INTERNATIONAL CONFERENCE ON CONTROL AND MANAGEMENT OF INADVERTENT RADIOACTIVE MATERIAL IN SCRAP METAL

"Accidental Cs-137 source melting in a steel mill in México"

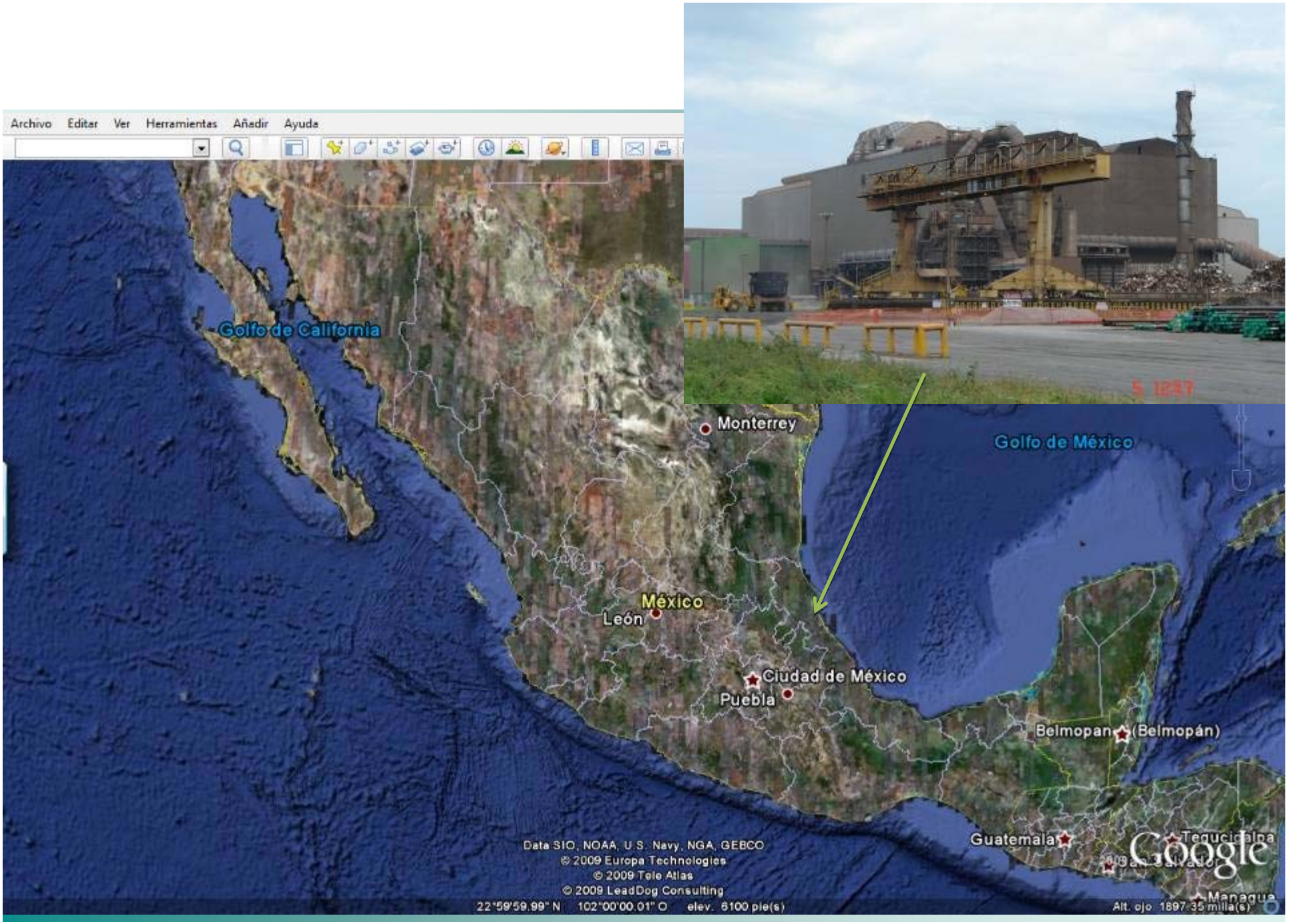
COMISIÓN NACIONAL DE SEGURIDAD NUCLEAR Y SALVAGUARDIAS

Alejandro Cortés Carmona

Radiological Impact and Emergency Section

On June 20th 2008, the Nuclear Safety and Safeguards National Commision (CNSNS) received a notification in which the steel mill Tubos de Acero de México, S. A., (TAMSA) had melted a radioactive source.

