Gas Storage - LNG Polskie Project
Project Value of Fire&Gas Detection&Control Part – 3.580.000€
PREFACE
The scope of this document is to describe the implementation of IFSMS/F&G System and Fire Fighting equipment supply specific to Swinoujscie - Poland LNG TERMINAL (PLNG) Project. It outlines the concepts and philosophies which were followed during the Detailed Design. The LNG Terminal plant is located around 60 Km North of Szczecin, in Poland.

IFSMS Description
The IFSMS is composed by the Fire & Gas System, Public Address General Alarm, Control Signaling Panels and Fire & Gas Detectors.

The F&G protects field process against any hazardous conditions resulting from following causes:
- Fire ignition
- Gas release
- Cold gas spilled

The F&G provides following actions:
- Detect fire or flammable gases in all areas.
- Detect LNG spillage with low-temperature detectors.
- Detect O2 depletion in all areas of the facility (inside buildings).
- Initiate (automatically or by manual intervention) respective sound and light alarms in the zones where the hazard is identified.
- Initiate the measures and the procedures aimed at containment and countering the hazard; i.e. starting the fire pumps, opening the sprinkler system valves, closing the throttles at the HVAC intakes etc.
- Initiate the operations of the IFSMS/F&G to execute the procedures of processing equipment shutdown and cut-off.

IFSMS is built with redundant processors which execute in parallel and have a modular structure microprocessor based
LFAP System Architecture

LFAP
System Architecture

Power Supply Unit
Power Supply

Battery Fault
Power Fault

Cabinet OverTemperature
Sensor

HVAC
TO F&G

Extinguishing
Control Panel

Redundant
Internal BUS

DI Cards
DO Cards

Addressable
Control Cards

Parallel Data Exchange BUS

Master CPU
Slave CPU

-ES-480 - Redundant BUS

OT 1200
Touch screen 15” HMI

OT 1200
Touch screen 15” HMI

EDS-505A-SS
Managed TCP/IP Switch

Redundant
TCP/IP - OPC

RS-485 Lines

Digital Control Panel

Heat Detector

Smoke Detector

Addressable Devices
Devided on two
Addressable Loops

Manual Call Point

HSSD Smoke Detector

Duct Smoke Detector

Flasher & Siren

6 CH conventional
to Addressable Loop Convertor

Full Duplex
Mono Mod F.O.

Turbo Ring

Gas Sampling System
F&G System Description
The F&G system is designed to be fault tolerant for:

- One Power Failure
- One CPU(processor/memory) Failure
- One BUS Failure
- One Communication Network Line Failure
- One IO Card Failure (where specified as redundant)

The F&G system has the possibility of replacement ("hot replacement" feature) of any module without disturbing the operation of the process or requiring any part of the system to be powered down.

System diagnostic is identifying all possible faults through testing.

F&G System Architecture
Field Devices

Gas Detection: Series **SMART S 500**
The Gas Detectors series SMART S 500 has been designed based on over 45 Years experience made by Dr. G.M. Bardoni in Fire & Gas applications and represents the “State of the Art” in Hydrocarbons, Flammable and Toxic Gas Detection.

**Innovative Intelligent Gas Detection Technology**

**DUAL INDIPENDENT CHANNEL UNIVERSAL TRANSMITTER**
**DUAL SENSOR HEAD TO DUAL CHANNEL TRANSMITTER WITH AUTOMATIC IDENTIFICATION, DIAGNOSTIC AND CONFIGURATION OF SENSOR.**
All Sensing Element are Hotfield replaceable without disconnecting power and sensor wires, within 5 minutes including auto zero calibration

