

# ISAB S.r.l.



# Refinery

- A coastal refinery located in Sicily, geographically very well placed.
- A single refinery resulting from the merger of two adjacent refineries: one built and put in operation in1975 by ERG (South Site) and the second (built in 1965) bought by ERG from ENI in October 2002 (North Site), plus a power unit (IGCC) that was put in production in 2000 by ERG.
- In December 2008 the refinery becomes ISAB S.r.l. ("ISAB"), a joint venture between ERG (51%) and LUKOIL (49%) which acquired the entire control since 1<sup>st</sup> January 2014.
- On 4<sup>th</sup> May 2023 GOI Energy purchases ISAB.

- Largest refinery and exporter of petroleum products in Italy.
- By Government Decree of 3 February 2023 the IGCC Complex and the North and South ISAB Refinery, i.e. the plants owned by ISAB, were declared to be of National Strategic Interest.
- ISAB processes about 20% of crude in Italy and produces 40% of the Sicily's automotive fuel.
- IGCC produces 13% of the Sicilian electricity consumption.



### Refinery



**North Refinery** 



**South Refinery** 



**IGCC** Power Plant

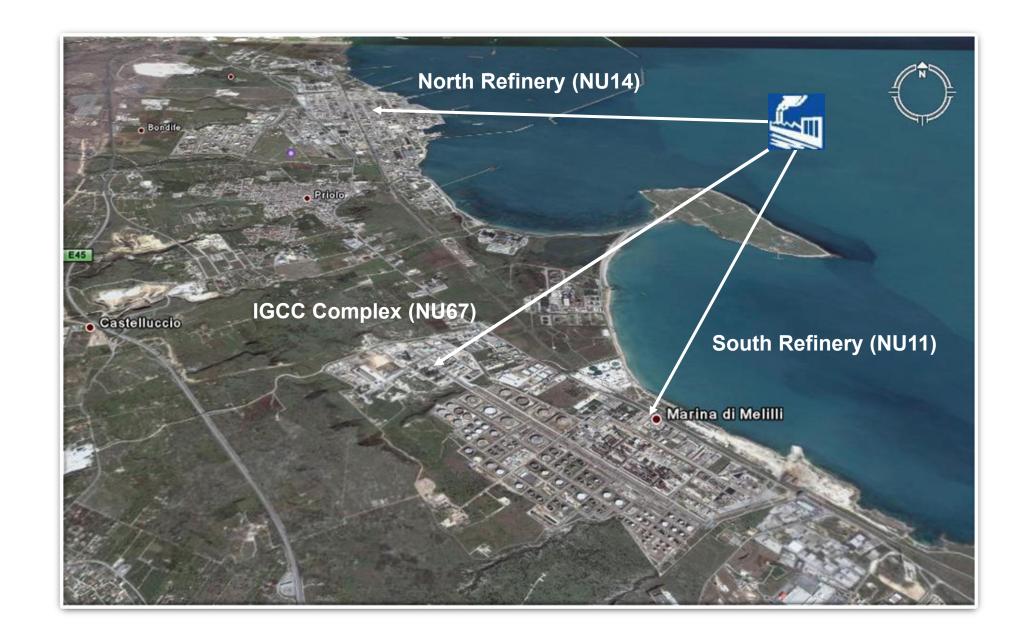


Infrastructures

- Refining designed capacity of 16 mtpa/320 kbpd
- Currently operated in a range at 8 to 10 mtpa/230 kbpd
- 9.7 Mt processed in 2021, 11.7 Mt in 2022, 11 Mt in 2023 and of 9,4 Mt in 2024<sup>(\*)</sup>
- Nelson complexity of 9.3
- Premium location in the centre of the Mediterranean Oil Market in Augusta industrial area
  - (\*) low throughput due to North T/A

