



Fukushima and JSDF

***Difficult communication between off-site
and on-site***

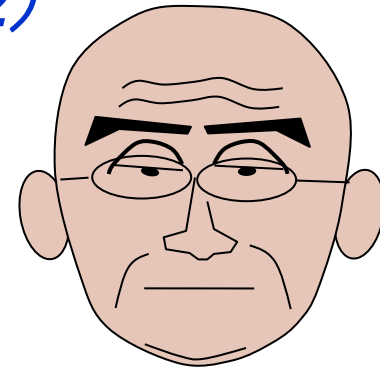
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*Senior Research Manager, SHIGEMATSU WORKS CO., LTD
(Ex-Deputy Commandant of Chemical School GSDF)*

Major General(Retired) Masahiko Hamada

Biography

- **Born in Yamaguchi, 1956**
- **Hiroshima Univ. Applied Chemistry**
- **Instructor, Chemical School, SDF**
- **Researcher, Chemical School, SDF**
- **Research Section, GSO - Tokyo Sarin Attack (95)**
- **Defense Attaché in the Netherlands (99-2002)**
- **Acting Head of Delegation OPCW**
- **Director of Education , Chemical School**
- **Deputy Commandant (--August 2012) 3.11 & Fukushima Daiichi NPP Accident**
- **Senior Research Manager, STS(October, 2012)**



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15m high Tsunami at Fukushima 1st Nuclear Power Plant (F1) ■ 3:41



15m high Tsunami at Fukushima 1st Nuclear Power Plant (F1) ■ 3:42



15m high Tsunami at Fukushima 1st Nuclear Power Plant (F1) ■ 3:43



Ball pointed pen and Safety Myth



- *Visited there 10 years ago*
- *Ball pointed pen*
- *No Realistic Communication; off-site & on-site*
- *No Realistic Exercise, Discussion*
- *Safety Myth in Japan*



Difficult Communication; Off-site & On-site

- Memories of Subway Sarin attack
- CNBC/GSDF at No.3 Reactor



Coordination with Subway Station Staff?

- **Nothing!**
- **Lessons Learned in Subway Sarin Attack ?**
- **Common Operational Picture (COP)**
- **Coordination Model**
- **Was it improved in Fukushima? No!**





5: Access Network

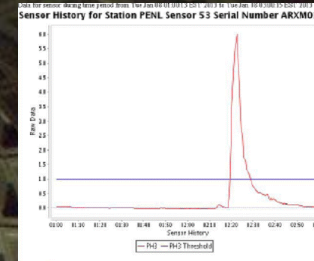


6: IC can get COP

4: Camera



2: Detection



3: Alarm in CP



1: CW Release

Departure of CNBC 12th March



- **Fate of Commander's Car (03-5276)**
- **3rd Reactor Hydrogen Explosion in 36h**

