

# **SMC AB**

## **– The Swedish Solution in Fire Fighting in the Oil Industry**

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Manager SHE Swedish Petroleum and Biofuels Institute,  
Managing Director SMC AB

**Meeting in Neste Oil Refinery**

**Borgå, Finland**

**September 16<sup>th</sup> 2014**



# Släckmedelscentralen SMC AB



- **A company mutually owned by the oil companies in Sweden, with the task of extinguishing fires in oil depots**
- **Agreements on co-operation with the Rescue Services in 4 cities (4 Regions).**
- **Special equipment at 4 depots**
- **Continuous exercises and drills at various depots**
- **International network**



# Släckmedelscentralen SMC AB

Freely translated ref. to Swedish Law,  
The Law on Prevention Of Accidents  
(SFS LSO Chapt. 2 § 4)

*” It is the plant owner’s responsibility to provide an emergency preparedness with organization, equipment and personnel to a reasonable extent, on such facilities where an accident may cause serious consequences for human beings or the environment”.*



# Buncefield UK, 11 Dec. 2005







HERTFORDSHIRE  
OIL STORAGE LTD




WEST SITE




TEXACO


TOTAL

 Petroleum Spirit Highly Flammable

 No Petrol Engine Vehicles

 No Smoking

 Drivers not familiar with Loading Procedures must report to Control Room

 Report to Control Room



PROMOTING SAFETY AT WORK



**WARNING**  
Automatic Barriers

Access by Card Only  
No Admittance to unauthorized vehicles  
Do not pass until barrier is fully raised



15

11 12 2005

# Jaipur, India October 2009

A brief report on

## HUGE FIRE AT IOC OIL DEPOT, JAIPUR, INDIA ON 29 OCT.-2009

- Aasif Vindhani, QP Refinery, Qatar









# Släckmedelscentralen SMC AB

## - History

- Investigation from 1992 -1995
  - Swedish Petroleum Institute (now SPBI), SP Technical Research Institute of Sweden, Authorities, and Rescue Services etc.
    - Design rates, Dimensioning issues, Capacity
    - Equipment
    - Tactics
- Founded in 1994
  - Oil companies having consulted with relevant authorities.