The event was detected by the company Zinc Nacional, which typically receives steel dust to be processed. Zinc Nacional radioactive portal alarm detectors were trigger when a TAMSA shipment was received. Zinc Nacional immediately reported the event to TAMSA and sent the shipment (80 tons) back.


Archivo Editar Ver Herramientas Añadir Ayuda
Golfo de California
Monterrey
Golfo de México
México
León
Ciudad de México
Puebla
Belmopan (Belmopán)
Guatemala
Tegucigalpa
Managua
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2009 Europa Technologies
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22°59'59.99" N 102°00'00.01" O elev. 6100 pie(s)
Alt. ojo 1897.35 milla(s)
Google


Archivo Editar Ver Herramientas Añadir Ayuda
veracruz puerto
Ctra Cardel-Veracruz
Boulevard Fidel Velázquez
Veracruz
Isla Pajaros
10 km
Veracruz, Veracruz-Llave, MEX
Ctra Paso de Ovejas-Veracruz
Ctra Paso del Toro-San Julián
Ctra A Mocambo
© 2009 Europa Technologies
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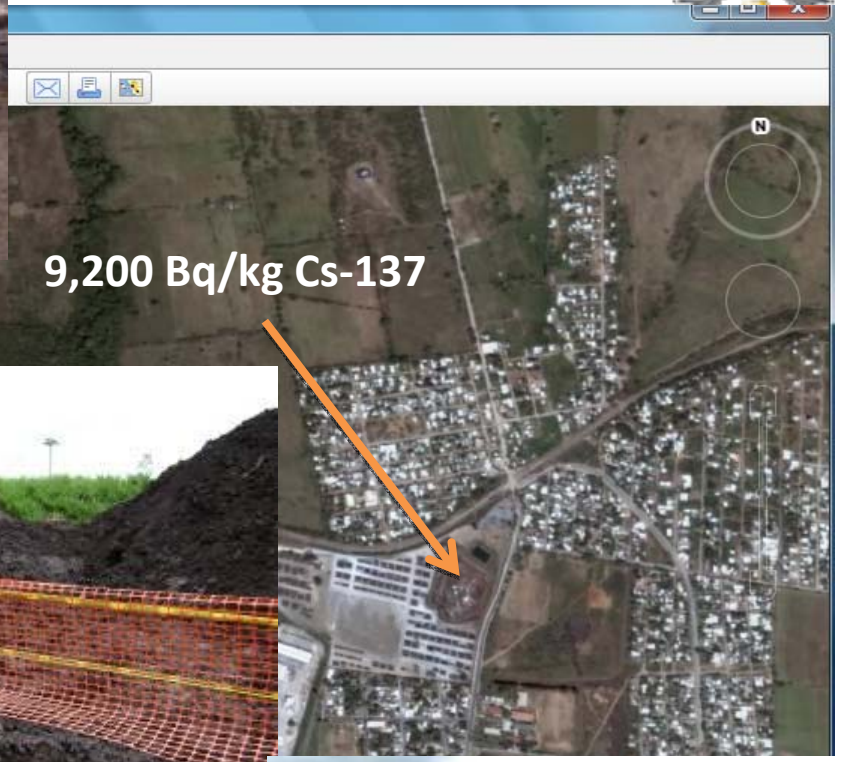
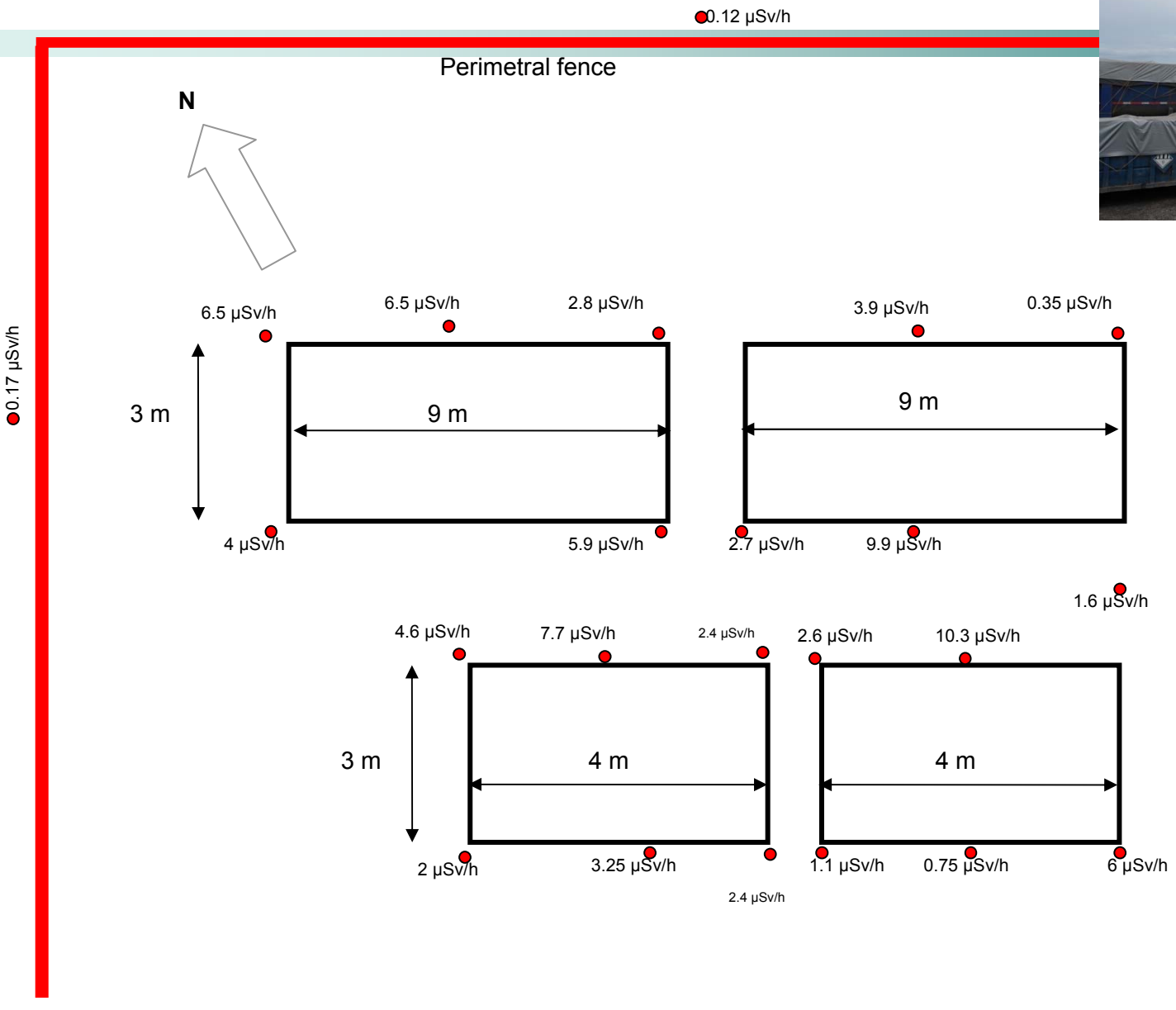
Google
Fechas de las imágenes: 15 de Mar. de 2007 - 13 de Jun. de 2007
19°10'27.17" N 96°11'26.42" O
Alt. ojo 12.89 milla(s)