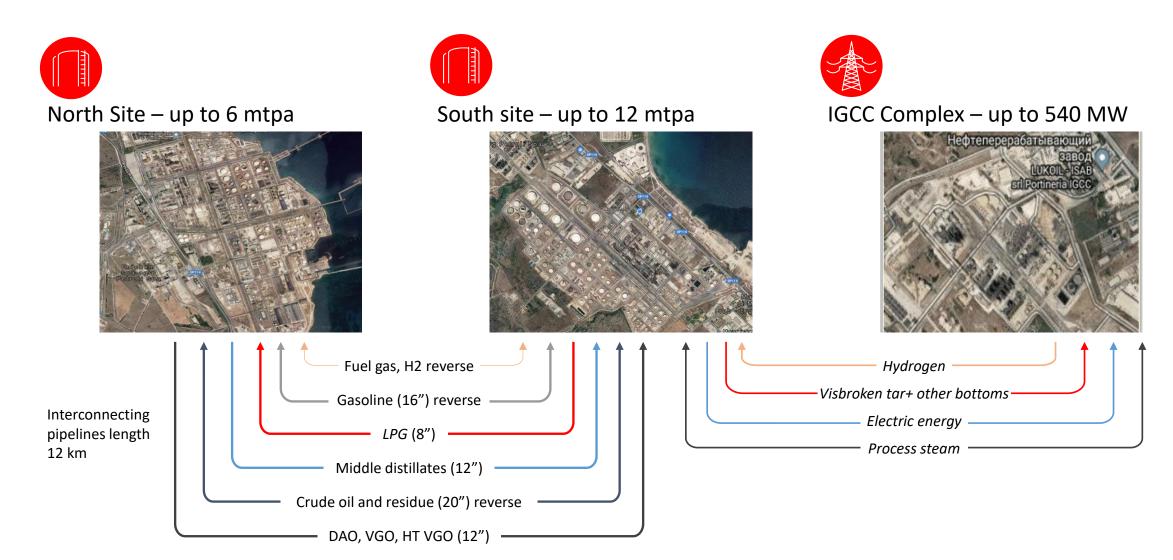
- Power plant with 540
   MW capacity
- Generates electricity using natural gas and asphalt
- In actual configuration is able to produce 15 kNm3/hr of hydrogen
- Extensive logistics infrastructures with 3 jetties, capable to serve ultra large crude carriers and a truck loading ramp
- Large and developed tanks farm







### Refinery





is a consulting and engineering company, highly specialized in the fields of

# HSE

# Health, Safety, Environment and Human Factor

### **Our activities**



Process Safety



Environmental and Sustainability



Safety Engineering



General
Health and
Safety studies



Communication and Training



HSE Organization Consulting

Founded in 1985, ICARO has carried out consultancy activities at **national and international** levels for important industrial groups, for the main engineering and construction companies, for public bodies.

In 2023, ICARO was acquired and became part of the international TÜV Rheinland group.





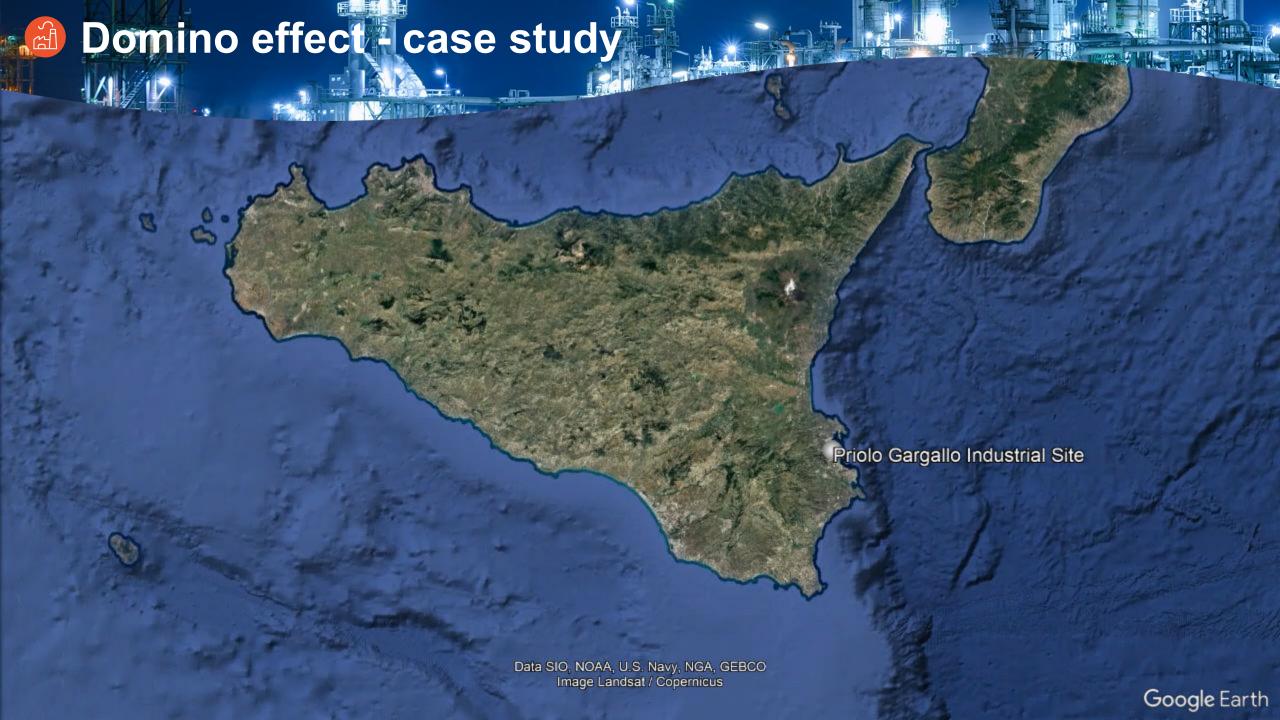
#### **Definition**

The **domino effect** in Legislative Decree 105/15, Italy's transposition of the European Seveso III Directive, is a **chain of accidents** that spread from one plant to another, where a major accident at one site can trigger risks for other sites. Annex E, part 1 of the decree provides for a stochastic method to assess the credibility of these chains between different facilities.