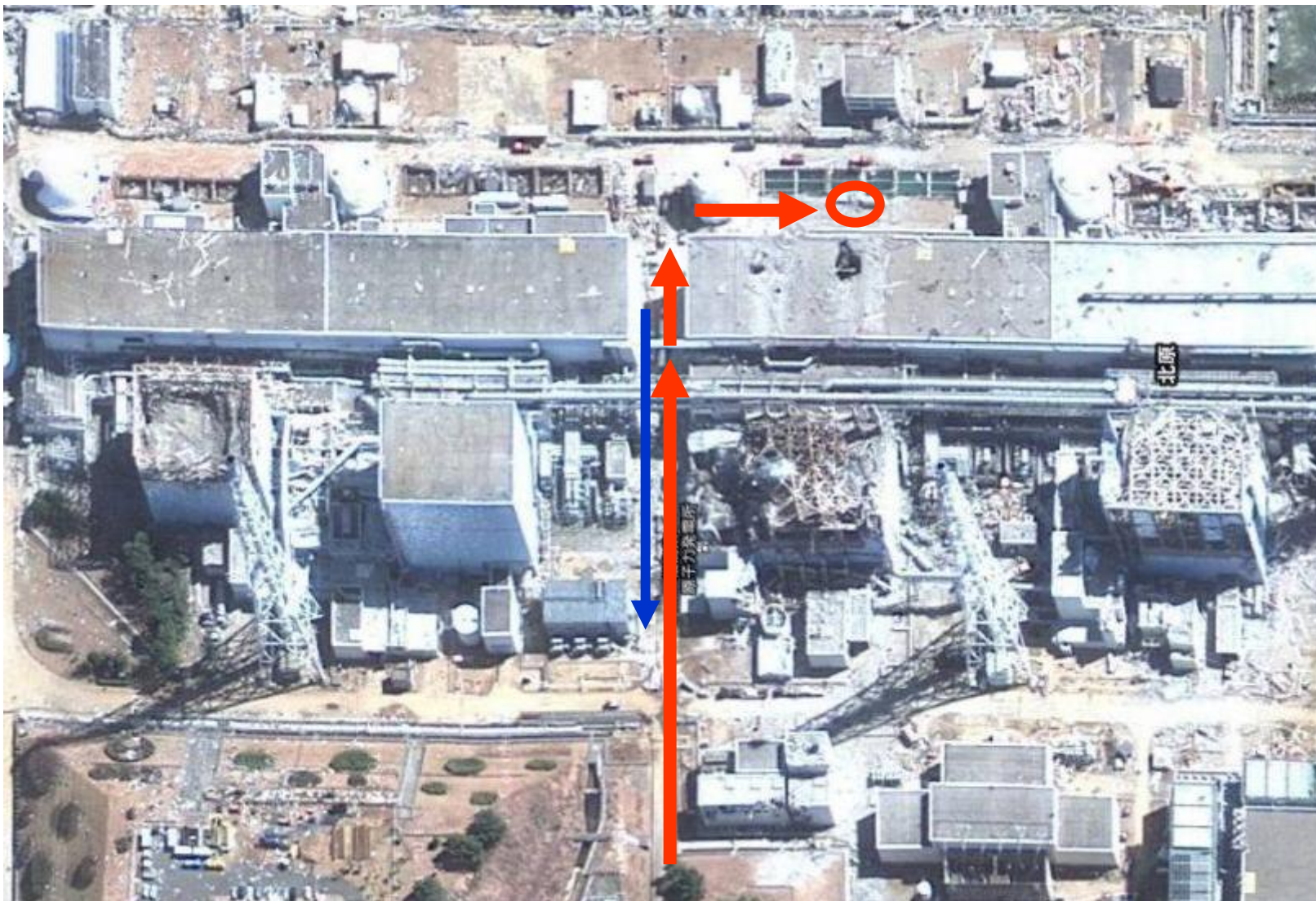
Hydrogen Explosion 14th March 1100



- **2nd Plant was also**
- **In a State of Chaos**
- **Difficult communication with on-site(TEPCO)**
- **Water Supply Inlet?**
- **Col. Iwakuma, CNBC**
- **“I will go by myself”**
- **6 Member's Team**



Location of Commander's Car ?



After the Explosion



- *Large Debris in the Car*
- *Driver ...Injured*

Just after the Explosion

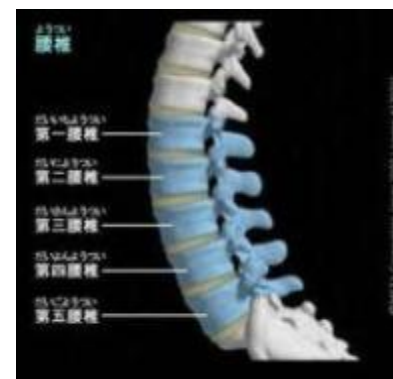


- *Between No.3 and No.2 Reactor*
- *Tried to escape from the High radiation Rate area*

Critical Infrastructure: Off-site Center

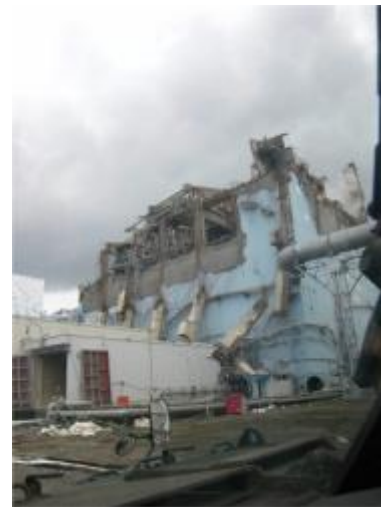


- *Fine Decon Site. But...*
- *No water supply, No power supply*
- *Sheltering Indoors..*
- *Don't Enter, Go 2nd Plant*
- *So Exhausted...Stunned*
- *Radiation...Each Other*
- *8 Times but still...*