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>20-30 VDC (2.4 Watt max at 24 VDC)</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-40°C to +80°C</td>
</tr>
<tr>
<td>Execution</td>
<td>Ex d IIC T6 – ATEX Ex II 2 G</td>
</tr>
<tr>
<td>Response time</td>
<td>&lt;5 Sec T50</td>
</tr>
<tr>
<td></td>
<td>&lt;8Sec T90</td>
</tr>
<tr>
<td>Analogue Output</td>
<td>4-20mA (3 wires) with HART</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 2% F.S.</td>
</tr>
<tr>
<td>Grade Protection</td>
<td>IP-65/67</td>
</tr>
</tbody>
</table>
**Open Path Gas Detector Safeye 703 (Operating Distance 50 - 140)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous Area Ex Approvals</td>
<td>IECEx</td>
</tr>
<tr>
<td>Reliability Approvals</td>
<td>TUV (SIL2)</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-40 °C to +55 °C</td>
</tr>
<tr>
<td>Power Supply</td>
<td>18-32 VDC Source + Detector/Iсточник + детектор 250mA (600mA start-up Peak)</td>
</tr>
<tr>
<td>Grade Protection</td>
<td>IP-67</td>
</tr>
<tr>
<td>Execution (ATEX)</td>
<td>II 2G Ex de (ia) IIC T5 (55°C)</td>
</tr>
<tr>
<td>Spectral Response</td>
<td>2.0÷4.0 um</td>
</tr>
<tr>
<td>Sensitivity Range</td>
<td>0-5 LEL.m Standard 0-2 LEL.m by dip-switch setting</td>
</tr>
<tr>
<td>Material</td>
<td>SS 316</td>
</tr>
<tr>
<td>Included Options</td>
<td>Swivel bracket in AISI 316 Relay Output 5A SPST Fault, 2A SPST Alarm.</td>
</tr>
<tr>
<td>Signal output</td>
<td>4÷20 mA HART Protocol</td>
</tr>
</tbody>
</table>

**Multispectrum Flame Detector FlameWatch UID-01**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response time</td>
<td>&lt; 5 Seconds Typical</td>
</tr>
<tr>
<td>Built in Test</td>
<td>Automatic</td>
</tr>
<tr>
<td>Signal output</td>
<td>4÷20 mA Sink (or Source as option) Relay SPST 5A for Alarm, Fault HART Protocol RS-485</td>
</tr>
<tr>
<td>Operating temp range</td>
<td>- 50 to + 75°C Option (-40 to +85°C)</td>
</tr>
<tr>
<td>Power Supply</td>
<td>24 Vdc (18 ÷ 32)</td>
</tr>
<tr>
<td>Protection</td>
<td>IP 66/67 per EN60529</td>
</tr>
<tr>
<td>Type of protection</td>
<td>ATEX directive 94/9/EC Ex II GD</td>
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</table>
Heat Detector (Eex d, Atex)/

<table>
<thead>
<tr>
<th>Function</th>
<th>Heat detector bi-metallic</th>
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</thead>
<tbody>
<tr>
<td>Body / Housing Material</td>
<td>SS</td>
</tr>
<tr>
<td>Mounting</td>
<td>j.b. light alloy</td>
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<tr>
<td>Contact rating</td>
<td>1A</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP65</td>
</tr>
<tr>
<td></td>
<td>ATEX II 2 G</td>
</tr>
<tr>
<td>TAG Label</td>
<td>SS316 type</td>
</tr>
</tbody>
</table>

Notification Devices

AWD100
Outdoor Loudspeaker for Hazardous Area
100W - 129dB@1m
50W – 123dB@1m
25W - 1117dB@1m
3 OUT OF 32 PRE PROGRAMMED TONES
3 CUSTOMIZABLE TONES ON REQUEST.
INTELLIGENT HAZARD TONE PRIORITY

Manual Call Point Ex-d/
Eex d IIC Group II2D

Flashing Beacon FL20
Сигнальный маяк
Lamp power - 6J 29Cd
Rate of protection - IP65
Public Addressable/General Alarm System

MAIN CONTROL NODE
It mainly consists of a microprocessor based communications engine “node”, including all hardware, software and licenses to provide the following indicative functions:
• maintain the registration data base;
• System restart and data retention;
• diagnosis and testing;
The PAGA System main control cabinet incorporated the automatic monitoring equipment to provide an early warning of system malfunction and to provide immediate and convenient system status information to the maintenance personnel.
The executed diagnostic tests:
• Line monitor test.
• Alarm generator test.
• Loudspeaker network monitoring
• Earth leakage

SES-ASA Engineering
Cav. Dr. G. M. Bardoni
Executive Director