATING



**INSULATION CAN BE
REINSTALLED OVER
CORRUGATIONS**

**PLENUM CHAMBER CAN
PROVIDE FLOW ON ONE
OR BOTH SIDES**

**WRAPPING PIPELINE
WITH CORRUGATED
SIDING GIVES GAS
FLOW CHANNELS**

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James R. Crawford, 337-344-0289, jimbobcrawford@gmail.com

Shipping Address: 15911 Lillja Rd, Houston, TX 77060, (281) 445-0988

PATENT PENDING

SPH-1 SURFACE PIPELINE HEATING INSTALLATION DATA SHEET

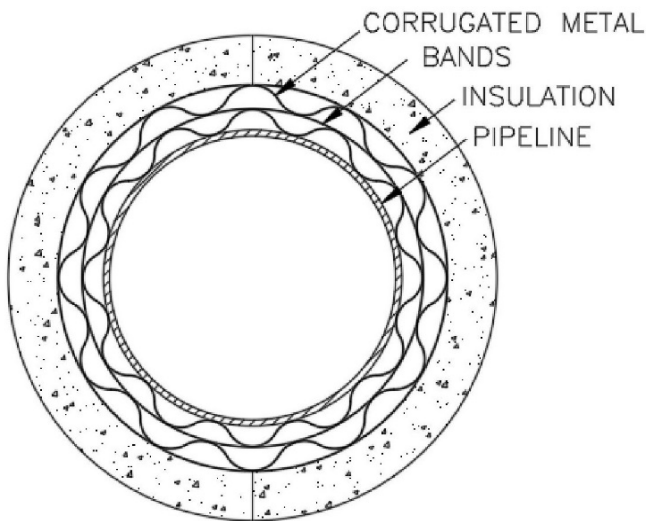
FILL OUT THESE SHEETS, SCAN, AND RETURN TO E-MAIL ADDRESS ABOVE.

NAME: _____ PHONE NO. _____

COMPANY: _____ E-MAIL _____

PIPELINE NAME: _____

PIPELINE LOCATION: _____



As seen in the figure, the SPH-1 SURFACE PIPELINE HEATING method is to wrap the pipeline in one or more layers of corrugated metal (roofing) to provide longitudinal flow passages.

Heated gases will be vented through these passages to warm the pipelines and in turn the fluids within the pipelines.

A plenum chamber will be added where the heated gases are introduced into the pipeline and where the gases are vented from the pipeline.

How many layers of corrugated metal will be used will be determined by the flowrate of the available gases and the distance they are to blow between the inlet and outlet chambers.

As the preferred heating gas is exhaust gas from existing sources, the spacing along the pipeline may be irregular. The number of layers of corrugated metal may vary along the pipeline. In some cases heating sources may be powered, including by wind energy.

This makes each section of pipeline having a heating source(s) to its vent location a separate design / installation project.

Due to the number of variables to be considered in an installation, a pilot study on your pipeline and heating sources will be beneficial.

BETA SUBSEA SYSTEMS

DIVISION OF BAUGH CONSULTING ENGINEERS, INC.

James R. Crawford, 337-344-0289, jimbob@crawfordtechnicalserv.com, www.betasubsea.com

SPH-1 SURFACE PIPELINE HEATING INSTALLATION DATA SHEET

THIS SHEET CAN BE FILLED OUT AS AN ESTIMATE FOR AN ENTIRE PIPELINE OR INDIVIDUAL SHEETS CAN BE FILLED OUT FOR SECTIONS OF THE PIPELINE.

AN ACTUAL QUOTATION CAN BE PROVIDED ON COMPONENTS FOR THE INSTALLATION. AN INSTALLED SYSTEM QUOTATION WILL REQUIRE AN ONSITE ENGINEERING STUDY.

SECTION NAME: _____

LOCATION OF SECTION: _____

PIPELINE O.D.: _____

PRESENT INSULATION O.D.: _____

HEATED AIR SOURCE: _____

HEATED AIR TEMP.: _____ SCFM AVAILABLE: _____

KNOWN BACK PRESSURE LIMITATIONS ON HEATED AIR: _____

DISTANCE OF HEATED AIR SOURCE(S) FROM PIPELINE: _____

DIFFICULTY OF REMOVING INSULATION FROM PIPELINE: _____

DIFFICULTY OF REINSTALLING INSULATION OVER ENLARGED CORE (2" LARGER IN DIAMETER PER CORRUGATED LAYER): _____

DIFFICULTLY OF ACCESS TO PIPELINE LOCATION: _____

IS THIS A WIND INTENSIVE AREA SUCH THAT WIND ENERGY COULD BE USED TO HEAT THE AIR?: _____