July 8th, 2008 First Inspection



July-August , 2008

83 persons
No internal contamination
5 Cs-137 were in place


0.12 µSv/h
Perimetral fence
N
0.17 µSv/h
6.5 µSv/h
6.5 µSv/h
2.8 µSv/h
3 m
9 m
4 µSv/h
5.9 µSv/h
3.9 µSv/h
0.35 µSv/h
9 m
2.7 µSv/h
9.9 µSv/h
Sand wall
1.6 µSv/h
4.6 µSv/h
7.7 µSv/h
2.4 µSv/h
2.6 µSv/h
10.3 µSv/h
3 m
4 m
4 m
2 µSv/h
3.25 µSv/h
1.1 µSv/h
0.75 µSv/h
6 µSv/h
2.4 µSv/h

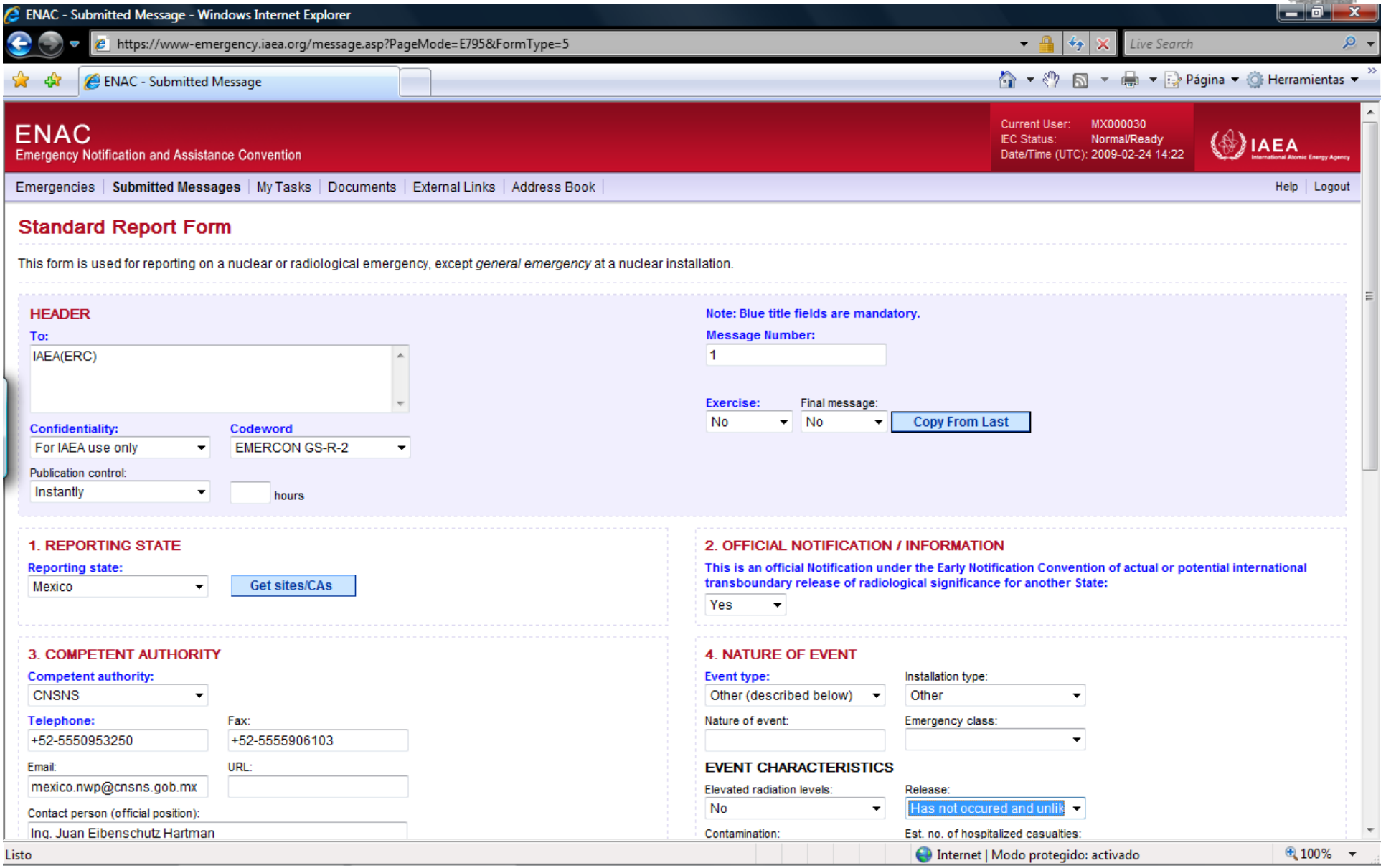
Dose rates (µSv/hr)

	CS-137 CONCENTRATION (Bq/Kg)
M1	1312
M2	1980
M3	334
M4	263
M5	383
M6	381
M7	217
M8	293
M9	367
M10	547
M11	518
M12	299
M13	345

