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-Generic Petroleum Specifications for UNFC
Satinder Purewal – Chair of PWG



- UNFC Petroleum Guidelines Project
- UNFC categories and classes
- G-axis uncertainty
- Project commerciality
- Environmental and social considerations
- Petroleum project definition
- Exploration projects
- Additional quantities in place-unrecoverable
- UNFC Sub-classes
- Closing Remarks

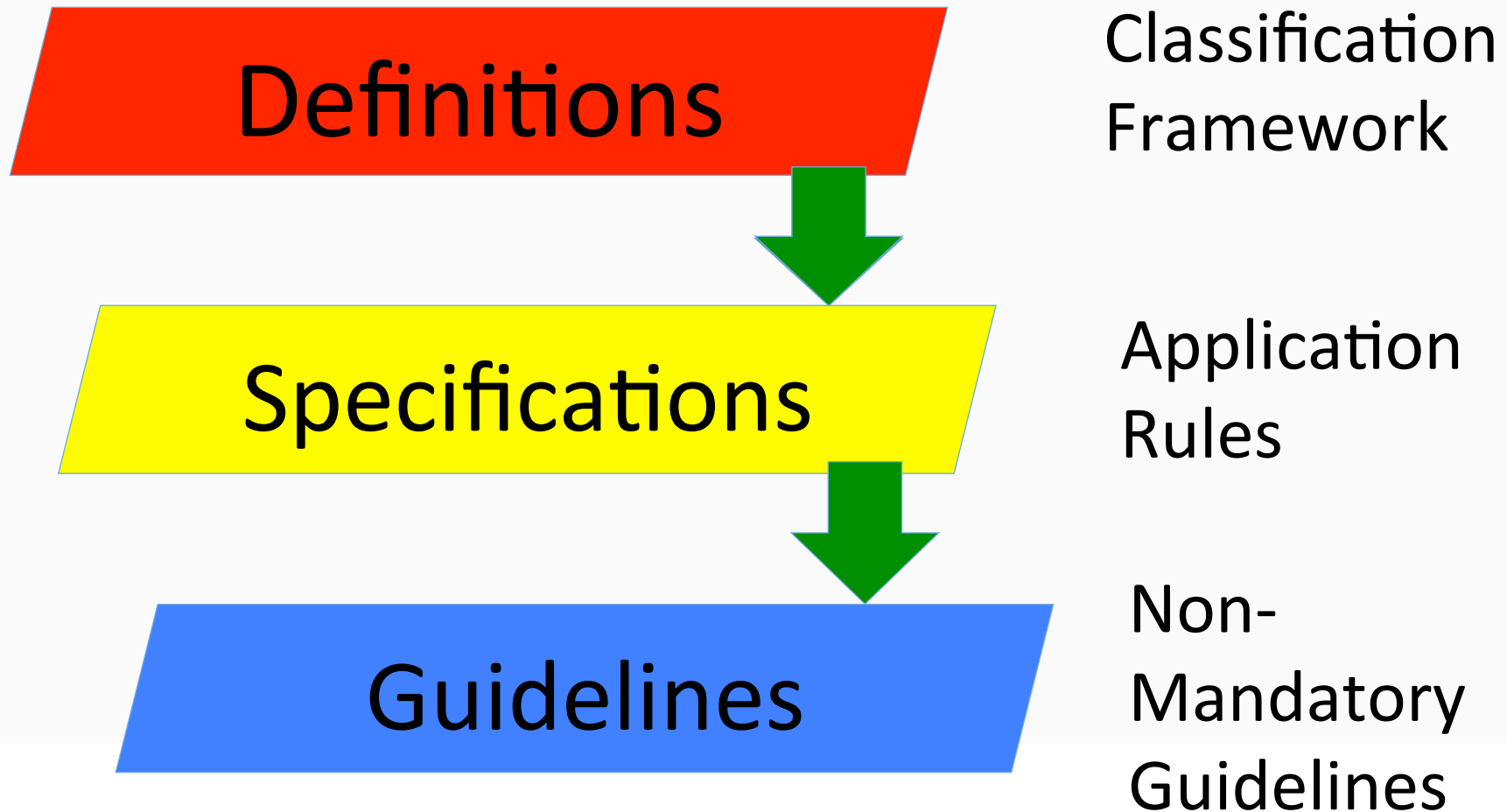


PWG Project

UNFC Specifications and Guidelines for Petroleum

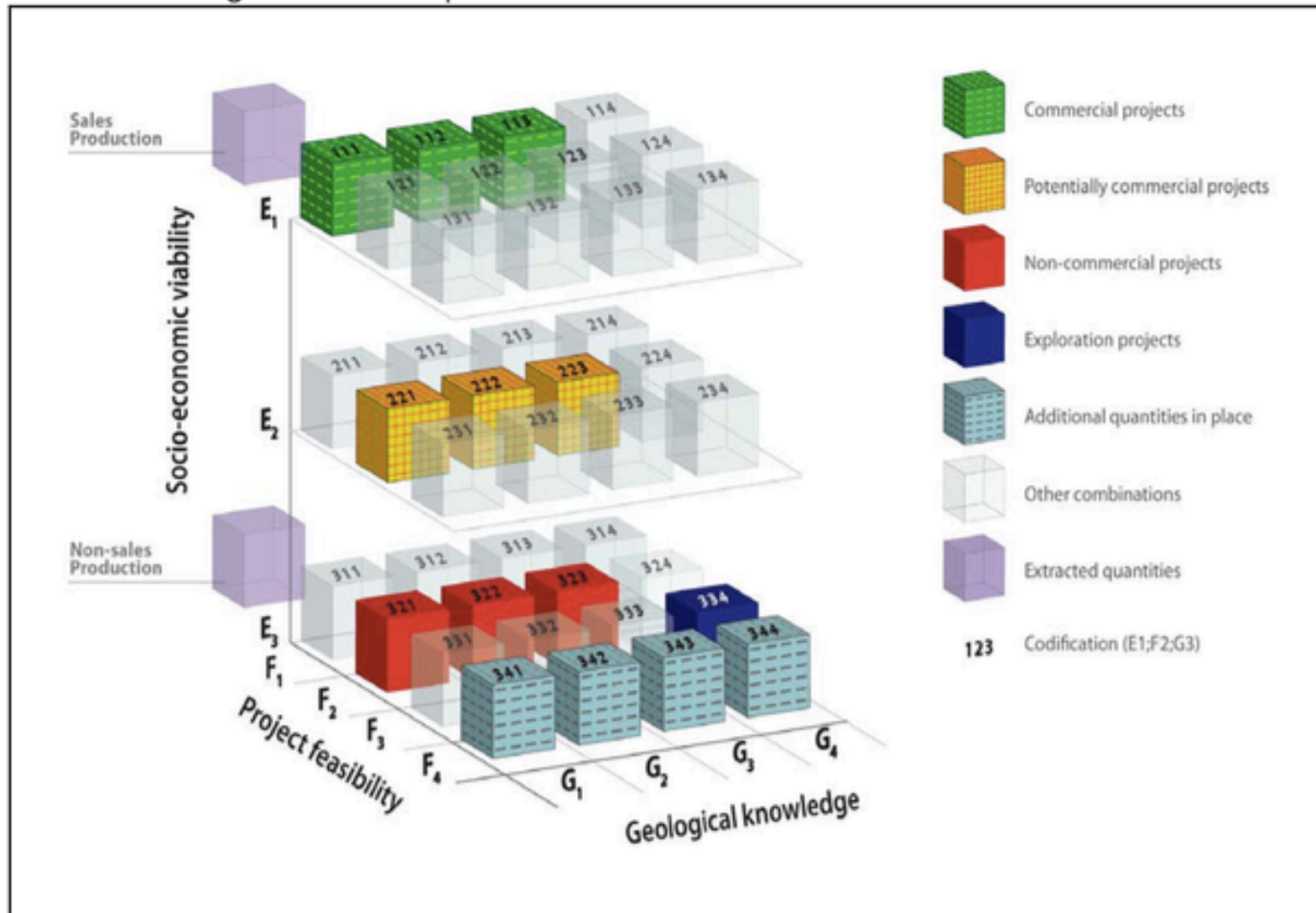


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UNFC-2009 Categories and Examples of Classes