Command & Control in Fukushima

-Mainly, In the Case of Water Cooling Operations



Command & Control in Fukushima



- ***It was not written in the plan***
- ***Not ready for operation on-site***
- ***Various actors: Fire Fighters, Police, ASDF, MSDF, and TEPCO***
- ***No Knowledge of Radiation : Fear***
- ***Coordination was essential , but***



The Answer was, One Commander SDF



- ***Deputy Commandant of CRF***
- ***MG. Taura controlled everything***
- ***Clear chains of command /supervision***
- ***Orderly, systematic planning process***
- ***Integrate inter-agency requirements***
- ***Using specialized skills with coordination***



Systems and Equipments in Monitoring, Protection and Decontamination

-Mainly, In the Case of Helicopters



0935	0007	009.7%
0935	0008	012.9%
0935	0009	00.71%
0935	0010	01.27%
0935	0011	03.74%
0935	0012	06.07%
0936	0013	00.02%
0941	0014	002.4%
0945	0015	000.5%
0950	0016	000.1%
0955	0017	004.7%
1000	0018	007.5%
1005	0019	002.4%
1010	0020	000.2%
1015	0021	007.5%
1015	0022	007.5%





Water Cooling Operation by Helicopters , 3.17



Monitoring just before Spray



0935	0007	009.3u
0935	0008	012.0u
0935	0009	00.31m
0935	0010	01.27m
0935	0011	03.74m
0935	0012	06.87m
0936	0013	08.02m
0941	0014	002.4u
0945	0015	000.5u
0950	0016	000.1u
0955	0017	004.7u
1000	0018	007.5u
1005	0019	002.4u
1010	0020	000.0u
1015	0021	003.5u
1015	0022	003.5u

- **3.170945 Sprayed**
- **0935 in 1 min (300ft)**
- **9 μ S μ /h→88mSv/h**
- **3.16 250mSv/h Canceled**
- **Time, Distance, Shielding**
- **Radiation Exposure Control : Important**



Inside : Monitoring Radiation

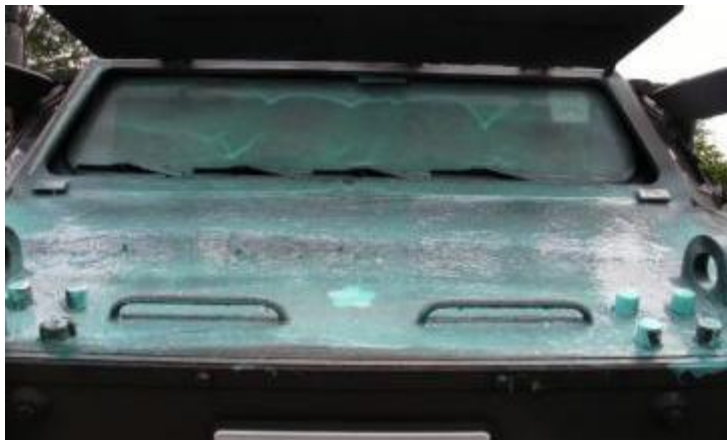


Hard to Decon

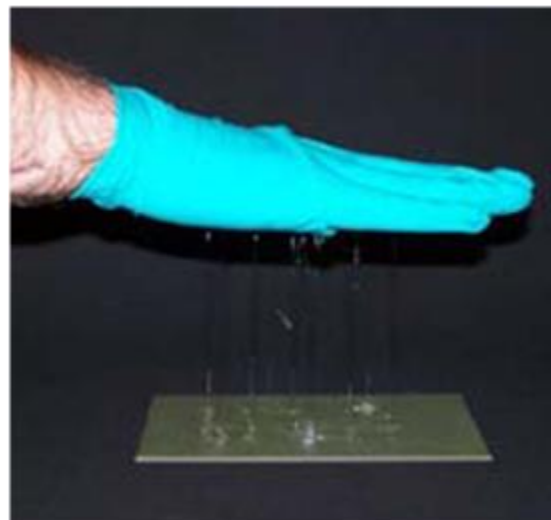
- **Spray Prohibited Spot/area**
- **Around the Engine**
- **Vehicles inside the site;
Contaminated**
- **How clean is clean? 1uSv/h?**
- **Background level ; So high!**

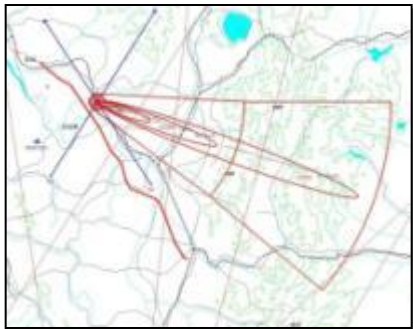


Pre-Coating



- *Tested ...Recon Vehicles*
- *Or Fire-Engine*
- *Effective? Yes!*
- *Sandwich? More Effective?*
- *Also Useful for TGD...*