# Structure & Organisation



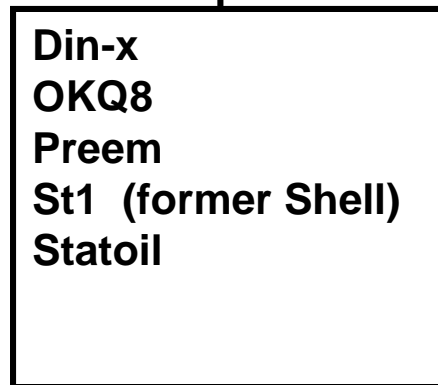
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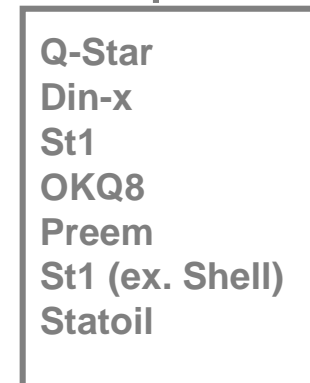
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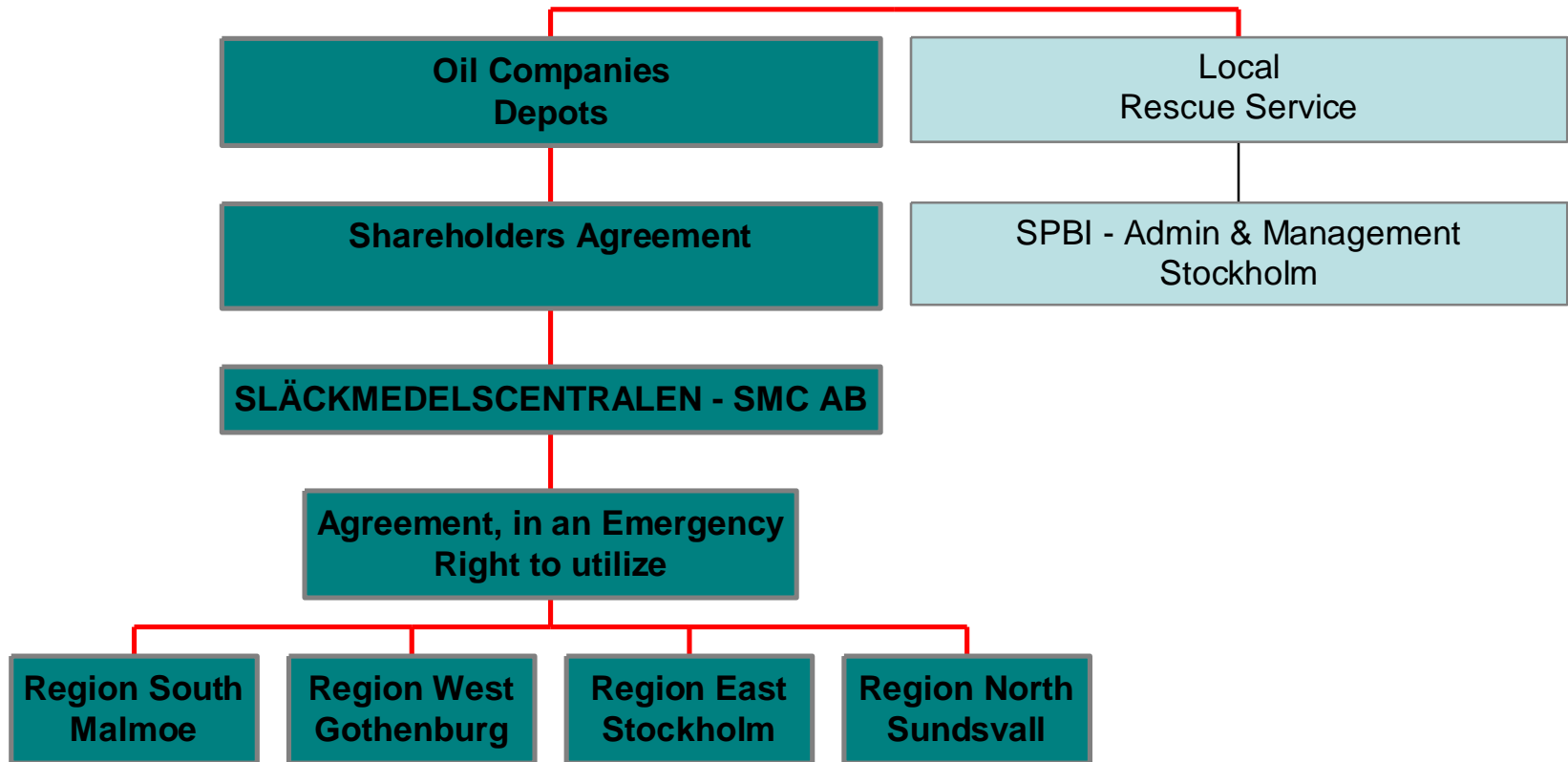
1 %  
each



5 %



# SMC - Organization





# Organization

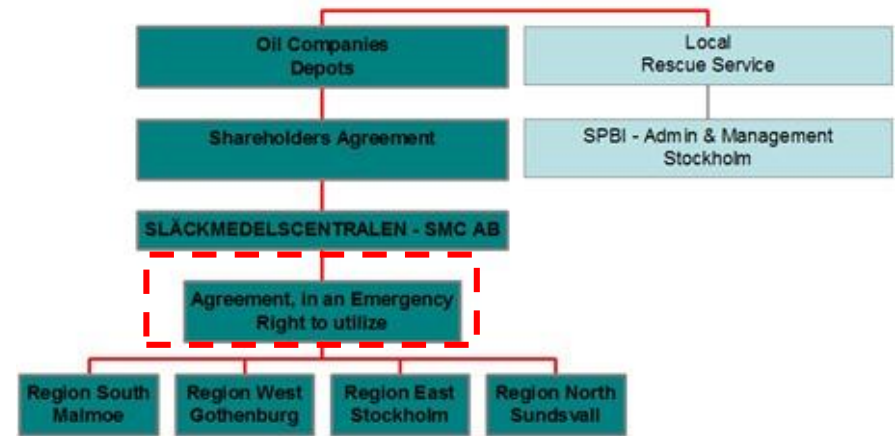
- Släckmedelscentralen SMC AB
  - No employees. Non-Profit Organization.
  - Administrated by SPBI, Stockholm, Sweden
- Agreements with Rescue Services
  - Sundsvall Fire & Rescue Service (Region North)
  - Stockholms Fire & Rescue Service (Region East)
  - Gothenburg Fire & Rescue Service (Region West)
  - Malmoe Fire & Rescue Service (Region South)



# Agreement with Rescue Services

## *Entailing:*

- ❑ SMC Equipment in store
- ❑ Funding for Service of an "SMC Coordinator"
- ❑ Rescue Services' right to use the equipment
- ❑ SMC Coordinator's duties
- ❑ Training and Competence
- ❑ Drills
- ❑ Maintenance



**The Rescue Services do the actual work within their own organisation(s).**

**The SMC provides**

- Funding
- Admin. + Management

# Funding & Governance Principles of the SMC (as from 1994 - 2014):

- ❑ Every Owners Capital Share is distributed out from Sales Markets Share of gasoline sales. Re-distribution of Shares every 5th year.

