

Hazard Identification Tool Earthquake – Haiti – 12 January 2010 EQ-2010-000009-HTI

Disclaimer

The present hazard identification has been carried out based on publicly available information. An attempt has been made to identify locations of facilities and objects as precisely as possible. However, the list is not exhaustive or conclusive; other hazards may be present in the area and some of the identified locations may be obsolete. Furthermore, the estimated impact types should not be used as a basis for decision making on response measures, but further investigations should be made to verify the information provided in the HIT and to assess the actual impact.

➤ **Objective**

The objective of the Hazard Identification Tool (HIT) is to alert the United Nations Disaster Assessment (UNDAC) and other emergency responders as well as the UN Country Team to potential secondary risks after a natural disaster posed by large infrastructure and industrial facilities containing hazardous materials located in the affected area. This information can be shared with competent local and national authorities as appropriate. Any actual secondary risk should be addressed at the earliest possible stage.

➤ **Methodology of the HIT**

The methodology of the HIT is based on the Flash Environmental Assessment Tool (FEAT), a rapid assessment methodology to identify the most acute hazards to human health and the environment after natural disasters. The HIT is compiled based on research using publicly available information sources and provides a list of “big and obvious” facilities and objects that may pose a risk to human health and life, as well as the natural environment. The list includes indications of the substances that are expected to be present in these facilities, as well as the hazard types associated with these substances and related **estimated** impact types. Wherever the (expected) location of a facility could be identified, this information has been filled into the first column of the HIT. If the facility is expected to be present, but no location could be identified, this has been indicated. Whenever the location field has been left blank, it is not expected that these facilities are present in the country.

➤ **Event**

A powerful earthquake of 7.0 magnitude (USGS) on the Richter Scale affected Haiti on 12 January, at 16.53hrs local time (GMT 21.53hrs). The earthquake happened 17km south-west of Port-au-Prince, the capital of Haiti (18.45N, 72.45W). There were two aftershocks — of 5.5 and 5.9 magnitude — that followed in the last hour. Initial reports suggest a high number of casualties and widespread damage, with an urgent need for Search and Rescue, however, there are no estimates available. Vulnerable construction and high population density are a concern. Media reported widespread power outages, little to no communication, the collapse of a hospital as well as the headquarters of the U.N peacekeeping mission. There is an unconfirmed report of damage to the presidential compound and national Parliament building. The airport is open and in use.

➤ **The Joint UNEP/OCHA Environment Unit**

The Joint UNEP/OCHA Environment Unit is the United Nations mechanism to mobilize and coordinate the international response to environmental emergencies caused by natural disaster, technological accidents and complex emergencies.

List of Hazards

Location	Actual Hazard			Estimated Impact Type 
	Facility	Substances	Hazard Type	
<i>These facilities may be present in the affected area.</i> Major towns are: Port-au-Prince Carrefour Delmas Cap-Haïtien Pétionville Gonaïves Saint-Marc Les Cayes Verrettes Port-de-Paix	Hospital / sterilizing industry	ethylene oxide	gas toxic to humans, carcinogenic, mutagenic	Direct impact on human health
	Winning, preparing and distribution of drinking water (with chemicals)	chlorine	gas toxic to humans, gas toxic to the environment	direct impact on human health
	Electricity distribution	ammonia	gas toxic to humans, gas toxic to the environment	direct impact on human health, life support and nature direct
	Production of food and drink, incl. slaughterhouse	ammonia	gas toxic to humans, gas toxic to the environment	direct impact on human health, life support and nature direct
<i>These facilities may be present in the affected area</i>	Aerospace manufacture / repair (land-side)	hydrofluoric acid, cyanide	liquid toxic to the environment, liquid toxic to humans , liquid toxic after contact with water	direct impact on life-support functions and nature (direct impact on human health)
<i>These facilities may be present in the affected area</i>	Agricultural services (incl. small storage)	mixed chemicals (fire)	gas toxic to humans (toxic smoke)	direct impact on human health
<i>These facilities may be present in the affected area</i>	Agriculture (animals, crop, forestry, fruit, etc.)	organotin pesticide, organochlorine pesticide, phenoxyacetic acid derivative pesticide, carbamate pesticide, substituted nitro phenol pesticide, organophosphorus pesticide, pyrethroid pesticide, triazine pesticide, mercury based pesticide, dithiocarbamate pesticide, mixed chemicals (fire)	toxic/persistent, carcinogenic, mutagenic, liquid toxic to the environment, liquid toxic to humans, flammable liquid, gas toxic to humans, (toxic smoke)	long-term impact, direct impact on life-support functions and nature (direct impact on human health)
Port Au Prince Intl Airport, Jacmel Airport	Airports (air-side)	kerosene	liquid toxic to the environment, toxic/persistent	long-term impact, direct impact on life-support functions and nature
	Artificial ski run	ammonia	gas toxic to humans, gas toxic to the environment	direct impact on human health
<i>These facilities may be present in the affected area</i>	Breeding and keeping animals	mixed chemicals (fire)	gas toxic to humans (toxic smoke)	direct impact on human health
<i>These facilities may be present in the affected area</i>	Bus-, tram- and metro, taxi stations	solvents, cleaning agents	liquid toxic to the environment, liquid toxic after contact with water, carcinogenic, mutagenic, flammable liquid, toxic/persistent	direct impact on human health, long-term impact