HSE - UK

Development of methods to assess the significance of domino effects from major hazard sites - 1998 "A domino event is defined as a loss of containment on a major hazard installation which has resulted directly or indirectly from a loss of containment of an adjacent nearby major hazard installation. The two events must occur concurrently or in close sequence and the hazard range must extend beyond that of initiating event."









Accident at the former ERGMED North Refinery (now ISAB) in the Priolo-Gargallo industrial site on April 30, 2006



Page 9 October 1, 2025



### **Event**

A crude oil residue leak was detected in a pipeline connecting storages to atmospheric distillation plant in a trench close to the underpass of the SS114 road.

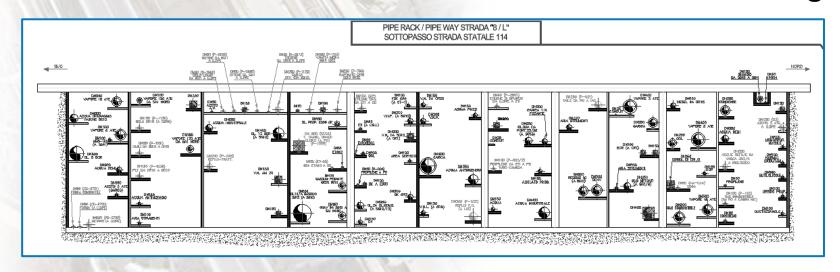


Page 10 October 1, 2025

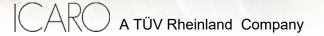


#### **Domino**

The release was followed by the formation of a flammable pool, which subsequently ignited, causing a pool fire.

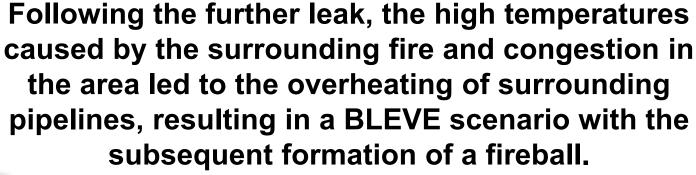


The heat radiation produced by the fire caused another line of flammable products, which was also present in the trench, to collapse.









#### The accident caused:

- Minor injury to a firefighter,
- Significant material damage,
- Repercussions on the refinery's operational setup,
- Impact on external road traffic (SS114 reopened only after static inspections),
- Impact on rail network (reactivated once the emergency is over).



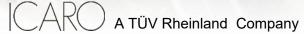


### **Emergency management**

The event led to the activation of the refinery's internal Emergency Response Plan and then, given the location (underpass under the public road) and the magnitude of the event itself, the External **Emergency Response Plan was also activated** 



The SS114 (not damaged) was closed to traffic and emergency response teams from the National Fire **Department joined the internal ones** to control and extinguish the fire







### **Emergency management**

**Emergency crews continued to cool the scene** for several hours, with the fire sometimes appearing to be completely extinguished and at other times reignited.

The fire persisted, although the pipe valves had been closed quickly, because they were located far from the underpass.

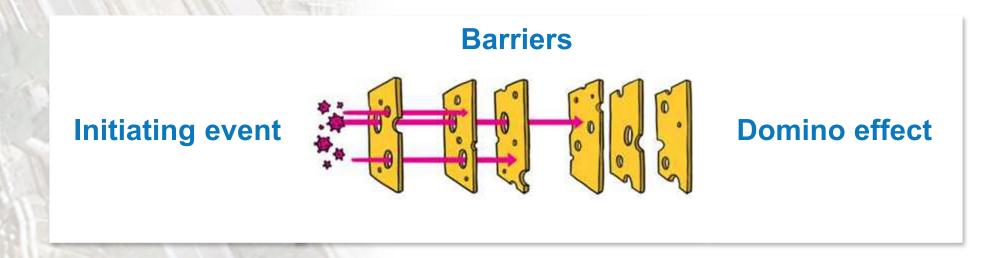
The crude oil inside the sectioned pipes continued to flow toward the underpass by gravity, reigniting the fire when in contact with the hot spots.