**This is due to Historical reasons:**

**The SMC was intended to extinguish very large gasoline fires. *The future looks different (not only gasoline).***

- ❑ Owner Company with > 10% has right to appoint a Board Member
- ❑ All legislative requirements applies for a "traditional company".  
That is to say compliance is mandatory for all laws and regulations on Taxes, Accounting, Reports etc., as any ordinary company.
- ❑ Share holders are for the time being invoiced an operational fee, in advance 2 times/y corresponding to 20% of the new purchase price of equipment. Investements, i.e. for new equipment, are charged as loans from owners.
- ❑ Over- or under funded amount is cleared in the end of each year.





# Revised Funding Principles 2014 – Onwards

The historical principles for cost sharing no longer applies.

## New principles

- Each Shareholder pays a Service Fee, in proportion to *actual* costs.
- Annual Service Fee, is charged Share Holder(s) with costs from cost driving variables, i.e. drills, transportation, fire fighters allowances etc.
- The total actual cost proportion is calculated from a net sum (after deducted income) times a weighing Factor(s):
  - **Big size depot Factor 1**
  - **Average size depot Factor 0,5**
  - **Small size depot Factor 0,2**
  - **Non-gasoline depots Factor 0,8**



### Depot **Company A** Factor

1	1
2	+
3	+
4	1
5	+
6	0,5
7	+
8	+

**Example**

....  
Total for **Company A** = 2,5 p.

Assume All Shareholder Company B, C, D, etc., gets for example the total sum of points together = 8,75 p.

Assume annual cost = 4,500 MSEK/y  
 $\frac{4,5 \times 10^6}{8,75} = X;$

$X * 2,5 \text{ p.} = \text{Company A's payment share as shareholder}$

# Cont'd - Revised Funding Principles

- **Other incomes such as**
  - **Annual Fees from External Agreements**
  - **Payment for being called in to service**
  - **Rental fees etc.**

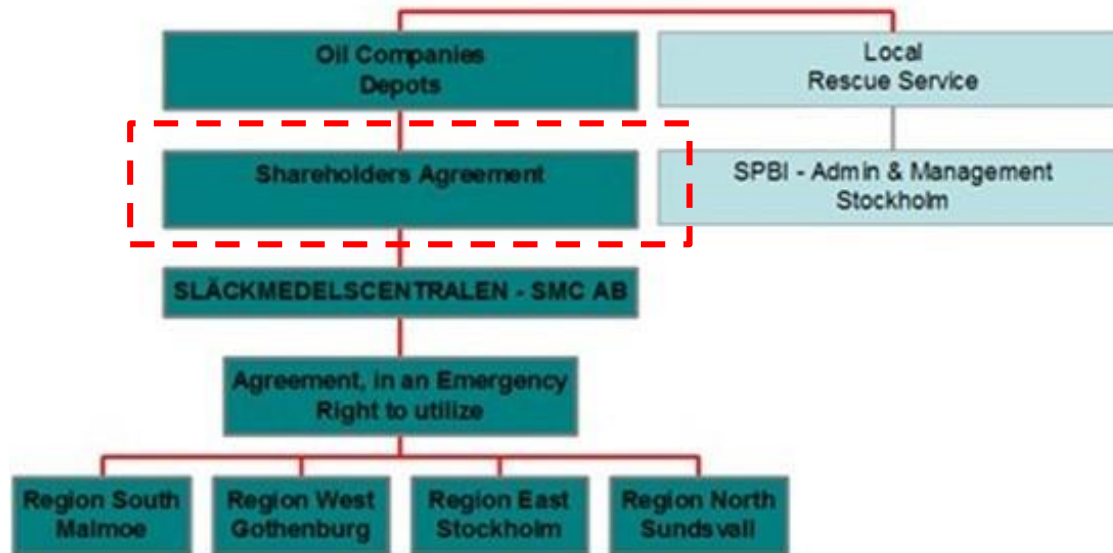
**Are deducted from the total annual cost before split between shareholders.**

**This sum, in previous picture represents the figure 4.5 MSEK, is the base for calculation of every other shareholder's annual fee.**



# Shareholders Agreement

”Konsortialavtal”



- **Describes Governing Principles**
- **Clarifies tasks, duties and rights (for owners)**
- **Legally committing**
- **Entails Statements on Board Meeting rules and Governing Principles**





