

Classifying Nickel ores and ore concentrates  
**Implementation of  
 GHS worldwide**

Singapore, 8<sup>th</sup> June, 2011

GHS implementation worldwide

## Agenda



- Summary of EU exercise and pending issues
- Overview of the new project
  - Which countries are included?
  - Broad overview of country timelines and status of GHS implementation
- Detailed review of UN Globally Harmonised System (GHS) implementation by country:
  - Lead government agencies and legislative overview
  - Implementation timelines
  - Key issues and major differences with the EU
  - Initial groupings for nickel ores and ore concentrates (O&Cs)
- Next steps
- Useful web links and tools and Q&A

GHS implementation worldwide: EU CLP

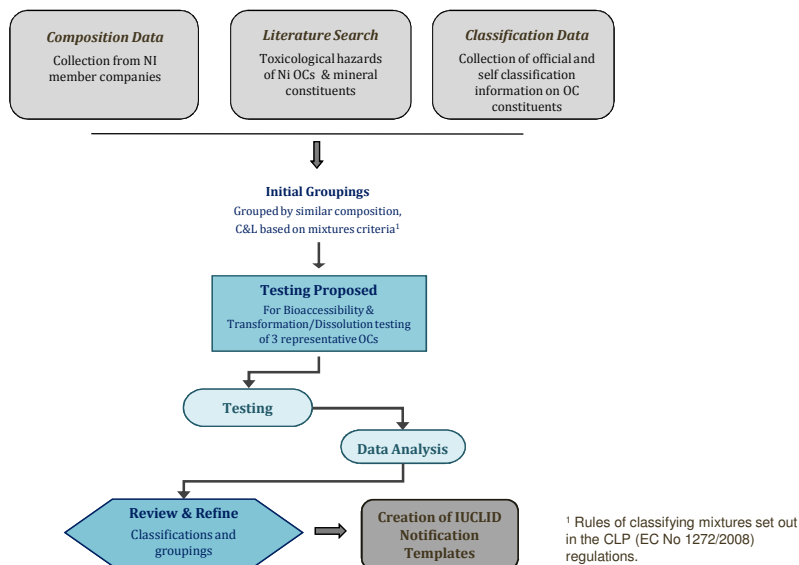
## Project overview and next steps



- GHS-aligned system in the EU: Classification, Labelling and Packaging of Substances and Mixtures Regulation (CLP, EC No 1272/2008)
- Legal requirement to notify the European Chemicals Agency (ECHA) of the classification and labelling (C&L) of substances and preparations placed on the market that meet the criteria for classification as 'dangerous'
- Because nickel ore concentrates (OCs) are considered to be substances under REACH, the deadline for notification was 3<sup>rd</sup> January 2011
- CLP text (EC No 1272/2008) based on UN GHS version 2

GHS implementation worldwide: EU CLP

## Approach to C&L Ni OCs



GHS implementation worldwide: EU CLP

## Testing and samples



- Assessment of Ni ion-release into simulated environmental and biological fluids from selected OCs can help to determine the appropriateness of the proposed classifications.

### Tests (Release of Ni, Fe, Cu and As):

- Bioaccessibility – in synthetic gastric, sweat and respiratory fluids
- 7-day transformation/dissolution protocol (TDp)

### Sample criteria:

- Highest maximum typical concentration of total Ni in proposed sulphidic OC group
- Some As present in OC
- Two As compounds were also tested for comparison and data gathered on NiS and Ni<sub>3</sub>S<sub>2</sub> under REACH were used

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GHS implementation worldwide: EU CLP

## Composition of Ni sulphidic OCs tested



Substance ID	Reason for selection	Typical maximum total conc. of Ni in OC	Typical maximum conc. of predominant Ni-bearing mineral(s) (w/w)	Typical conc. (median of range) of predominant Ni-bearing mineral(s) (w/w)
Company O (Sample ID: N132A)	Highest conc. of pentlandite and violarite combined: 25 – 55% pentlandite, 0 – 5% violarite. Contains classified Ni-bearing minerals: millerite (2 – 10%), heazlewoodite ≤ 1%, gersdorffite (NiAsS) 0.5 – 1%	29%	Pentlandite (55%) and millerite (NiS; 10%)	Pentlandite (40%) and millerite (NiS; 6%)
Company C (Sample ID: N133)	High in pentlandite; 19-20%. As (~1%) present as gersdorffite (2%). No millerite, heazlewoodite or other Ni-bearing minerals/chemicals already classified under CLP (EC No 1272/2008)	8%	Pentlandite (20%)	Pentlandite (19.5%)
Company K (Sample ID: N134)	Highest conc. of millerite, 20-21%. As (~0.5%), present as gersdorffite (0.1%)	14%	Millerite (NiS; 21%)	Millerite (NiS; 20.5%)