Remaining Issues and Way Forward

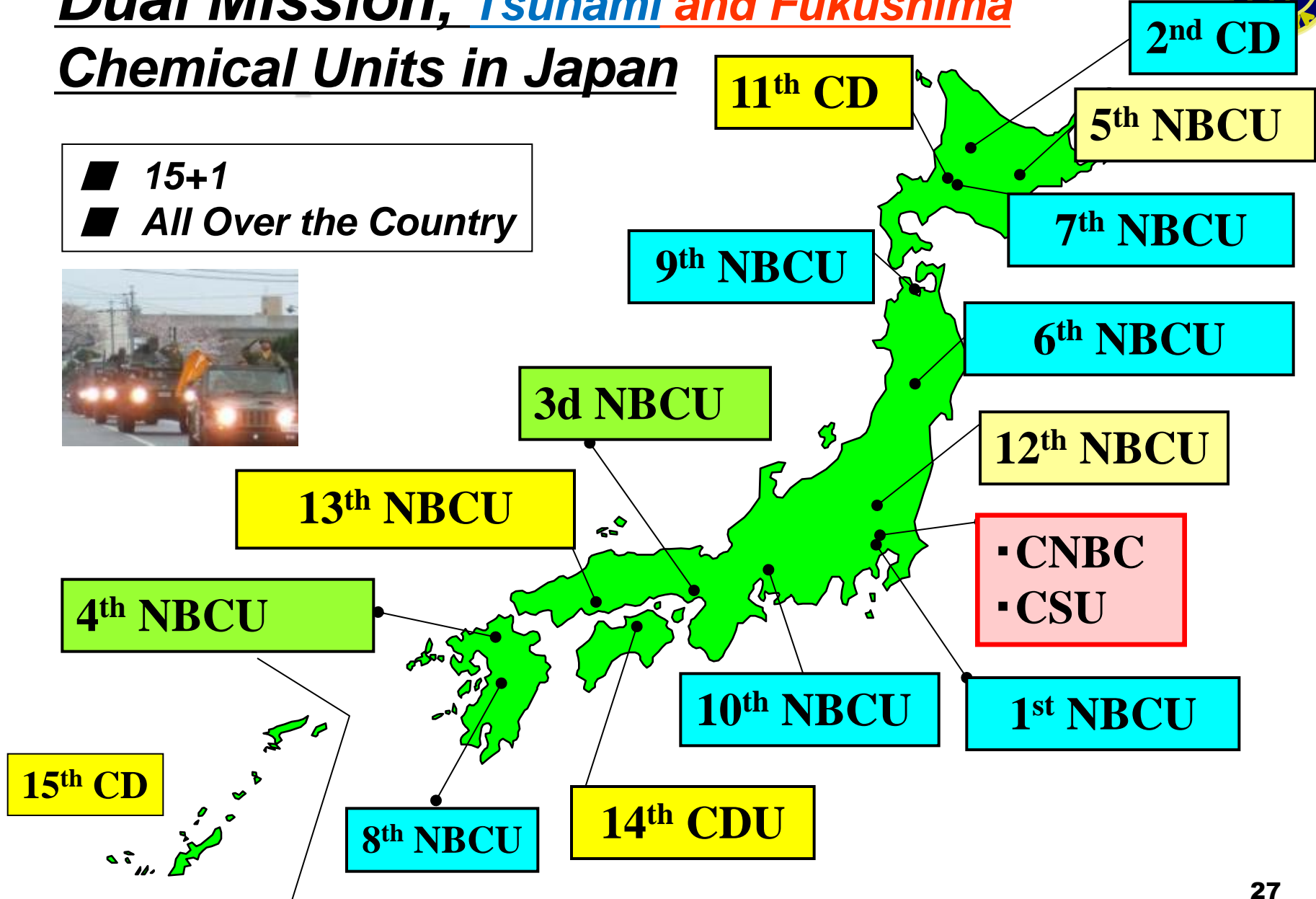
- *Dual Mission*
- *How clean is clean?*
- *Drill and Exercise*
- *More.....*