# Associate Members through Agreement

- AFAB (Arlanda Fuel AB)
- Vopak
- Nordic Storage
- Scandinavian Tank Storage
- CMP - Prövestenen (Copenhagen Malmö Port)
- Almer Oil
- Stena Oil AB

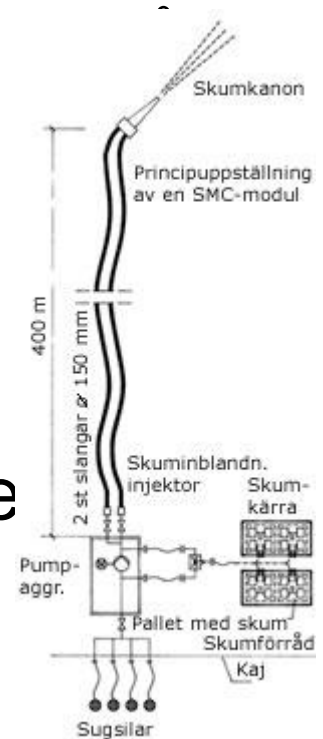
**Discussions continues with other companies**



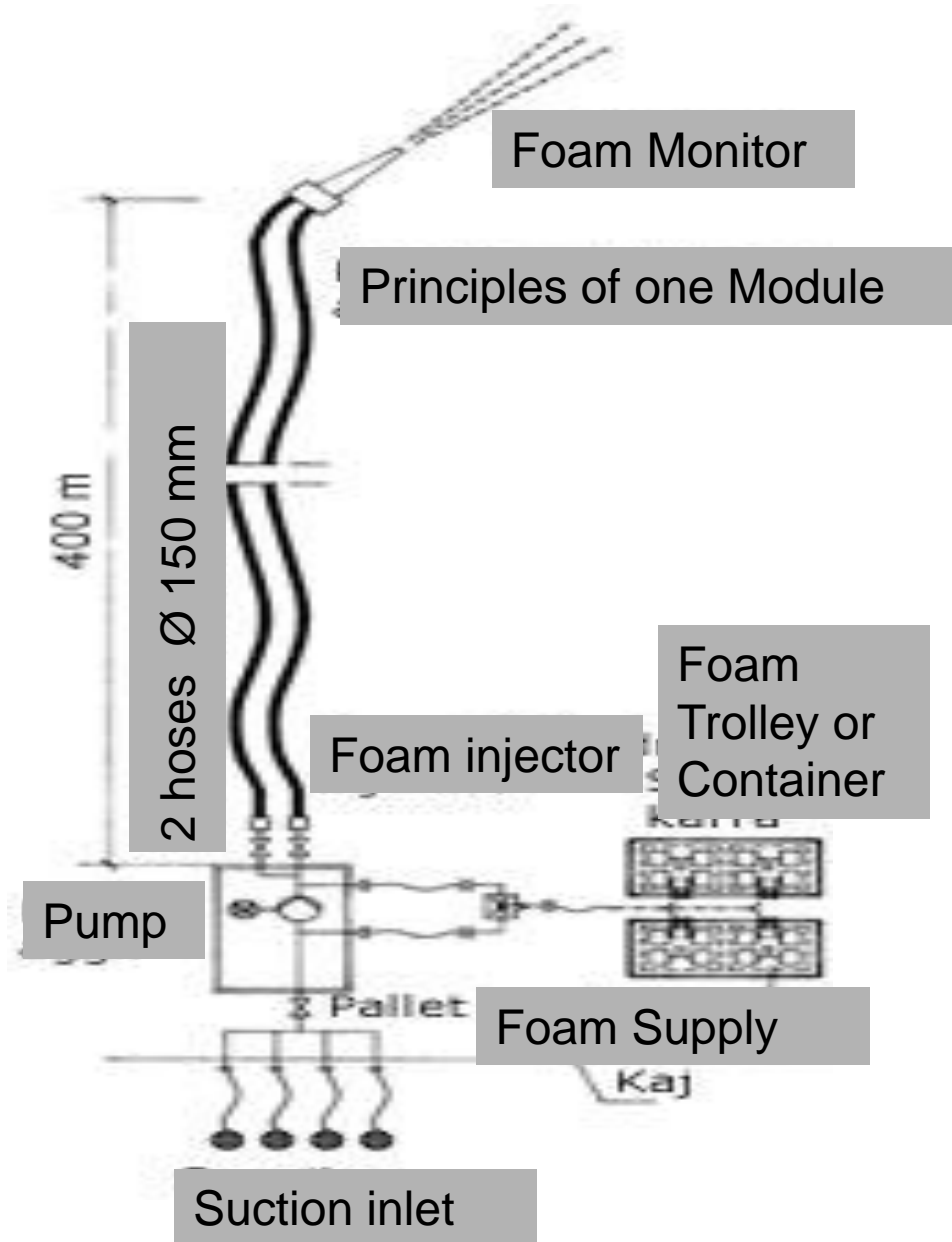
# Equipment - 1 module

8 modules in total in SMC AB

- One diesel propelled pump - capacity 10.000 litres/minute.
- 2 x 800 metres Fire hose, diameter 150 mm (6 ").
- 16 tonnes foam liquid (alcohol resistant).
- Equipment for 3 % and 6 % foam mixture
- En foam monitor with a capacity of 8000 litres/minute.