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<i>These facilities may be present in the affected area</i>	Car scrap yard	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic/persistent, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact, direct impact on life-support functions and nature
<i>These facilities may be present in the affected area</i>	Defense	hydrazine, fuel, explosives	liquid toxic to the environment, liquid toxic to humans, flammable liquid, toxic/persistent (explosive)	long-term impact, direct impact on life-support functions and nature (direct impact on human health)
	Energy production and distribution (steam, propane / butane, oil and solvents, etc.)	natural gas, propane, butane, ammonia	flammable gas, gas toxic to the environment, gas toxic to humans	direct impact on human health
	Environmental services	mixed chemicals (fire)	gas toxic to humans, (toxic smoke)	direct impact on human health
<i>These facilities may be present in the affected area</i>	Fish farming	mixed chemicals (fire)	gas toxic to humans (toxic smoke)	direct impact on human health
<i>These facilities may be present in the affected area</i>	Forestry and -services (incl. small storage)	mixed chemicals (fire)	gas toxic to humans (toxic smoke)	direct impact on human health
	Galvano industry	chromium (III)	toxic/persistent, carcinogenic, mutagenic, solid toxic after contact with water	direct impact on human health
	Gas distribution	natural gas	flammable gas, gas toxic to the environment	direct impact on human health
<i>These facilities may be present in the affected area</i>	Gas service stations (with LPG)	liquefied petroleum gas (LPG)	flammable gas, gas toxic to the environment	direct impact on human health
	Glass production	hydrogen fluoride	explosive, solid toxic after contact with water	direct impact on human health
Dam Peligre, on River Artibonite, near Mirebalais, Dept. du Centre	Hydro dams (large)	---	---	Dam stability might be affected, dammed water, high voltage electricity
	Ice skating rink	ammonia	gas toxic to humans, gas toxic to the environment	direct impact on human health
	Iron and steel foundries	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic/persistent, liquid toxic after contact with water, carcinogenic, mutagenic	direct impact on human health, direct impact on life-support functions and nature, long-term impact