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## Test results and classifications

- The bioaccessibility data support the health hazard classifications proposed according to the CLP mixtures rules
- TDp data suggest that less stringent classifications are required than those proposed according to the CLP mixtures criteria

### Presence of asbestos and respirable crystalline silica (RCS):

- Guidance sort from the Industrial Minerals Association (IMA)-Europe
- Asbestos – classify for carcinogenicity and STOT RE, RCS (quartz and cristobalite) classify for STOT
- Companies classified on an individual basis

### Physical hazards

- Companies classified on an individual basis since groupings could not easily be made on physical hazard criteria

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## Classifications and notification templates

<i>OC group</i>	<i>Classification</i>
Ni sulphidic OCs that are high in millerite ( $\geq 10\%$ )	Carc. 1A Muta. 2 STOT RE 1 Skin Sens. 1 Acute Tox. 3 (inhalation and oral) Aquatic Chronic 2
Ni sulphidic OCs that are high in pentlandite ( $\leq 55\%$ ), contain $< 10\%$ millerite and $\leq 1\%$ heazlewoodite	Carc. 1A Muta. 2 STOT RE 2 Skin Sens. 1 Acute Tox. 3 (inhalation and oral) Aquatic Chronic 2
Ni sulphidic OCs that are high in pentlandite ( $\leq 20\%$ ) and $< 0.1\%$ millerite or heazlewoodite	Acute Tox. 3 (inhalation and oral) Aquatic Chronic 3
Lateritic OCs	No classification (optional classification to be included if respirable crystalline silica present).

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## Recent changes and updates



### 2<sup>nd</sup> ATP (EU No 286/2011) to EU CLP

- 2<sup>nd</sup> ATP aligns CLP with version 3 of UN GHS
- Published on 10 March 2011

#### Health hazards:

- Skin sensitisation now has two sub-categories 1A and 1B, pertaining to strong and 'other' sensitisers respectively

#### Environmental hazards:

- Introduction of a chronic M-factor
- Separate chronic categories for non-rapidly and rapidly degradable substances
- Chronic classification cut-offs have been lowered

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## Recent changes and updates



### Deadline for notification updates based on 2<sup>nd</sup> ATP

- Substances: 1 December 2012
- Mixtures: 1 June 2015

#### Self-classifications by other metal commodity organisations:

- Chalcopyrite – Aquatic Acute Cat. 3
- lead compounds with the exception of those specified elsewhere in Annex VI to CLP – Carc. Cat. 2, M factor = 10
- **These and other constituent classifications may change based on the 2<sup>nd</sup> ATP**
- MECLAS tool available at: [www.meclas.eu/](http://www.meclas.eu/) provides up-to-date classification information on mineral constituents as part of an on-line classification tool

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## Overview of new project



- Extend EU CLP classifications to other GHS countries
- Began in March 2011

### Objectives:

- Gather information on GHS implementation and regulatory criteria in different GHS jurisdictions relating to the C&L of nickel O&Cs
- Derive GHS C&L proposals for groups of O&Cs mined/used globally according to GHS criteria in the different regions/countries
- If needed, check proposed classifications by performing limited testing e.g. transformation dissolution and/or bioaccessibility
- Finalise O&C group classifications according to criteria in the different GHS jurisdictions