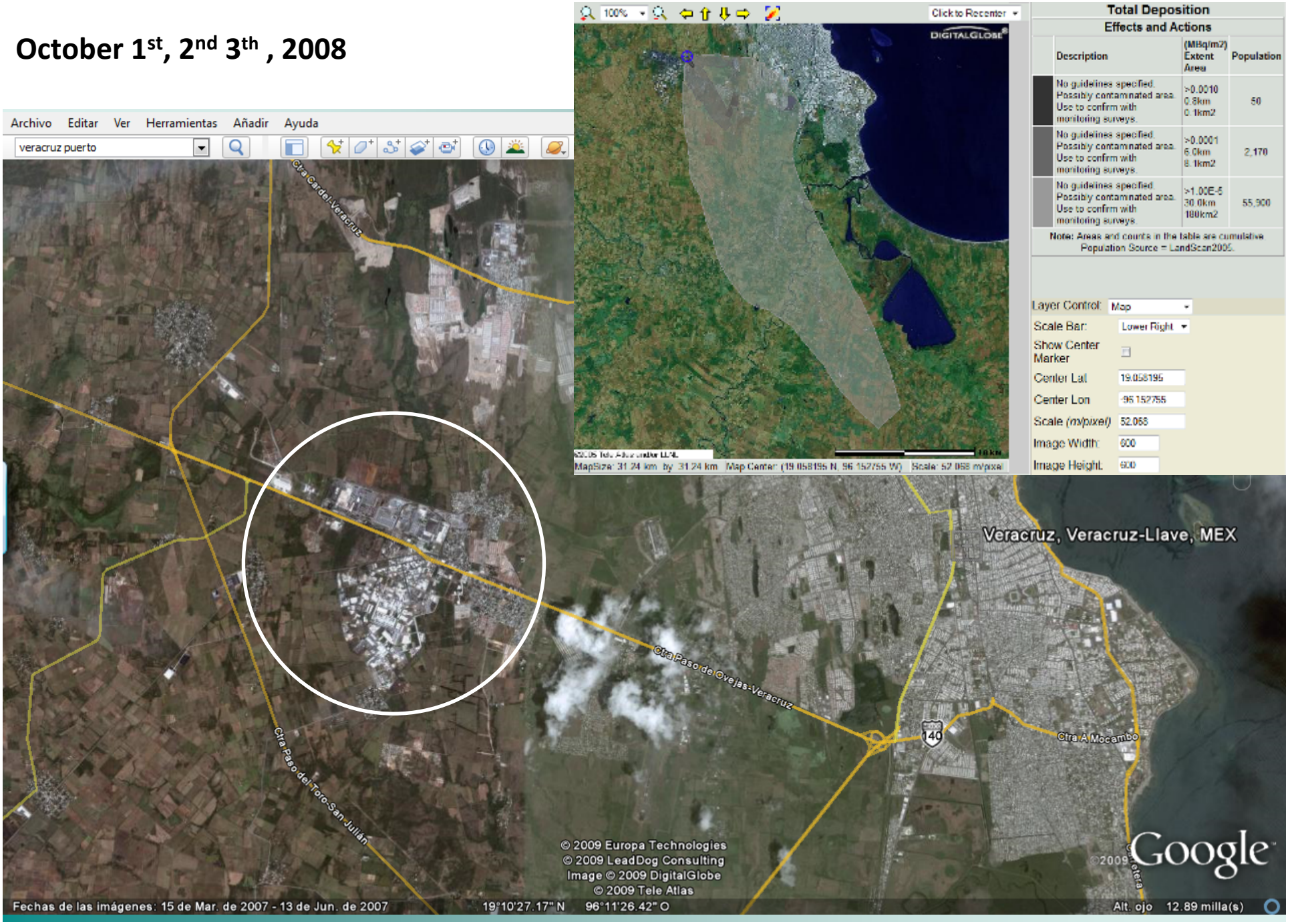
	A	B	C	D	E	F	G	H	I	J
1	0.29	0.76	0.5	1.65	0.30	0.3	0.32	0.29	0.08	0.08
2	0.37	1.5	0.58	0.44	0.33	0.33	0.35	0.30	0.08	0.08
3	0.37	1.82	0.76	0.30	0.35	0.38	0.34	0.34	0.09	0.09
4	0.40	1.7	0.75	0.48	0.39	0.39	0.32	0.35	0.20	0.32
5	0.35	0.91	0.40	1.00	0.40	0.35	0.23	0.33	0.25	0.30
6	0.33	0.80	0.45	1.07	0.40	035	0.25	0.33	0.28	0.32
7	0.28	0.75	0.48	0.51	0.38	0.40	0.30	0.30	0.30	0.13
8	0.20	0.45	0.55	0.45	0.40	0.38	0.33	0.33	0.35	0.45
9	0.19	0.57	0.80	0.65	0.33	0.34	0.25	0.20	0.18	0.20
10	0.20	0.75	0.34	0.66	0.30	0.33	0.20	0.18	0.20	0.20