# Principles - one SMC Module



# Tactics

- Important to know Site layout and Facility arrangements:
  - Pump position (prevailing wind, distance to water) etc.
- Wind direction important. Increased foam mixture – Shorter distances!
- Failure in planning and correct positioning of equipment – wasted foam (~240 litres/min.). This means that the whole effort may have to be conducted all over again.
- Successful fire (GESIP exercise vessel diam. 11 meters) ext. within 2,5 min.
- **Time distribution for successful extinguishing: 95 % planning and logistics - 5 % extinguishing effort!**



# General Experiences and Conclusions

- ❑ SMCs Extinguishing equipment is well adapted and dimensioned for depot fires (oil vessel fires)
- ❑ Tactics with "soft application on vessel top edge" is suitable for vessels of smaller size. SMC equipment is "over dimensioned" for smaller vessels (short time to extinguish fire)



# Experiences and conclusions, cont'd.

- ❑ Selection of suitable pump- and foam monitor position with ref. to wind and trajectory length is important



- Test with foam monitor:**
- **Strong effect from side wind!**
  - **Increased foam mixture induces *shorter trajectory distances !***





# Foam Monitors - experiences

Long "Aspirating" Foam Monitor pipe (Air inlet mixture) – Softer application.



Short "Foam Monitor" pipe (direct foam mixture in water) – More direct application.



# SMC-Exercises

- Involved:
  - Local Fire & Rescue Service
  - Oil Companies
  - Harbour (oil depots are often on harbour's premises)
  - SMC: s Co-ordinator
- Preparation and Planning + *Risk Assessment*
- Practical exercise (Equipment, Org., Procedures etc.)
- Collecting of experience, ("lessons learned")
- Agreement on mitigating measures
- Update of "Emergency Plans", Tactical Plans



# Risk Assessment *before* the Exercise

DOKUMENTMALL  
SMC AB / Per Brännström  
Dokument: Säkerhetsföreskrifter  
Utgåva / Datum: 1. 2010-04-14



Sida \_\_\_\_\_

SMC AB

Datum: \_\_\_\_\_  
Plats: \_\_\_\_\_  
Företag: \_\_\_\_\_  
Depå etc.: \_\_\_\_\_

Deltagare: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## RISKANALYS: RISKGENOMGÅNG MED ÅTGÄRDSPROGRAM

Här nedan följer en lista på de arbetsmoment där särskild hänsyn skall tas för att undvika skador på människor eller egendom

ARBETSMOMENT - RISK	SANNOLIKHET			KONSEKVENS			TYP AV SKADA	ÅTGÄRD	ANSVAR
	liten	medel	stor	liten	medel	stor			
<b>Förberedelsearbeten:</b> Kontroll av uppställningsplats SMC utrustning. Hinder eller inhägnader mot tredje part /företag/ vid användning?	X			X			Vid hinder av uppställning kan intilliggande tunga fordon inte komma in. Ev. påverkan på annans egendom.	Kontakta markägare. Samråd med depåchef. Vid behov flytta ev. fysiska hinder. Samråd med berörda ägare samt depåchef. Ev. överväg ställa SMC utrustning på alternativ uppställningsplats.	Koordinator (namn)
Samtidigt pågående byggnads- och underhållsarbeten på intilliggande cistern där SMC övnings skall utföras.  Finns tung Trafik nära cistern? Finns lyftkranar uppställda? Skydda SMC brandslangar?		X				X	Risk för personskada (halkrisk, byggnadsställning)	Kontakta samordningsansvarig för Arbetsmiljöfrågor (BAS-P, Bas-U) samt ansvarig arbetsledare. Kontakta depåchef och ev. projektledare för beslut och åtgärd. Dokumentera åtgärd.  Avspärrningar. Ev. lyftledare/signalman.  Ordna "Bryggor" över brandslangar?	Koordinator (namn) Ansvarig Arbetsledare (namn) Bas-P (namn) Bas-U(namn) Proj.led (namn)  Depåansvarig / SMC koordinator
Kontroll av cistern med omgivning (invallning etc.). Avrinning? Igensatta dräneringsbrunnar?		X				X	Risk för Cisternlyft vid stora vattenmassor som fylls på.	Säkra att avrinning fungerar. Kontrollera var vattnet leds (ev. underminering).	Koordinator (namn)



# Logistics SMC Equipment





# Logistics SMC Equipment



# SMC Exercise in Karlstad October -09 with Swedish Air Force





# Close Up: Loading operation on Aircraft



# Equipment Assembly



A large-scale exercise includes several parts such as transportation, to set out pumps and fire hose and foam proportioning units.