Generic Specifications – Petroleum G-axis Uncertainty 1



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UNFC Categories			
G1	1P		Reserves (incremental)
G2	2P-1P		
G3	3P-2P		
G1	1P		Reserves (Scenario)
G1+G2	2P		
G1+G2+G3	3P		
G1	1C - Low		Contingent Resources
G1+G2	2C - Best		
G1+G2+G3	3C - High		
G4.1	Low		Prospective Resources
G4.1+G4.2 (=G4)	Best		
G4.1+G4.2+G4.3	High		

Generic Specifications – Petroleum G-axis Uncertainty 2



UNFC 'minimum' categories			UNFC Class
E1	F1	G1, G2, G3	Commercial Projects
E2	F2	G1, G2, G3	Potentially Commercial Projects
E3	F2	G1, G2, G3	Non-Commercial Projects
E3	F4	G1, G2, G3	Additional in Place
E3	F3	G4	Exploration Projects
E3	F4	G4	Additional in Place

- E and F categories set minimum standards for Classes
e.g. Potential Commercial Project can be E2F2, E1F2, E2F1
- Non-Sales quantities are always classified as E3





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	F1.1	F1.2	F1.3	F2.1	F2.2	F2.3	F3.1	F3.2	F3.3	F4
E1.1	1	2	3	4						
E1.2	1	2	3							
E2			4	4	5					
E3.1	12	12	12	12	12	12				
E3.2			6	6	6		8	9	10	
E3.3			7	7	7	7				11

key	UNFC Class
1	Commercial Projects
2	
3	
4	Potential Commercial Projects
5	
6	
7	Non-commercial Projects
11	Unrecoverable
8	Exploration Projects
9	
10	
11	Unrecoverable
12	Defined in alternate system
Grey	Uncommon mappings





- E-axis categories explicitly define to take account of the social and environmental issues which may be relevant to the commercial viability of the petroleum extraction project
- This is in addition to legal, economic and other non-technical factors
- Time estimate of impact of social and environmental issues to be considered as part of life-cycle project planning
- Environmental and social impediments may prevent a project from proceeding or cessation of an ongoing project (unless remedial action taken agreed with all stakeholders)



- A **Petroleum** Project is a defined development which provides the basis for economic evaluation and decision-making.
- **Exploration and appraisal delineation drilling** form the early stages of evaluation and the Project **may** be defined only in conceptual terms.
- More mature Projects will be defined in significant detail.
- Where no **petroleum** development can currently be defined for all or part of a **accumulation**, based on existing technology or technology currently under development, all quantities associated with that **accumulation** (or part thereof) are classified in Category F4.





	Low Estimate	Best Estimate	High Estimate
Prospect	E3.2,F3.1,G4.1	E3.2,F3.1,G4.1+G4.2	E3.2,F3.1,G4.1+G4.2+G4.3
Lead	E3.2,F3.2,G4.1	E3.2,F3.2,G4.1+G4.2	E3.2,F3.2,G4.1+G4.2+G4.3
Play	E3.2,F3.3,G4.1	E3.2,F3.3,G4.1+G4.2	E3.2,F3.3,G4.1+G4.2+G4.3

Additional Quantities in Place-Unrecoverable



	Low Estimate	Best Estimate	High Estimate
Discovered	E3.3,F4,G1	E3.3,F4,G1+G2	E3.3,F4,G1+G2+G3
Undiscovered	E3.3,F4,G4.1	E3.3,F4,G4.1+G4.2	E3.3,F4,G4.1+G4.2+G4.3



E axis “minimum” Category or Sub- Category	F axis “minimum” Sub- Category	UNFC-2009 Sub-class
E2	F2.1	Development Pending
E2	F2.2	Development on Hold
E3.2	F2.2	Development Unclassified
E3.3	F2.3	Development not Viable