**This approach is similar to that followed for the EU CLP project**

GHS implementation worldwide

## Overview of new project

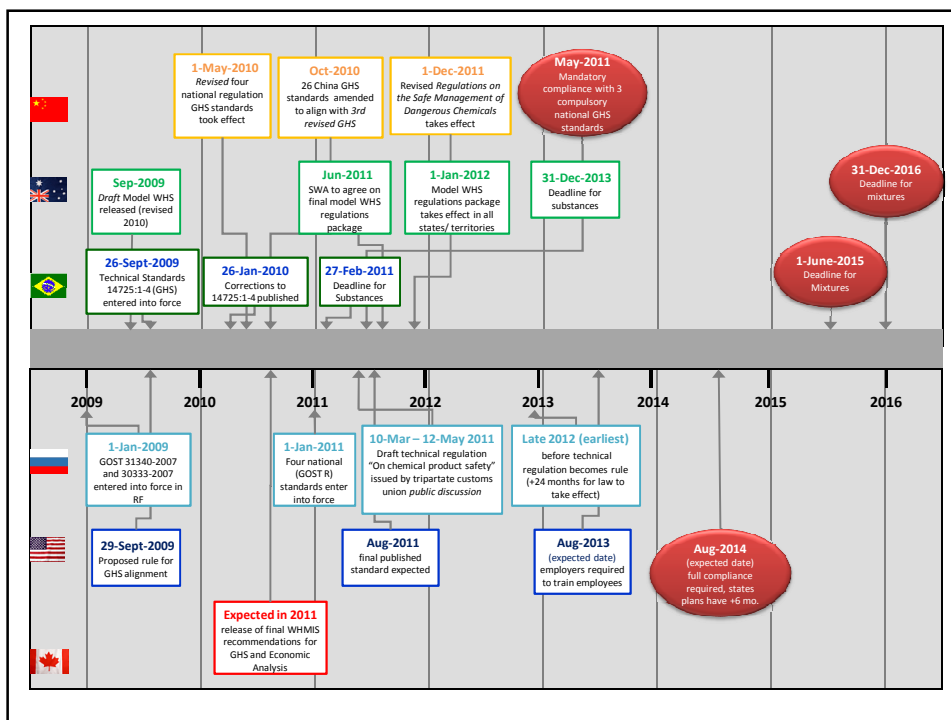


- Information on the composition of Ni O&Cs and countries/regions of interest was gathered from NI member companies by questionnaire
- A priority list of countries (for targetted research) was generated based on the results of the questionnaire
- Composition information is being used to place Ni O&Cs into preliminary groups to which country/region-specific GHS classification criteria will be applied
- The following slides present an overview of GHS implementation in key countries based on preliminary research, and initial groupings of Ni O&Cs

GHS implementation worldwide: Countries of interest



Country	Status of preliminary research on GHS implementation
Australia	Complete
Brazil	In progress
Canada	Complete
China	Complete
Cuba	No public information available of GHS implementation.
Dominican Republic	Not started
Indonesia	In progress
Madagascar	Some work going on at the national level with regards to GHS-implementation under SAICM. However, no specific legislation located and progress is considered to be limited.
New Caledonia	In progress. New Caledonia is not covered by EU CLP regulations.
Russian Federation	Complete
South Africa	Not started
Tanzania	Not started
United States	Complete



GHS implementation worldwide: Australia

## Legislative overview



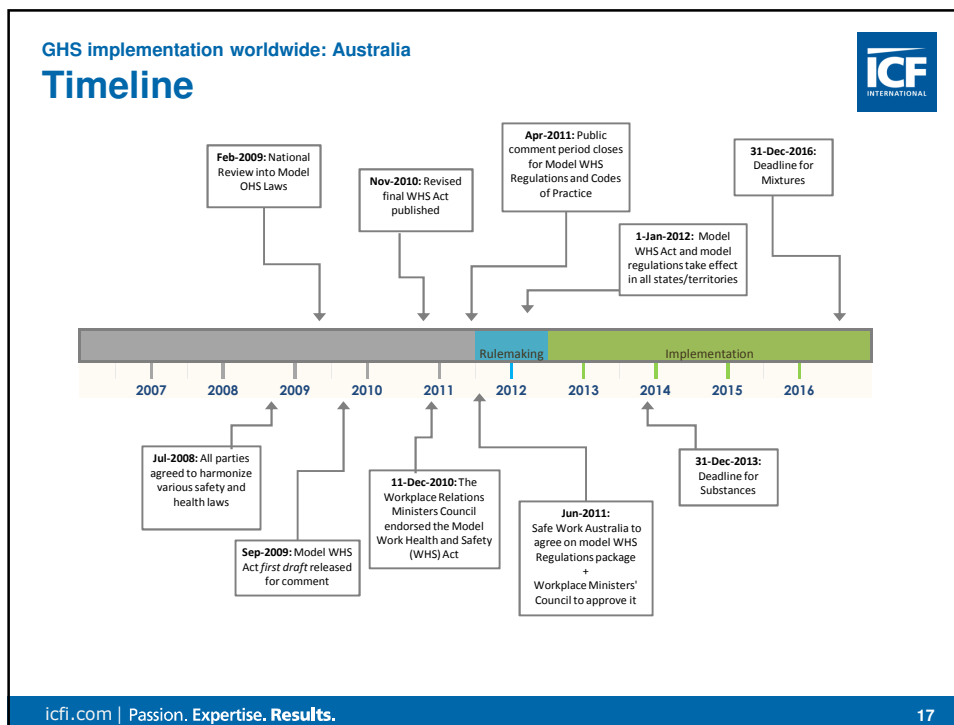
- Lead government body responsible for implementing GHS into national law is **Safe Work Australia (SWA)**
- SWA concerned only with workplace hazardous chemicals
- Final national *Draft Model Work Health and Safety (WHS) Regulations*, which incorporate GHS in relation to the use, handling and storage of substances, mixtures and articles expected this month
- The *Model WHS Regulations* do not apply to transport of dangerous goods or environmental hazard classification; Physical and health hazards are within the scope
- The *Model WHS Regulations*, relevant *Codes of Practice* on SDS and Labelling, will come into force on 1<sup>st</sup> Jan 2012.
- Deadline for Mixtures: 31<sup>st</sup> Dec 2016