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<i>These facilities may be present in the affected area</i>	Laundry, carpet clean, hair dresser, undertaker, fitness, etc.	dibenzoyl peroxide, chlorosilane, hydrogen peroxide	liquid toxic to the environment, liquid toxic to humans, toxic/persistent, gas toxic to the environment	direct impact on life-support functions and nature (direct impact on human health)
	Loading and storage ships (oil and solvents, hazardous, etc.)	oil and solvents, fire	liquid toxic to the environment, toxic/persistent, combustible	direct impact on human health
	Manufacturing synthetic fibers	acrylic acid	liquid toxic to the environment, flammable liquid	direct impact on life-support functions and nature
	Marshalling yards	chlorine, liquefied petroleum gas (LPG)	gas toxic to humans, gas toxic to the environment, flammable gas	direct impact on human health
	Mining: gold, copper, nickel etc.	arsenic, mercury, cyanide	toxic/persistent, carcinogenic, mutagenic, solid toxic after contact with water, liquid toxic to the environment, liquid toxic to humans, liquid toxic after contact with water, gas toxic to the environment	long-term impact (direct impact on human health, direct impact on life-support functions and nature)
	Oil and gas mining (on-shore, off-shore)	oil and solvents, natural gas	liquid toxic to the environment, toxic/persistent, flammable gas, gas toxic to the environment	direct impact on human health
	Photo and film development	solvents	liquid toxic to the environment, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact
	Production of accumulators and batteries	mixed chemicals (fire)	gas toxic to humans, toxic/persistent (toxic smoke)	direct impact on human health
	Production of agricultural chemicals	chlorine, carbon disulfide	gas toxic to humans, gas toxic to the environment, liquid toxic to the environment	direct impact on human health
	Production of cardboard and paper	chlorine bleaching	gas toxic to humans, gas toxic to the environment	direct impact on life-support functions and nature
	Production of chemicals - other	dimethylsulphate, chloride salts	liquid toxic to the environment, liquid toxic to humans	direct impact on human health, direct impact on life-support functions and nature

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Location	Actual Hazard			Estimated Impact Type 
	Facility	Substances	Hazard Type	
	Production of clothing (incl. painting and printing)	solvents	liquid toxic to the environment, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact
	Production of cokes	oxigas	flammable gas, gas toxic to the environment	direct impact on human health
	Production of cokes electrodes	liquid acid, hydrogen, methanol	liquid toxic to the environment, flammable liquid, flammable gas, gas toxic to the environment, carcinogenic, mutagenic	direct impact on life-support functions and nature (direct impact on human health, long-term impact)
	Production of color and paint	solvents	liquid toxic to humans, liquid toxic after contact with water, carcinogenic, mutagenic	direct impact on life-support functions and nature
	Production of electro motors- and generators	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic/persistent, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact, direct impact on life-support functions and nature
	Production of fertilizer	ammonium nitrate, ammonia	liquid toxic to the environment, liquid toxic to humans, gas toxic to humans, gas toxic to the environment	direct impact on human health
	Production of fireworks	ammonium nitrate, ammonia	liquid toxic to the environment, liquid toxic to humans, toxic/persistent, gas toxic to humans, gas toxic to the environment	direct impact on human health
	Production of industrial gasses	monovinylchloride, ethene, hydrogen chloride, propane, oxygen	gas toxic to humans, carcinogenic, mutagenic /gas toxic to the environment/gas toxic to humans, gas toxic to the environment/flammable gas, gas toxic to the environment/GMR	direct impact on human health
	Production of inorganic chemical base materials	ammonium nitrate	explosive, solid toxic after contact with water	direct impact on human health
	Production of iron and steel base materials	oxigas	flammable gas, gas toxic to the environment	direct impact on human health, direct impact on life-support functions and nature
	Production of lacker	toluene diisocyanate	liquid toxic to the	direct impact on

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	Facility	Substances	Hazard Type	
		and varnish	environment, toxic/persistent	human health
	Production of lamps	hydrogen	flammable gas, gas toxic to the environment	direct impact on human health
	Production of leather	galvano, zinc bath	liquid toxic to the environment, liquid toxic to humans, toxic/persistent	direct impact on human health, long-term impact, direct impact on life-support functions and nature
	Production of lubricants	oil and solvents	liquid toxic to the environment, toxic/persistent	long-term impact, direct impact on life-support functions and nature
	Production of oil and solvents products (base materials)	oil and solvents	liquid toxic to the environment, toxic/persistent	long-term, direct impact on life-support functions and nature
	Production of organic chemical base materials	organotin compound (liquid), n.o.s., dibromomethane, tetrabromoethane, pentachloroethane, chromic fluoride (solution), arsenic compound - liquid, n.o.s., arsenic chloride, hexachlorobenzene, butadienes (inhibited), pentachlorophenol, acrylonitrile, monovinylchloride, organic peroxide, bromine, chlorine, dimethylsulphate, fluorosulfonic acid, acrolein (inhibited), mercury compound (liquid), n.o.s., vinyl bromide (inhibited), fluorine, butane, trichlorobenzenes-liquid, hydrazine, anhydrous, bromomethylpropanes, chlorobenzene, hexachlorocyclopentadiene, formaldehyde (solution), vinyl chloride (inhibited)	toxic/persistent, carcinogenic, mutagenic, liquid toxic to the environment, liquid toxic to humans, flammable gas, gas toxic to the environment, gas toxic to humans, explosive	direct impact on human health, long-term impact, direct impact on life-support functions and nature
	Production of perfumes and cosmetics	solvents	liquid toxic to the environment, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact
	Production of pharmaceutical base materials	methanol, ammonia, isopropanol, pentane, medicine	liquid toxic to the environment, carcinogenic,	direct impact on human health