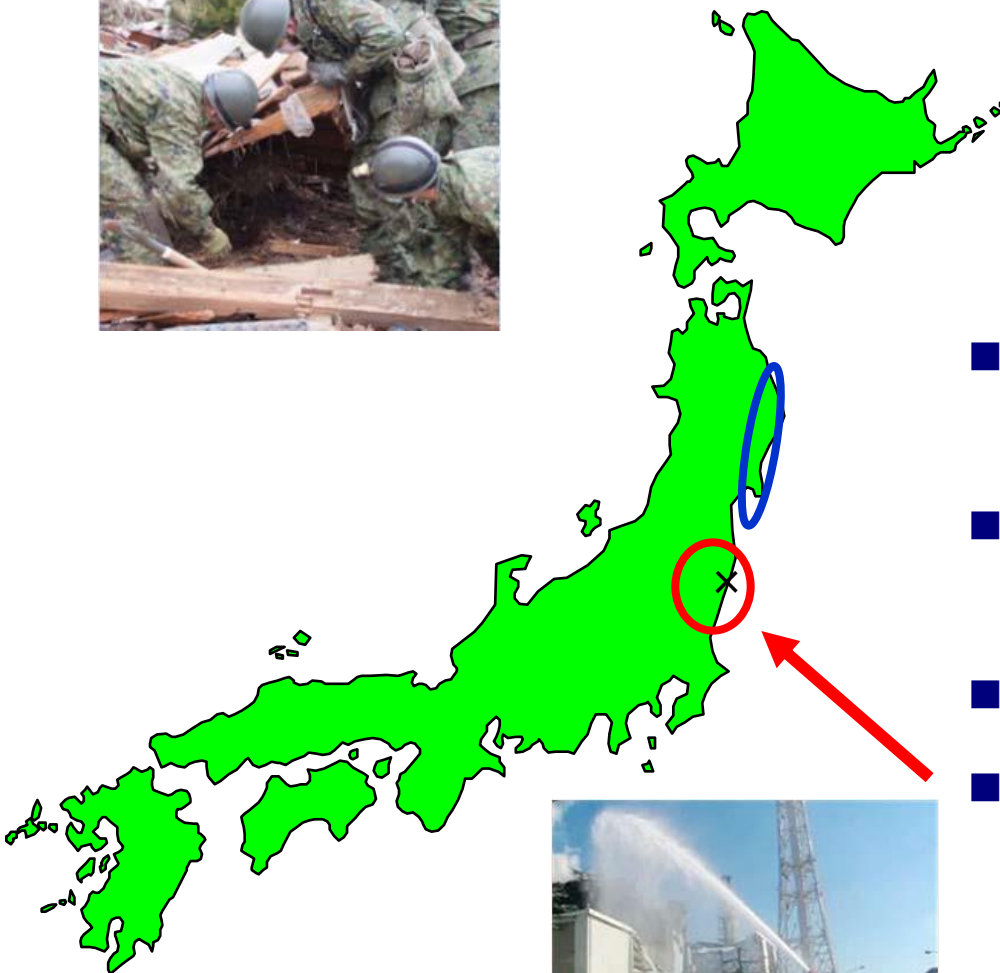


Dual Mission; *Tsunami and Fukushima* Chemical Units in Japan

- 15+1
- All Over the Country



Dual mission of Chemical Corps



- **Tsunami/Search and rescue, washing remains**
- **6 Units; Iwate, Miyagi /Water Supply, Bath...**
- **Fukushima/10 Units**
- **Enhanced CNBC 400 Soldiers**



How clean is clean in Fukushima?



- **Confusion in GSDF units**
- **Screening Level had changed several times**
- **6000cpm(41/162, 25%needed decon)**
- **Raised to 13000cpm**
- **March 20, 100,000cpm**
- **Based on IAEA Manual, $1\mu\text{Sv/h}$**
- **Questions from GSDF Units: Why? $1\mu\text{Sv/h}=100,000\text{cpm}$?**
- **FAX: Complicated calculations**
- **Was it reasonable? Yes**
- **Mass Decon in Fukushima; Difficult**
- **Cold weather, Limited Capability**

Way Forward; MOD and SDF



- **Enhanced Relationship with Nuclear Regulatory agency**
 - **Coordination Procedure, Exercise and Verification**
 - **Loan from MOD; Colonel & Major**
- **Revised Operational Plan for disaster prevention**
- **Development of Human Resources, Radiation Experts**
- **Strengthening coordination with US and Other Countries**
 - **New post ; Director for Defence Policy**