- NB: Sub-categories set ‘minimum’ standards for sub-classes.
e.g. Development pending must be at least E2F2.1 and cannot be E3 or F2.2 (or lower)
However, it can be E1F2.1 or E2F1.3

Concluding Remarks



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- UNFC is a stand alone classification system for Petroleum
- UNFC maps seamlessly to other classification systems such as PRMS, RF2013, etc.
- UNFC stands out for incorporating environmental and social considerations into the petroleum project consideration (new or ongoing)
- UNFC has the added advantage of its potential application and utility to resources other than petroleum (e.g. minerals, renewables, etc.). which single commodity focused classifications do not have that flexibility





Thank you!

Name Surname

Position

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Back-up Slides



- For Generic specifications
 - 'Shall' means provision is mandatory
 - 'Should' means provision is preferred
 - 'May' means alternative provisions are equally viable





Abbreviated Version of UNFC-2009, showing Primary Classes

Total Commodity Initially in Place	Extracted	Sales Production			
		Non-Sales Production ^a			
		Class	Categories		
			E	F	G ^b
	Future recovery by commercial development projects or mining operations	Commercial Projects ^c	1	1	1, 2, 3
	Potential future recovery by contingent development projects or mining operations	Potentially Commercial Projects ^d	2 ^e	2	1, 2, 3
		Non-Commercial Projects ^f	3	2	1, 2, 3
	Additional quantities in place associated with known deposits ^g		3	4	1, 2, 3
	Potential future recovery by successful exploration activities	Exploration Projects	3	3	4
	Additional quantities in place associated with potential deposits ^g		3	4	4



UNECE | UNFC-2009 Classes and Sub-classes defined by Sub-categories^a

UNFC Classes Defined by Categories and Sub-categories						
Total Commodity Initially in Place	Extracted	Sales Production				
		Non-sales Production				
	Class	Sub-class	Categories			
			E	F	G	
	Known Deposit	Commercial Projects	On Production	1	1.1	1, 2, 3
			Approved for Development	1	1.2	1, 2, 3
			Justified for Development	1	1.3	1, 2, 3
		Potentially Commercial Projects	Development Pending	2 ^b	2.1	1, 2, 3
			Development On Hold	2	2.2	1, 2, 3
		Non-Commercial Projects	Development Unclassified	3.2	2.2	1, 2, 3
Development Not Viable			3.3	2.3	1, 2, 3	
Additional Quantities in Place		3.3	4	1, 2, 3		
Potential Deposit	Exploration Projects	[No sub-classes defined] ^c	3.2	3	4	
	Additional Quantities in Place		3.3	4	4	

G-Axis Categories and definitions



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<p>G1</p>	<p>Quantities associated with a known deposit that can be estimated with a high level of confidence.</p>	<p>For in situ (in-place) quantities, and for recoverable estimates of fossil energy and mineral resources that are extracted as solids, quantities are typically categorised discretely, where each discrete estimate reflects the level of geological knowledge and confidence associated with a specific part of the deposit. The estimates are categorised as G1, G2 and/or G3 as appropriate.</p> <p>For recoverable estimates of fossil energy and mineral resources that are extracted as fluids, their mobile nature generally precludes assigning recoverable quantities to discrete parts of an accumulation. Recoverable quantities should be evaluated on the basis of the impact of the development scheme on the accumulation as a whole and are usually categorised on the basis of three scenarios or outcomes that are equivalent to G1, G1+G2 and G1+G2+G3.</p>
<p>G2</p>	<p>Quantities associated with a known deposit that can be estimated with a moderate level of confidence.</p>	
<p>G3</p>	<p>Quantities associated with a known deposit that can be estimated with a low level of confidence.</p>	
<p>G4</p>	<p>Estimated quantities associated with a potential deposit, based primarily on indirect evidence.</p>	<p>Quantities that are estimated during the exploration phase are subject to a substantial range of uncertainty as well as a major risk that no development project or mining operation may subsequently be implemented to extract the estimated quantities. Where a single estimate is provided, it should be the expected outcome but, where possible, a full range of uncertainty in the size of the potential deposit should be documented (e.g. in the form of a probability distribution). In addition, it is recommended that the chance (probability) that the potential deposit will become a deposit of any commercial significance is also documented.</p>