GHS implementation worldwide: Australia

## Legislative overview



- Classification criteria in *Draft Model WHS Regulations* based on UN GHS version 3
- Criteria for mixtures are similar to those described in the EU CLP (including 2<sup>nd</sup> ATP)
- Environmental endpoints are not within the scope of the *Draft Model WHS Regulations*.
  - The Australian Criteria for the Classification Hazardous Chemicals (6 October 2009) included details of classifications of chemicals for environmental effects, but this document has been discontinued and superseded by the *Draft Model WHS Regulations*.
- Enforcement will take place at the State/Territory level.
- SWA are currently developing a nationally consistent compliance and enforcement policy.



**GHS implementation worldwide: Brazil**

## Legislative overview

- Lead government departments for GHS implementation are:
  - **Brazilian Ministry of Work and Employment** (MTE, Ministério de Trabalho e Emprego)
  - **Ministry for Development, Industry, and Foreign Trade** (MDIC, Ministério de Desenvolvimento, Indústria, e Comércio Exterior)
- The GHS Working Group (GT-GHS), formed in 2001 as a subgroup to the National Commission on Chemical Security, includes >45 member ministries, institutions, industry groups, and companies.
- GT-GHS is primarily responsible for implementing GHS in Brazil
- GT-GHS collected over 850 different pieces of legislation relevant to chemical safety, transportation, commerce, classification, and labeling in Brazil. However, no new legislation for GHS implementation has been considered

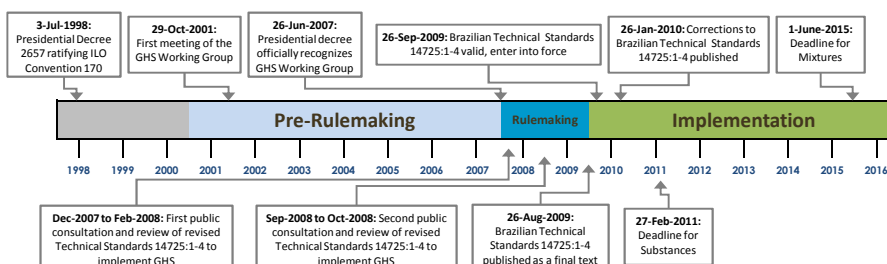
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## Legislative overview



- ABNT Brazilian Technical Standards 14725:1-4 implement GHS in Brazil
- The four Standards first issued in 2009 (updated in 2010) cover terminology, health and environmental hazard classification, labelling and SDS preparation
- Consumer protection laws provide the legal basis for the Brazilian Technical Standards
- The compliance deadline for substances was 27<sup>th</sup> Feb 2011
- The compliance deadline for mixture is 1<sup>st</sup> June 2015
- Research on specific classification criteria is on-going by ICF

## Timeline



GHS implementation worldwide: Canada

## Legislative overview



- The lead government agency responsible for GHS implementation is Health Canada, via the Workplace Hazardous Materials Information System (WHMIS)
- WHMIS is implemented through coordinated federal, provincial and territorial legislation
- An Interdepartmental Committee on GHS develops the Canadian position for all GHS activities
- Amendments to the Hazardous Products Act (HPA) and associated Controlled Products Regulations (CPR) are required to implement GHS into the Canadian workplace
- Limited progress toward GHS implementation has been made so far and no compliance dates are available