Way Forward; MOD and SDF



- ***New radio communication systems***
 - *Disaster Prevention Radio System*
 - *Field Digital Radio System*
- ***Development of UAV& UGV***
- ***NBC recon Vehicles, PPE, Filters***
- ***Dose Record Book with Medical History Report***



9 SDF Support Activities in NPP accidents



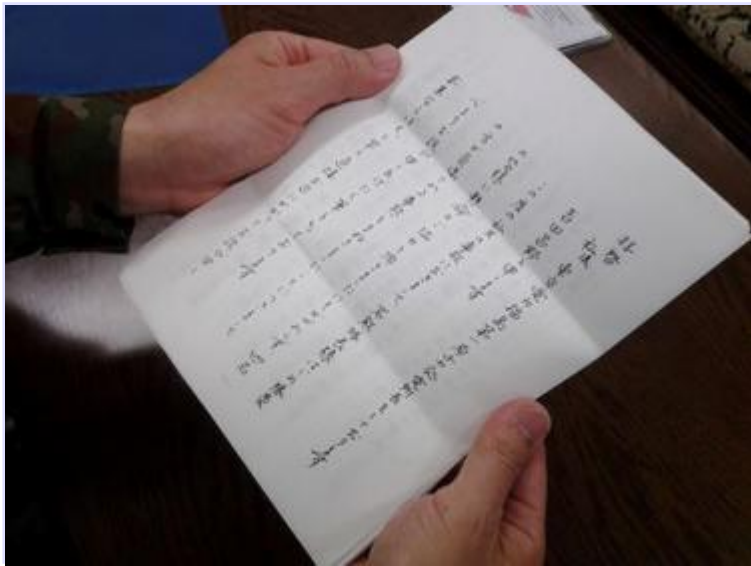
- **Based on Revised MOD Operational Plan for disaster prevention (under consideration)**
 - **Emergency Monitoring**
 - **Grasp the Damage Situation**
 - **Support for Evacuation**
 - **Search & Rescue of Missing**
 - **Fire Fighting Operations**
 - **First-aid Treatment**
 - **Emergency Transportation**
 - **Emergency screening and Decontamination**
 - ◆ **Other activities; depend on the response of the operator of nuclear activities**

Air Lift Operation of Water-Cooling Motor



- ***This could save Fukushima Daini NPP***
 - ***March 12th, 2100-2200***
 - ***300kg – 3 packs***
 - ***Toshiba Factory, Kansai***
 - ***From KOMAKI Air-base***
 - ***To Fukushima Local Airport***
 - ***Emergency Transportation***
 - ***If this Motor could not ---***
 - ***If this Operation had failed, Fukushima Daini would have Melt-Down like Daiichi***
- ***This Emergency Transportation save the Country, JAPAN***

Letter from the Head of F1



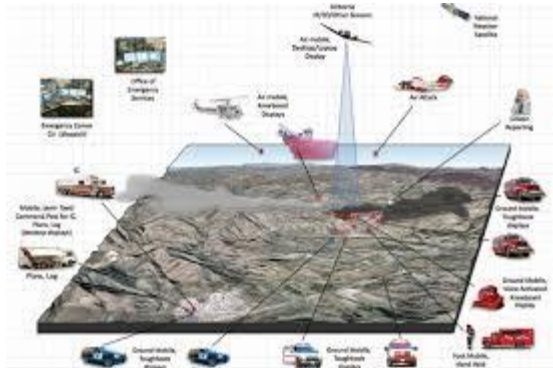
- **4 Months after the Hydrogen Explosion of No.3 Reactor**
- **To Co. Iwakuma, CNBC**
- **Real Samurai, Excellent Commander**
- **Not TEPCO, but Government**



In My Opinion; Next Step

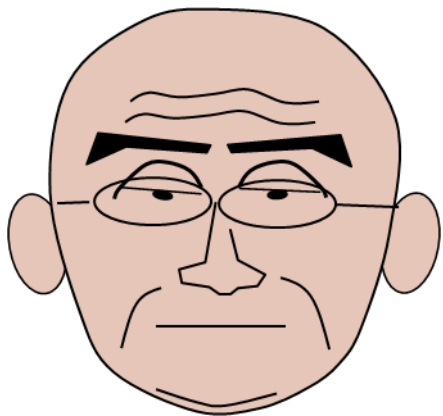


- **Scenario?; Like National Planning Scenario of US Government**
- **NICS?; Next Generation Incident Command System or PROTECT?**
- **Training Course? Incident Commander for NPP Accidents**





Good travels at a snail's pace



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