Two SMC modules.



# SMC – Called in several times

- Kälarne – June 1997
- Tyresta – July 1999
- Venezuela – Feb/May-00
- Bergs Oil depot April -00
- Borlänge – April - 00
- Ånge – July - 00
- Piteå – Nov - 00
- Malmö - Sept - 01
- Perstorp – July - 01
- Landskrona – July -01
- Dals Långed – Oct -02
- Ballingslöv – Dec -03
- Värnamo – July -04
- Härnösand - Sept - 04
- Helsingborg – Feb -05
- Karlstad – Oct. - 06
- Västerås – March - 07
- Karlstad – October-08
- **Mönsterås – Aug. 2011**
- **Nynas Refinery- Oct. 2011**
- **Halmstad Sept. 2012**
- **Malmö Oil depot June 2013**
- **Västmanland Forrest Fire Aug. 2014**



# Very large forest fire in Sweden

31 July-12th August

- Some 70 Rescue services deployed
- Some 350 fire fighters round the clock, about 1.000 man in total including Army and Air Force units
- Water Bombing Aircraft called in from Italy and France
- Swedish Defence called in (i.e. helicopters. Logistical support, fuel distribution)
- >17.000 Acres (> 170 sq. Km:s) of forest area completely destroyed
- > 1 Billion SEK costs so far
- ~ 25 civil living estates burnt down
- One person killed, one severely injured. Other injuries as well





# SMC Pumps in Service During Fire extinguishing



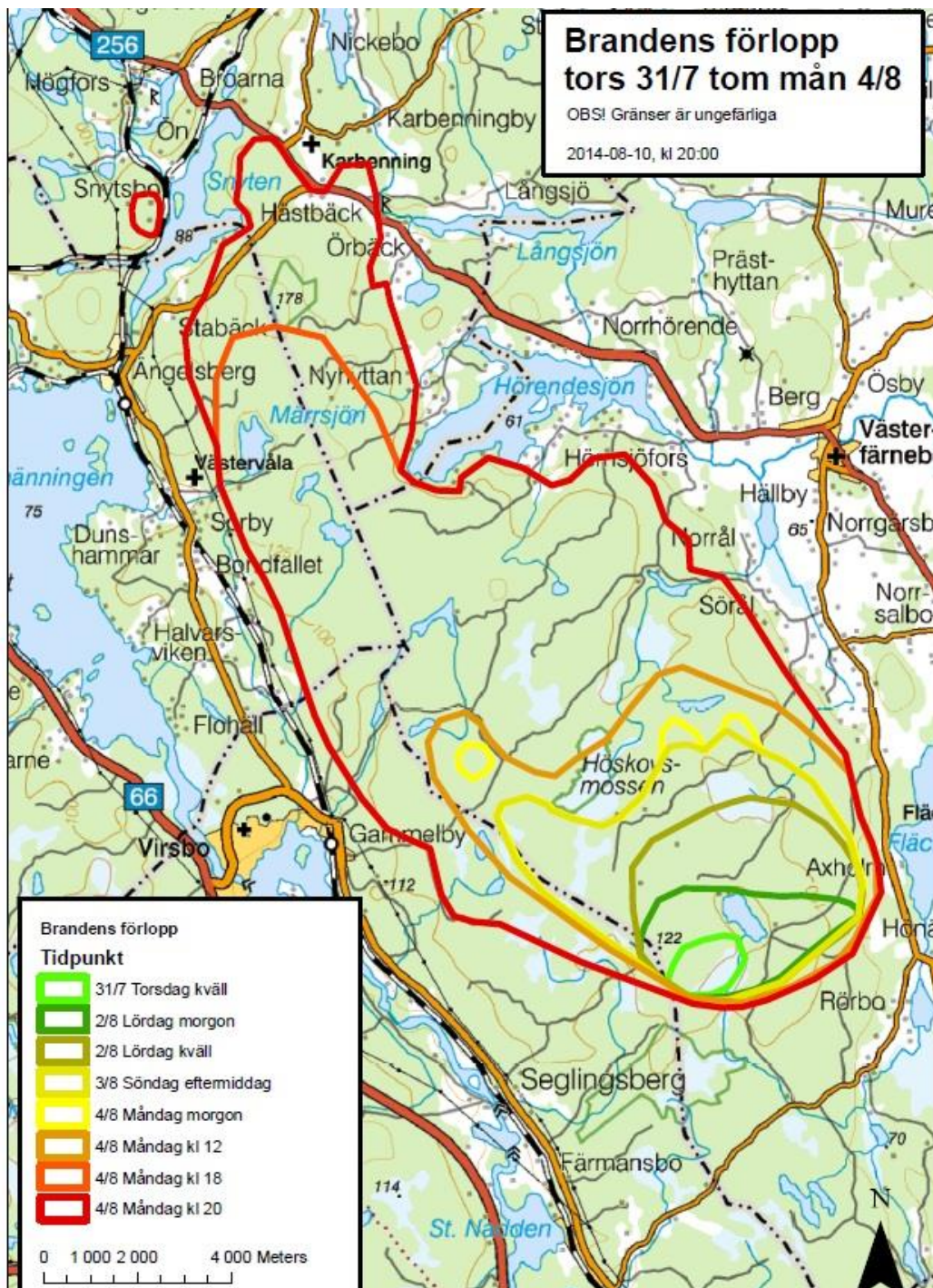
[https://www.youtube.com/watch?v=3nUXDXrSCJs;](https://www.youtube.com/watch?v=3nUXDXrSCJs)