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	Facility	Substances	Hazard Type	
			mutagenic /gas toxic to humans, gas toxic to the environment/ flammable liquid/ST	
	Production of photochemical products	solvents	liquid toxic to the environment, liquid toxic after contact with water, carcinogenic, mutagenic	direct impact on human health, long-term impact
	Production of rubber (incl. tires)	chloroprene	carcinogenic, mutagenic, liquid toxic to the environment	long-term impact
	Production of soap and detergents	chloride salts	liquid toxic to humans, liquid toxic to the environment	direct impact on human health
	Production of steel pipes	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic/persistent, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact, direct impact on life-support functions and nature
<i>These facilities may be present in the affected area</i>	Production of sugar	sulfur dioxide	gas toxic to humans, gas toxic to the environment	direct impact on human health, direct impact on life-support functions and nature
	Production of synthetic resin	toluene diisocyanate, acrylic acid	liquid toxic to the environment, liquid toxic to humans, toxic/persistent, flammable liquid	direct impact on life-support functions and nature
	Production of textiles	solvents	liquid toxic to the environment, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact
<i>These facilities may be present in the affected area</i>	Production of wood	solvents	liquid toxic to the environment, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact
	Radioactive and nuclear industry (Nuclear plants incl. cooling towers; research reactors)	radioactive material	<i>specialized expertise needed</i>	direct impact on human health, long-term impact
Minor tracks near Port-au-Prince and Harbor and Leogane	Railway stations (no marshalling)	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic/persistent, liquid toxic after contact with water, carcinogenic, mutagenic	direct impact on human health, long-term impact, direct impact on life-support functions and nature
	Recycling	fire	combustible	direct impact on human health

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	Recycling of liquids and rubber	trichlorobenzenes, trichloride ethanes	liquid toxic to the environment, liquid toxic to humans, carcinogenic, mutagenic, toxic/persistent	long-term impact, direct impact on life-support functions and nature
	Recycling of oil and solvents and lubricants	oil and solvents	liquid toxic to the environment, toxic/persistent	long-term impact
	Refinery of vegetable oil, solvents and grease	ammonia	gas toxic to humans, gas toxic to the environment	direct impact on human health, direct impact on life-support functions and nature
	Refinery of oil and solvents and gas (incl. storage)	oil and solvents, natural gas	liquid toxic to the environment, toxic/persistent, flammable gas, gas toxic to the environment	direct impact on human health
<i>These facilities may be present in the affected area</i>	Scrap yards (collection)	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic/persistent, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact, direct impact on life-support functions and nature
	Ship dismantling	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic/persistent, liquid toxic after contact with water, carcinogenic, mutagenic	direct impact on human health, long-term impact, direct impact on life-support functions and nature
<i>These facilities may be present in the affected area</i>	Swimming facilities	chlorine bleaching	gas toxic to humans, gas toxic to the environment	direct impact on life-support functions and nature
	Synthetic manufacturing	phenolic resin	liquid toxic to the environment	direct impact on life-support functions and nature
	Tanker cleaning	oil and solvents, cleaning agents	liquid toxic to the environment, liquid toxic after contact with water, carcinogenic, mutagenic, liquid toxic to the environment, toxic/persistent	direct impact on human health
	Tanning industry	aniline, cyanide, ammonium sulfate, sulfuric acid, arsenic, chromium (III)	carcinogenic, mutagenic, liquid toxic to the environment, liquid toxic after contact with water, liquid toxic to humans, toxic / persistent, solid toxic after contact with water	direct impact on human health, long-term impact
	Textile industry (dyes)	naphthalene, benzene, bromine, chlorine, alkali, sodium nitrate,	toxic / persistent, solid toxic after contact with water, carcinogenic,	direct impact on human health