GHS implementation worldwide: Canada

## Current status of implementation



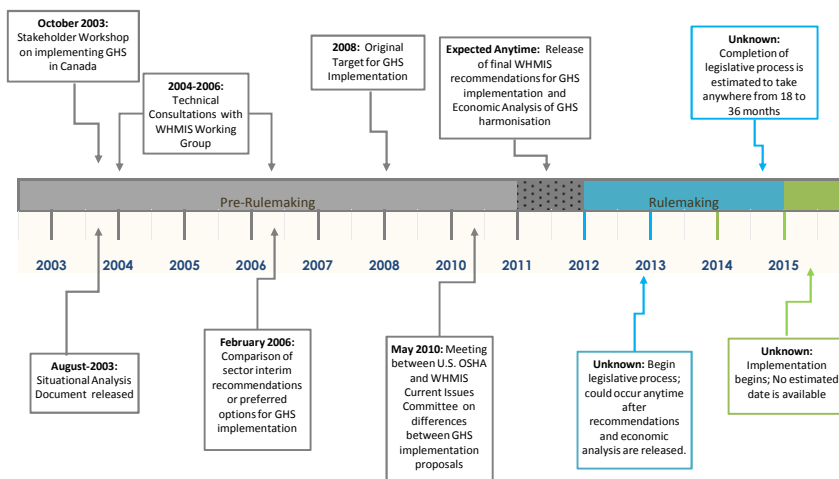
- In February 2006 Health Canada released a document on sector recommendations on adoption of key portions of the UN GHS (revision 1)
- The document recommended adoption of all physical and health hazard classes with the exception of 20 still under discussion
- Some of the GHS health hazard classes would be combined
- Environmental hazard classes were pending discussion for the acute endpoint; chronic endpoints were not recommended for implementation
- The document recommended retaining several existing WHMIS hazard classes for continuity and to maintain the current overall level of protection

## Current status of implementation



- These recommendations are draft and will need to be updated to align with the most recent version of the UN GHS (revision 3)
- The recommendations are not final and subject to change through consultation and the legislative process
- Final recommendations and an economic analysis of the impact of GHS implementation are expected to be released anytime.
- The original proposed timeline for implementation of GHS was 2008 which was pushed back to 2010; no updated timeline has been released by Health Canada
- Once the legislative process is started it is expected to take anywhere from 18 months to three years to complete

## Timeline



GHS implementation worldwide: China

## Legislative overview



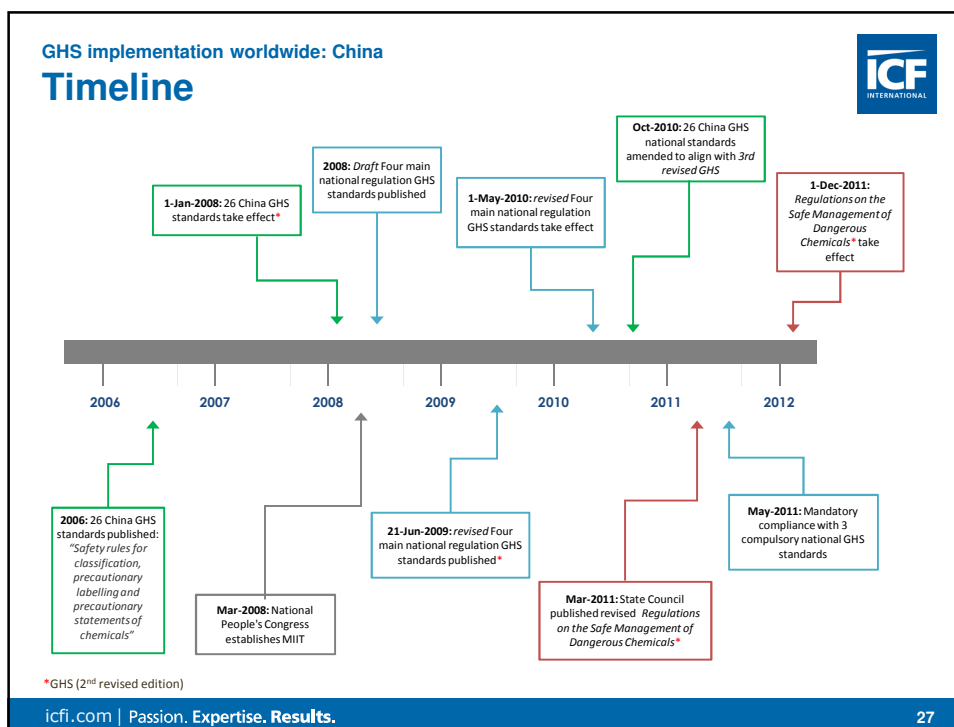
- The Ministry of Industry and Information Technology (MIIT), created in March 2008, is the primary department responsible for GHS implementation
- China's legislative and regulation system includes four levels:
  - First level: laws approved and promulgated by People's Congress
  - Second level: Administrative laws promulgated by State Council
  - Third level: Regulations issued by ministry
  - Four level: National Standards
    - compulsory (GB)
    - recommended (GB/T)
- In 2006, China issued 26 China GHS standards via compulsory National Standards to align with GHS (effective from 1<sup>st</sup> Jan 2008); these were updated in Oct 2010 to align with UN GHS revision 3