# Brandens förlopp tors 31/7 tom mån 4/8

OBS! Gränser är ungefärliga

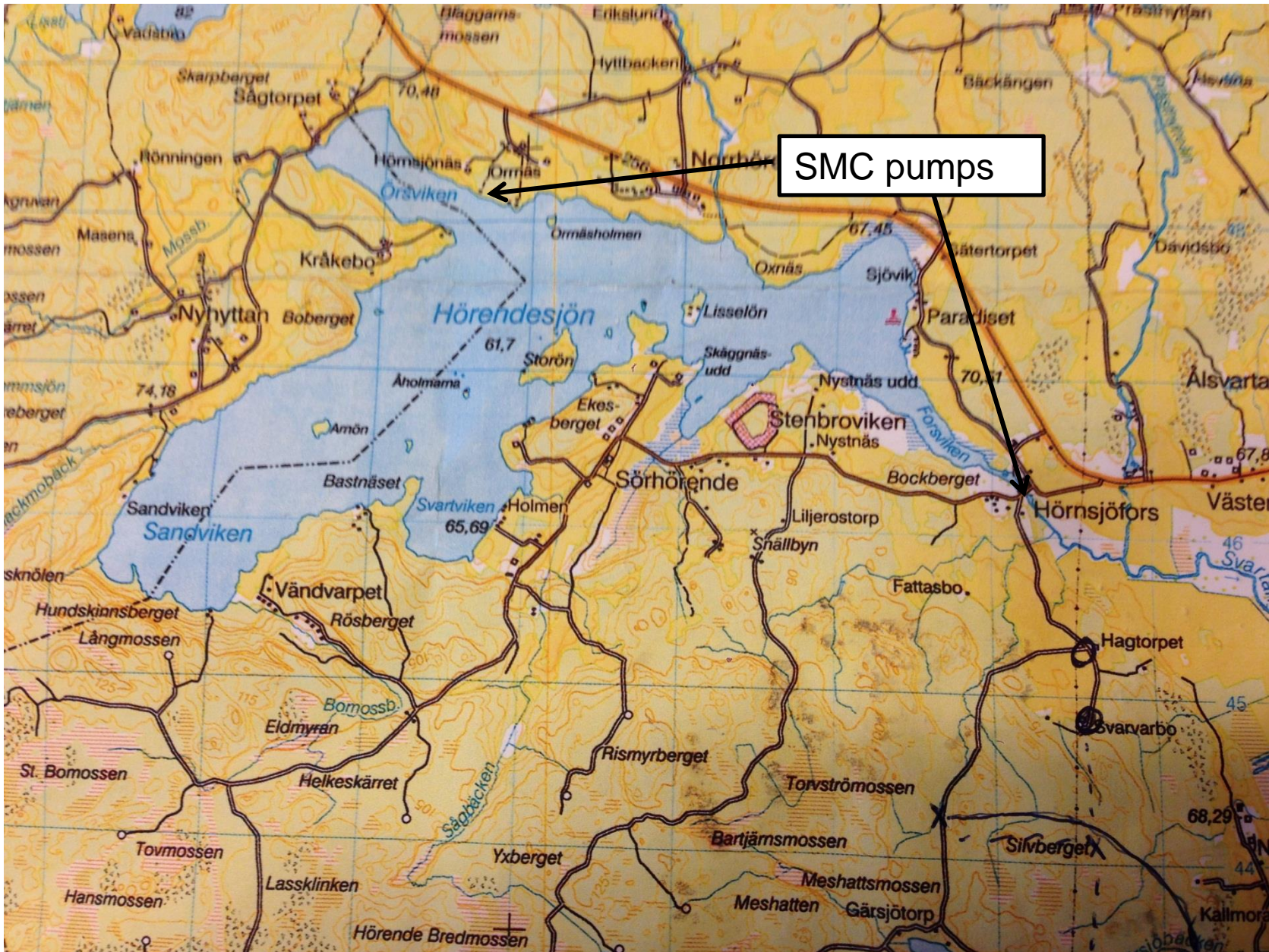
2014-08-10, kl 20:00



Brandens förlopp	
Tidpunkt	
	31/7 Torsdag kväll
	2/8 Lördag morgon
	2/8 Lördag kväll
	3/8 Söndag eftermiddag
	4/8 Måndag morgon
	4/8 Måndag kl 12
	4/8 Måndag kl 18
	4/8 Måndag kl 20

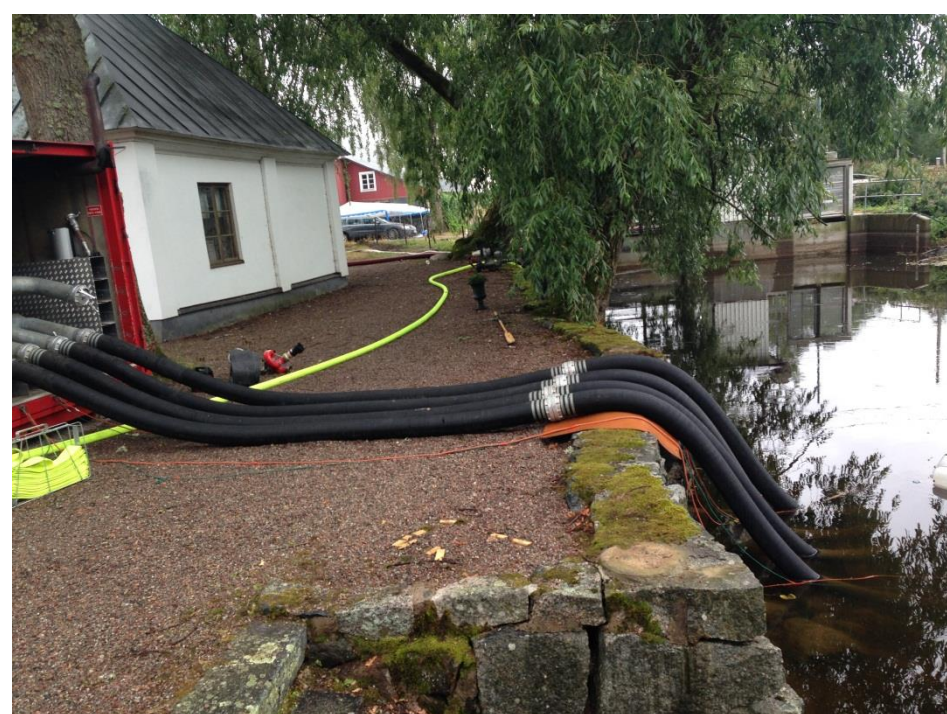






SMC pumps







Approx. 1.500 m 6" Hoses along roads +  
another 3 km 3" Hoses



# Hose Recovery





# The Fires Devastating Results



# **Very large fire in a wooden chip storage in a Pulp & Paper Mill in Mönsterås, Sweden, August 13-17**





# Fire at Night, August 13, 2011



# Water (or Foam) Monitor Arrangements



Please note the amount of water



# Some Facts and Experiences About the Fire, Mönsterås Aug. 2011

- 2 Football arena sized, wooden chip storage caught fire Friday August 12th 2011. Estimated amount of wooden chip: 150.000 m<sup>3</sup> (or more) . Fire is believed to have started in a rubber conveyor belt distributing the chip, due to mechanical breakdown.
- Some 1.200 man hours consumed (intensive on use of personnel )
- SMC equipment flow on 30 m<sup>3</sup>/hour, 5 helicopters 8 m<sup>3</sup>/hr.
- All in all SMC pumped > 200.000 m<sup>3</sup> water
- Necessary to bring both pumps / Region when the Alarm is given
- Pressure losses i hoses
- Safety Instructions important (High pressures and flow)
- Important to check that equipment is interchangeable (e.g. hose container between regions)



Thank you!  
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