544130 Bq/kg Cs-137

August 22nd, 2008



October 1st, 2nd 3th , 2008

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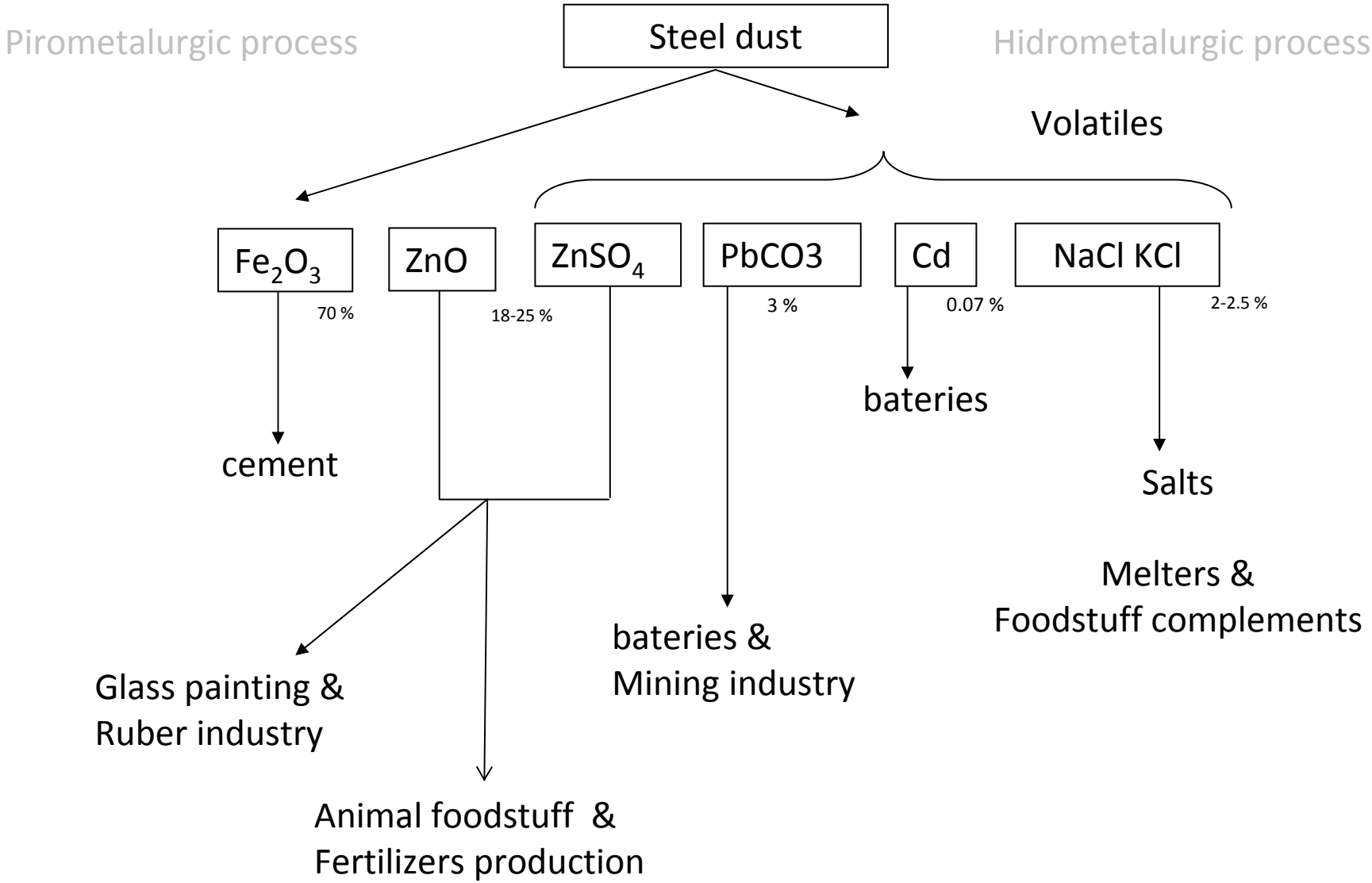
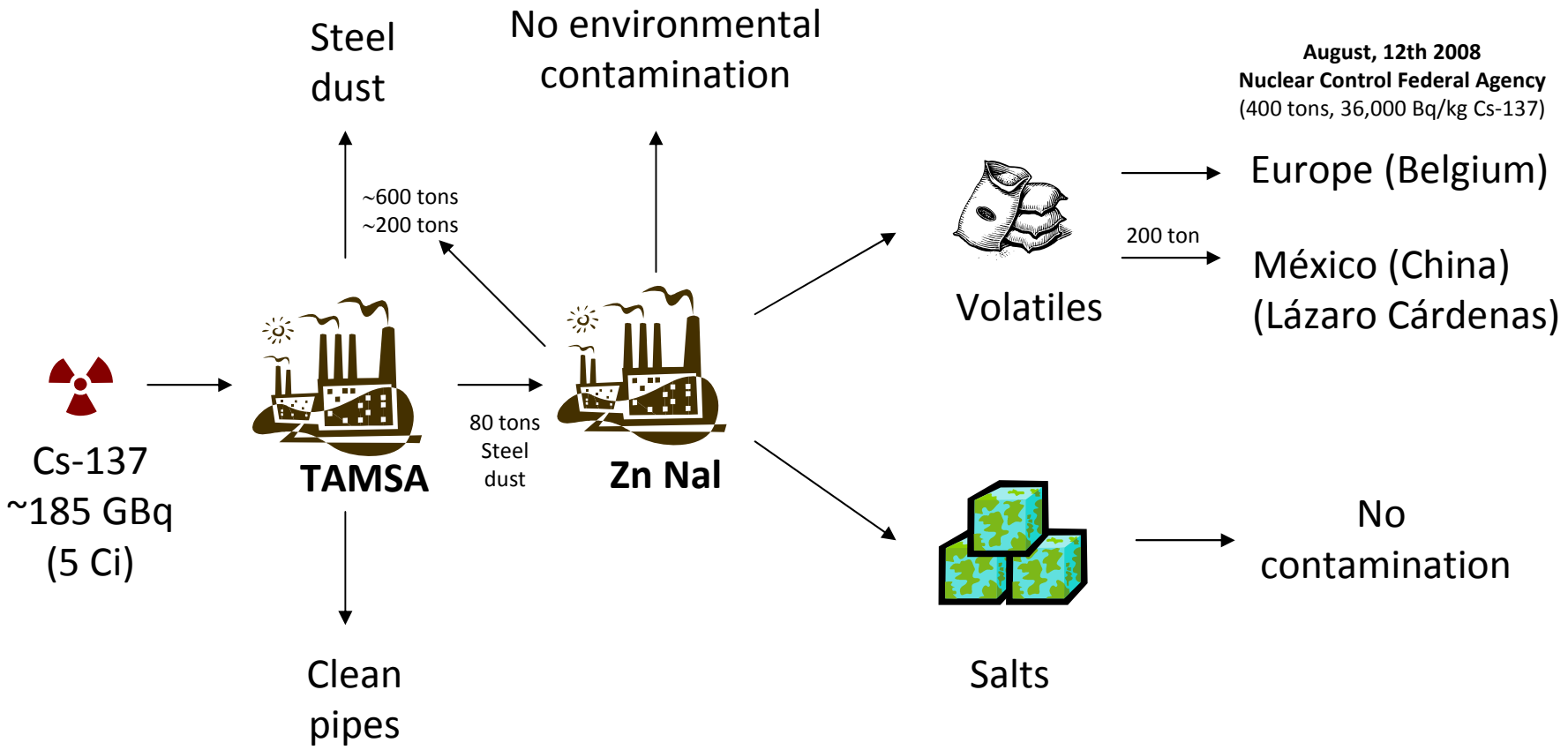
maquixco
San Diego
Phoenix
40 persons
No internal contamination
Golfo de California
Zn Nal
Golfo de México
TAMSA
Belmopan
Guatemala
Tegucigalpa
San Salvador
Managua
Suspended particles
Soil
Environmental dose rate
Water
A7
A8
TP13
A3
A2
TP14
A4
S11
TP3
A6
S10
S3
S4
TP12
S12
TP15
TP4
S9
S5
A5
A0 2
A0 1
S1
A1
TP11
TP10
TP8
W1
S13
S 6
TP5
A10
S14
A9
TP7
TP6
S7
S8
Zn Nal
Google