GHS implementation worldwide: China

## Legislative overview



- In 2008, four National Standards (3 compulsory) were published to outline GHS implementation in China – these were updated in 2009
  - The four National Standards cover classification, labelling, packaging and SDS preparation (voluntary)
  - From 1<sup>st</sup> May 2011, compliance with the 3 compulsory National GHS Standards became mandatory
  - Aligned with UN GHS revision 2
  - The four National Standards have yet to be updated to align with UN GHS revision 3
- Official English translations of the 4 National Standards are not available; unofficial translations are being sort by ICF
- From 1<sup>st</sup> Dec 2011 the *Regulations on the Safe Management of Dangerous Chemicals* will come into effect



**GHS implementation worldwide: Russian Federation and CIS**

## Legislative overview

- The Russian Federation (RF) is the major contributor to and works closely with the Commonwealth of Independent States (CIS)


**Key bodies:**

- RF: The Federal Agency on Technical Regulating and Metrology is an executive body of the RF, under the jurisdiction of Ministry of Industry and Energy of the RF
- CIS: The Euro-Asian Council for Standardization, Metrology and Certification is a regional standards organization for the CIS of which Russia is the largest member-state
- Customs Union of Belarus, Kazakhstan, and Russia (CU): came into existence on 1<sup>st</sup> Jan 2010 to remove customs borders by 1<sup>st</sup> July 2011 and a single economic space expected by 1<sup>st</sup> Jan 2012

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GHS implementation worldwide: Russian Federation and CIS

**Legislative overview**




**The RF implements GHS in two ways:**

- Adoption of Technical Regulation "On chemical products safety" (in draft form), which harmonizes safety requirements with the UN GHS Rev.3 (also applies in CU) – compliance with the stated requirements will be mandatory for all market participants
- Systems of National and Interstate (Regional) Standards (GOST) which implement GHS
  - Four National (GOST R, 2010) Standards cover general requirements for the classification of chemicals and mixtures for health and environmental hazards – compliance with these is voluntary, perhaps to fulfill the need for voluntary standards compliance before creating a technical regulation
  - Two GOST (2007) standards on labelling and SDS (also applies to CIS) – compliance appears to be mandatory (TBC)

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GHS implementation worldwide: Russian Federation and CIS