F-Axis Categories and Definitions



Category	Definition	Supporting Explanation
F1	Feasibility of extraction by a defined development project or mining operation has been confirmed.	Extraction is currently taking place; or, implementation of the development project or mining operation is underway; or, sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a defined development project or mining operation.
F2	Feasibility of extraction by a defined development project or mining operation is subject to further evaluation.	Preliminary studies demonstrate the existence of a deposit in such form, quality and quantity that the feasibility of extraction by a defined (at least in broad terms) development project or mining operation can be evaluated. Further data acquisition and/or studies may be required to confirm the feasibility of extraction.
F3	Feasibility of extraction by a defined development project or mining operation cannot be evaluated due to limited technical data.	Very preliminary studies (e.g. during the exploration phase), which may be based on a defined (at least in conceptual terms) development project or mining operation, indicate the need for further data acquisition in order to confirm the existence of a deposit in such form, quality and quantity that the feasibility of extraction can be evaluated.
F4	No development project or mining operation has been identified.	In situ (in-place) quantities that will not be extracted by any currently defined development project or mining operation.



Category	Definition ^b	Supporting Explanation ^c
E1	Extraction and sale has been confirmed to be economically viable. ^d	Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions. All necessary approvals/contracts have been confirmed or there are reasonable expectations that all such approvals/contracts will be obtained within a reasonable timeframe. Economic viability is not affected by short-term adverse market conditions provided that longer-term forecasts remain positive.
E2	Extraction and sale is expected to become economically viable in the foreseeable future. ^d	Extraction and sale has not yet been confirmed to be economic but, on the basis of realistic assumptions of future market conditions, there are reasonable prospects for economic extraction and sale in the foreseeable future.
E3	Extraction and sale is not expected to become economically viable in the foreseeable future or evaluation is at too early a stage to determine economic viability. ^d	On the basis of realistic assumptions of future market conditions, it is currently considered that there are not reasonable prospects for economic extraction and sale in the foreseeable future; or, economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase). Also included are quantities that are forecast to be extracted, but which will not be available for sale.

E-Axis sub-Categories and Definitions



Category	Sub-Category	Sub-Category Definition
E1	E1.1	Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions.
	E1.2	Extraction and sale is not economic on the basis of current market conditions and realistic assumptions of future market conditions, but is made viable through government subsidies and/or other considerations.
E2	No sub-categories defined	
E3	E3.1	Quantities that are forecast to be extracted, but which will not be available for sale.
	E3.2	Economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase).
	E3.3	On the basis of realistic assumptions of future market conditions, it is currently considered that there are not reasonable prospects for economic extraction and sale in the foreseeable future.

F-Axis sub-Categories and Definitions



F1	F1.1	Extraction is currently taking place.
	F1.2	Capital funds have been committed and implementation of the development project or mining operation is underway.
	F1.3	Sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a defined development project or mining operation.
F2	F2.1	Project activities are ongoing to justify development in the foreseeable future.
	F2.2	Project activities are on hold and/or where justification as a commercial development may be subject to significant delay.
	F2.3	There are no current plans to develop or to acquire additional data at the time due to limited potential.



	F1.1	F1.2	F1.3	F2.1	F2.2	F2.3	F3.1	F3.2	F3.3	F4
E1.1	1	2	3	4						
E1.2	1	2	3							
E2			4	4	5					
E3.1	12	12	12	12	12	12				
E3.2			6	6	6		8	9	10	
E3.3			7	7	7	7				11

key	UNFC Class
1	Producing
2	Dev Approved
3	Dev Justified
4	Potential Commercial Projects
5	Dev on Hold
6	Dev Unclear
7	Dev Unviable
11	Unrecoverable
8	Prospect
9	Lead
10	Play
11	Unrecoverable
12	Defined in alternate system