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	Facility	Substances	Hazard Type	
		sodium sulfide	mutagenic, liquid toxic to the environment, liquid toxic to humans, gas toxic to the environment, gas toxic to humans	
<i>These facilities may be present in the affected area</i>	Trading and repair cars, motorcycles, service stations	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic / persistent, liquid toxic after contact with water, carcinogenic, mutagenic	long-term impact, direct impact on life-support functions and nature
	Trading professional fireworks (large enterprises)	fireworks	explosive	direct impact on human health
<i>These facilities may be present in the affected area</i>	Truck and (rail) lorry repair shops	cleaning agents, solvents	liquid toxic to the environment, flammable liquid, toxic/persistent	long-term impact, direct impact on life-support functions and nature
	Wholesale chemical products	mixed chemicals (fire)	gas toxic to humans (toxic smoke)	direct impact on human health
<i>These facilities may be present in the affected area</i>	Wholesale fertilizers	ammonium nitrate	explosive, solid toxic after contact with water	direct impact on human health
	Wholesale fire products (SME)	fire	combustible	direct impact on human health
<i>These facilities may be present in the affected area</i>	Wholesale liquid and gas fuels	oil and solvents, natural gas	liquid toxic to the environment, toxic/persistent, flammable gas, gas toxic to the environment	long-term impact, direct impact on life-support functions and nature (direct impact on human health)
	Wholesale mineral oil and solvent product (excl. fuels)	oil and solvents	liquid toxic to the environment, toxic/persistent	long-term impact
<i>These facilities may be present in the affected areas.</i>	Wood treating industry	pentachlorophenol, creosote, chromium (III), arsenic, copper salts	liquid toxic to humans, solid toxic after contact with water / liquid toxic to the environment, carcinogenic, mutagenic / toxic / persistent	direct impact on human health, direct impact on life-support functions and nature

Explanation of the impact types



Direct impact on human health

- adverse health effects, possibly leading to immediate death



Long-term impact on life-support functions, nature and humans

- toxic persistent substances entering the food chain and natural ecosystems and effects of carcinogenic substances.



Direct impact on life-support functions and nature

- crops, fish resources, agricultural land, water supply
- biodiversity and ecosystems

Indication of priority

The colors in the 'Impact column' indicate the priority to be given to this specific hazard.
(Red = Priority nr. 1, Orange = Priority nr. 2, Blue = Priority nr. 3)

Information sources

- **World Energy Council: Survey of Energy Resources 2007**
http://www.worldenergy.org/publications/survey_of_energy_resources_2007/default.asp
- **UNEP/GRID Arendal – Maps and Graphics Library**
<http://maps.grida.no/>
- **Official Energy Statistics**
<http://www.eia.doe.gov/emeu/cabs/index.html>
- **IAEA Country profiles and databases on Nuclear Power Plants and Research Reactors**
http://www-pub.iaea.org/MTCD/publications/PDF/cnpp2003/CNPP_Webpage/pages/countryprofiles.htm
<http://www.iaea.org/programmes/a2/index.html>
<http://www.iaea.org/worldatom/rrdb/>
- **ICOLD World Register of Large Dams**
<http://www.icold-cigb.net/rechercheldidentification.aspx?typrech=rg>
- **Stockholm Convention on Persistent Organic Pollutants (POPs) - National Implementation Plans**
<http://www.pops.int/documents/implementation/nips/submissions/default.htm>
- **UNEP PCDD/PCDF Inventories**
http://www.chem.unep.ch/pops/pcdd_activities/inventories/default.htm
- **Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal**
<http://www.basel.int/natreporting/compilations.html>
- **Maps of Oil and Gas infrastructure**
http://www.lib.utexas.edu/maps/map_sites/oil_and_gas_sites.html
- **International Minerals Statistics and Information**
<http://minerals.usgs.gov/minerals/pubs/country/>
- **MineSite – Information on World Mining Operations**
<http://www.infomine.com/minesite/>