**Legislative overview**



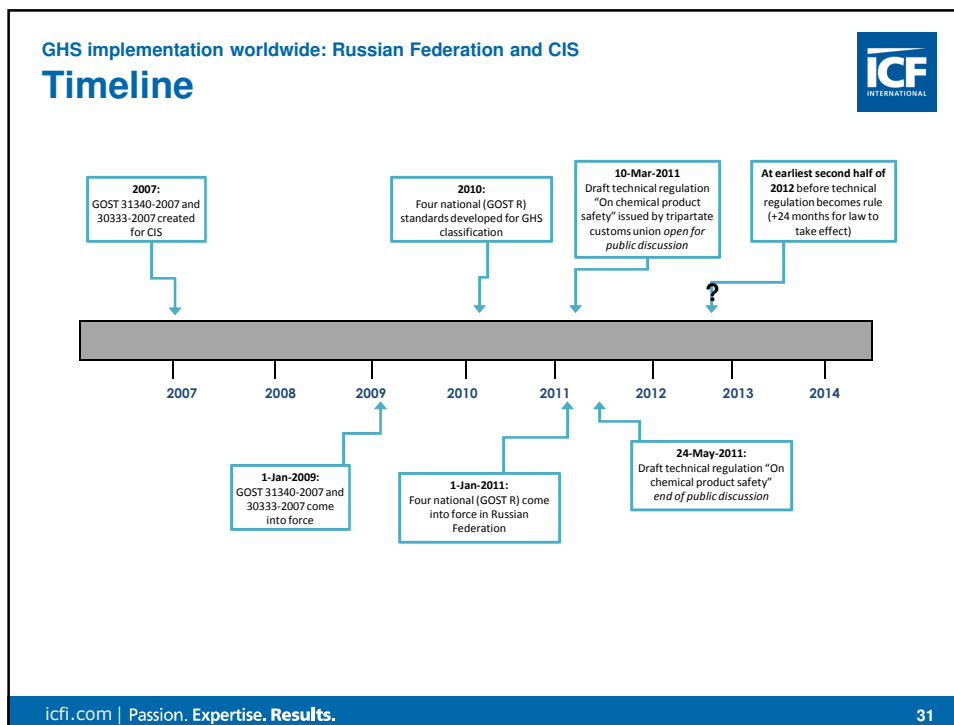
**The CU implements GHS via:**

- Adoption of Technical Regulation "On chemical products safety", currently in draft form. Final version expected during 2<sup>nd</sup> half of 2012 at earliest

**CIS implements GHS via:**

- Two GOST (2007) standards on labelling and SDS (Russia and the CU have more GOST standards) – compliance appears to be mandatory (TBC)

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**GHS implementation worldwide : USA**

**Legislative overview**

- The Department of Labour's Occupational Safety and Health Administration (OSHA) is the primary government agency responsible for GHS implementation in the workplace
- Three other key Federal agencies would also be affected by adoption of GHS and are in various stages of planning
- The interagency committee on GHS is headed by the Department of State
- After the adoption of GHS, OSHA will have a required employee training program on the new GHS hazards (not required under GHS, but a product of GHS adoption by OSHA)
- In Sept 2009 OSHA published a proposed rulemaking to align the existing Hazard Communication Standard (HCS) with the UN GHS (revision 3) – final rule expected in August 2011

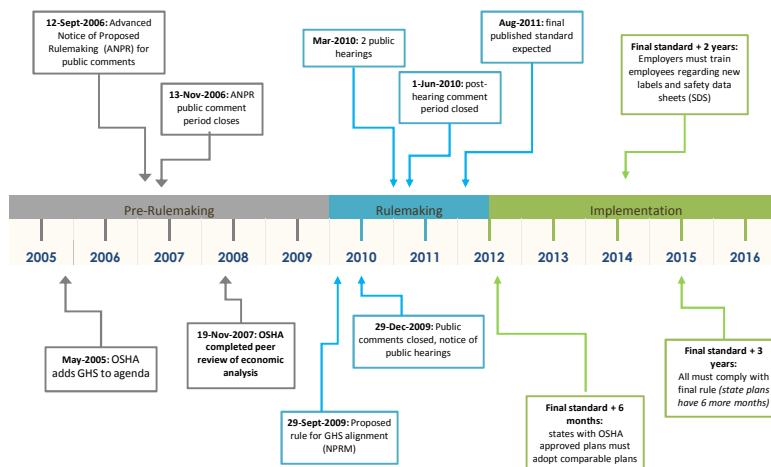
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## Legislative overview



- Within 6 months of the final rule, the 26 states and territories which have their own OSHA-approved OSH plans must adopt comparable or better provisions
- Within 2 years of the final rule, employers must train employees regarding new labels and SDS
- Within 3 years of the final rule, compliance with all provisions of modified final rule is mandatory

## Timeline



GHS implementation worldwide : USA

## Key issues for Ni O&Cs



- Under the existing HCS, a chemical is considered to be a carcinogen if found to be so by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or listed in *29 CFR 1910, Subpart Z, Toxic and Hazardous Substances, OSHA*
- IARC (vol. 49, 1990) overall evaluation: *Ni compounds are carcinogenic to humans*
- NTP (11<sup>th</sup> ROC, 2005): Ni compounds are listed as *Known to be human carcinogens*
- Based on these findings and OSHA criteria, OSHA considers *Ni compounds* to be carcinogenic
- **However, it is currently unclear which Ni substances are included under *Ni compounds***