Zinc Nacional process



Container	Sample characteristics	Measured quantity of Cs-137 in Bq/g
MEDU1756464	Taken from big bag with doserate 3 µSv/h	36.2 ± 0.4
	Taken from big bag with doserate 0.5 µSv/h	0.02 ± 0.01
GLDU3820447	Taken from big bag with doserate 2 µSv/h	16.7 ± 1
	Taken from big bag with doserate 1 µSv/h	3.1 ± 0.2
GLDU3663651	Homogenised sample prepared with material from all big bags present in container	24.2 ± 1
MSCU2486433	Homogenised sample prepared with material from all big bags present in container	5.9 ± 0.5



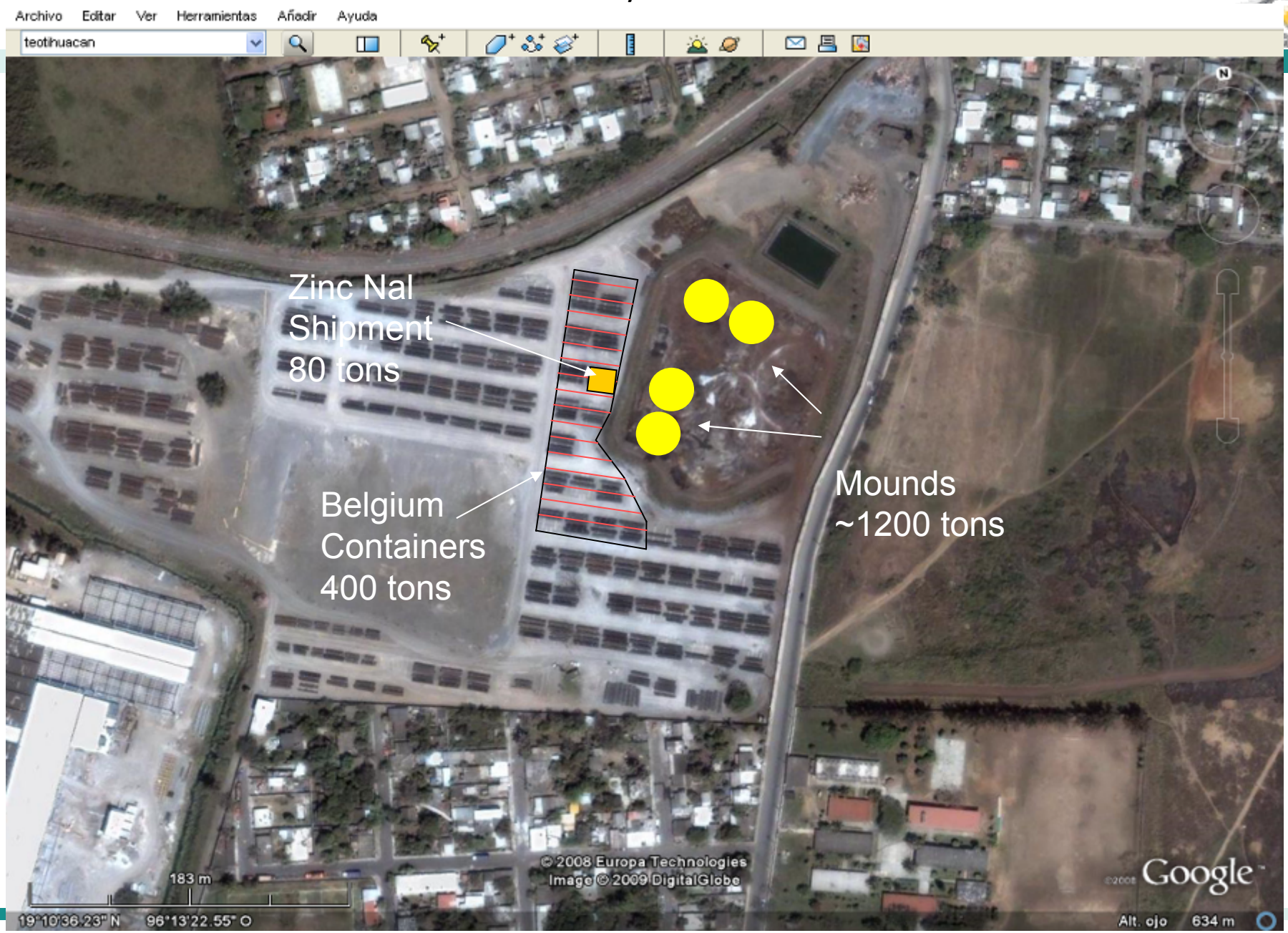
The CNSNS asked for a mission of experts to the IAEA to evaluate the situation

Experts from the IAEA, CSN and ENRESA attended the mission

The mission was carried out in october 2008 and a complete report was generated

- Legal framework
- Waste management
- Spanish experience

Now a days


Archivo Editar Ver Herramientas Añadir Ayuda
teotihuacan
Zinc Nal
Shipment
80 tons
Belgium
Containers
400 tons
Mounds
~1200 tons
© 2008 Europa Technologies
Image © 2009 DigitalGlobe
183 m
19°10'36.23" N 96°13'22.55" O
Google
Alt. ojo 634 m

Now a days

CONCLUSIONS

1. No regulatory framework for these activities
2. The Commission has proposed a protocol for the control and management of inadvertent radioactive material in scrap metal in cooperation with steel producers
3. The CNSNS required the intervention of the National Nuclear Research Institute to propose TAMSA a project for the clean-up and disposal of the radioactive material at the facility
4. A 1 year long project has been proposed to TAMSA, which includes:

    - Confinement and concentration determination of the steel dust in the mounds
    - Determination of the concentration of all 1 ton bags coming from Belgium
    - Segregation of the material, if possible
    - Building a pilot plant to duplicate Zinc National process to extract the Cs

However, Mexico up to now, doesn't have a final radioactive wastes repository!!!

5. TAMSA shall build a temporary repository for the material (10 years)