The fire was finally brought under control in the early afternoon of May 2.



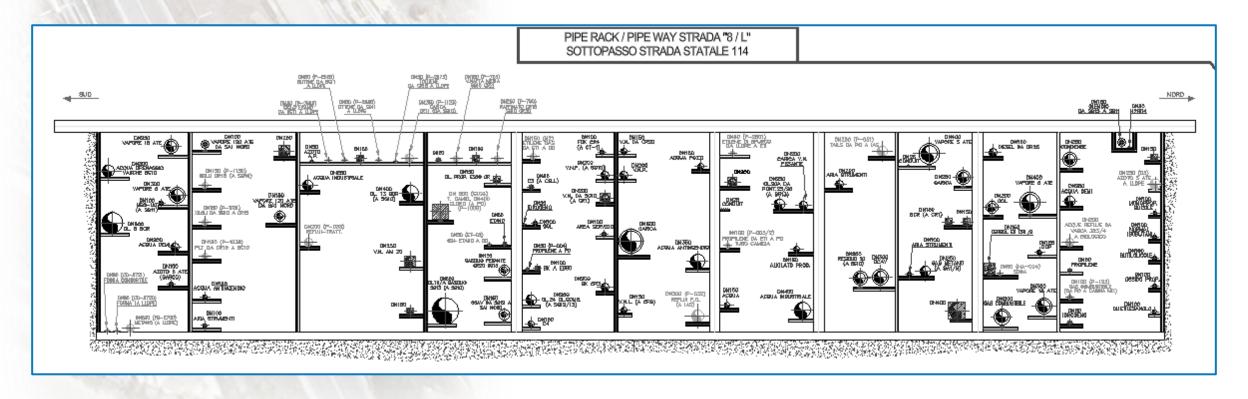
### Follow up

Following internal and external investigations (Public Authorities), several improvements were identified and implemented to prevent similar events from recurring.



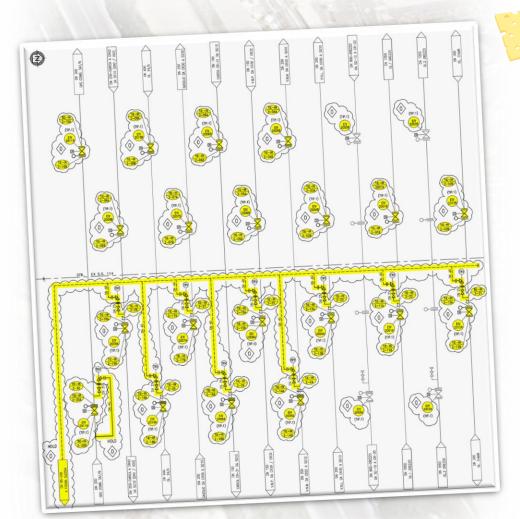
#### **Barriers**

Separation of product transfer lines by type within existing tunnels separated by reinforced concrete dividing walls.





#### **Barriers**



Installation of shut-off valves on individual lines upstream and downstream of the underpass.

Fire-protected EIVs actuated from safe location.

Extension to other overpasses and underpasses.







#### **Barriers**

### Installation of:

- gas detectors,
- flame detectors,
- **Linear Heat Detection Cables.**

Which activate water and foam mixture fire protection systems



### **Barriers**

Water and foam mixture fire protection systems.

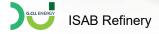




# Domino effect - conclusion

### **Summarizing**

- Domino effects generally lead to an escalation of the initial scenario, with consequences progressively amplified in space, time, and magnitude that can be catastrophic in some cases.
- Domino effects make the accident much more difficult to control, mitigate, and suppress.
- Mitigating barriers are necessary to make the possibility of escalation remote. Among the most effective are:
  - **Isolation systems**: the (remotely) segregation of items and plant sections allows for a significant reduction in the quantities of hazardous substances involved in the accident, reducing the duration and scale of the initial scenarios.
  - **Firefighting systems**: these allow cooling and firefighting, containing the spread of the effects.
  - **Detection systems**: these allow rapid intervention by isolation and firefighting systems, further reducing the likelihood of domino effects.





# Domino effect - conclusion

### **Summarizing**

Specifically, following the incident, ISAB took steps to ensure that:

- The criteria adopted for underpass 8/L, where the incident occurred, were also adopted for the other underpass 8/N and for the two overpasses above the railway line.
- The criteria adopted for fireproofing were reapplied and extended (retrofitting) to all the systems for both sites (Impianti NORD and Impianti SUD).
- Internal safety standards were modified and updated, in particular for Passive Protections.

# Thank you