GHS implementation worldwide : USA

## Key issues for Ni O&Cs



- Reminder: Under EU CLP criteria only certain nickel minerals are classified (listed in Annex VI of CLP) as carcinogens e.g. millerite (NiS) and heazlewoodite (Ni<sub>3</sub>S<sub>2</sub>). Others e.g. pentlandite ((Fe,Ni)<sub>9</sub>S<sub>8</sub>) and violarite (FeNi<sub>2</sub>S<sub>4</sub>) are not classified
- It is unclear how this issue will be dealt with in OSHA's final rule (due Aug 2011)
- This issue is also relevant to respirable crystalline silica (RCS), which is not currently classified as a carcinogen in the EU, but was classified by IARC in 1997 as a *known human carcinogen* (group 1) and NTP as *known to be a human carcinogen*
- This issue may also be relevant to other countries e.g. Australia and Canada who consider IARC assessments in their carcinogenic evaluations

GHS implementation worldwide

## Preliminary Ni O&C groups



- Groups based on composition data gather via questionnaire
- In line with EU-CLP groups
- Questionnaire data shows four different Ni O&C **types**:
  - Sulphidic Ni O&Cs containing primarily NiS/Ni<sub>3</sub>S<sub>2</sub>
  - Iron sulphide Ni O&Cs containing primarily pentlandite/violarite
  - Oxidic Ni O&Cs containing NiO primarily in goethite
  - Saprolitic Ni O&Cs containing Ni primarily in saponite
- Many Ni O&Cs also contain:
  - Chalcopyrite (Aquatic Acute Cat. 3), Arsenic (Acute and Aquatic Tox.), galena (contains lead; Carc. Cat. 2, M factor = 10 ) and cobalt (some Co compounds classified in 1<sup>st</sup> ATP to CLP), RCS and asbestos fibres, which may lead to classification

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GHS implementation worldwide

## Preliminary Ni O&C groups



- Of these four types the following preliminary 'loose' groups are proposed:
  - Ni O&Cs containing NiS/Ni<sub>3</sub>S<sub>2</sub>
  - Ni O&Cs containing NiS/Ni<sub>3</sub>S<sub>2</sub> and pentlandite/violarite
  - Ni O&Cs containing pentlandite/violarite (< 0.1% NiS/Ni<sub>3</sub>S<sub>2</sub>)
  - Oxidic Ni O&Cs containing NiO primarily in goethite
  - Saprolitic Ni O&Cs containing Ni primarily in saponite
- Currently non Ni-containing minerals have not been included
- However, further refinement of these groups is on-going
- The groups may change depending on the classification criteria

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GHS implementation worldwide

## Useful web links and tools



- MECLAS tool (available at: [www.meclas.eu/](http://www.meclas.eu/)) is an on-line tool for classification of complex metal compounds according to EU criteria
- [http://live.unece.org/trans/danger/publi/ghs/ghs\\_rev03/03files\\_e.html](http://live.unece.org/trans/danger/publi/ghs/ghs_rev03/03files_e.html) - download the UN GHS revision 3
- [http://live.unece.org/trans/danger/publi/ghs/implementation\\_e.html](http://live.unece.org/trans/danger/publi/ghs/implementation_e.html) - Overview of GHS implementation by country (but not very up-to-date)
- Free webinar on *Regulations on safe management of chemicals (2011) and China GHS* (by Chemical Regulation and Inspection Service; CIRIS)  
[http://www.youtube.com/watch?v=iBoGlixTws&feature=player\\_embedded#at=169](http://www.youtube.com/watch?v=iBoGlixTws&feature=player_embedded#at=169)
- <http://safeworkaustralia.gov.au/Legislation/AdministrativeRegulations/Pages/Model%20work%20health%20and%20safety%20Regulations.aspx> – Australian Model Regulations and other documents
- <http://www.regulations.gov/public/component/main?main=RuleDocuments&agency=DOL&pubperiod=200910&rin=1218-AC20> – USA OSHA's proposed rule and other documents
- Full links to key regulatory documents are provided in each country profile in preparation by ICF

**Thank You!**  
**Any questions?**

