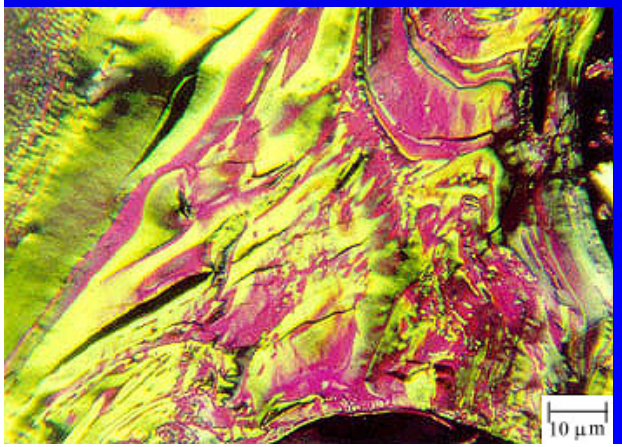
COAL COST REDUCTION USING LOW RANK COALS

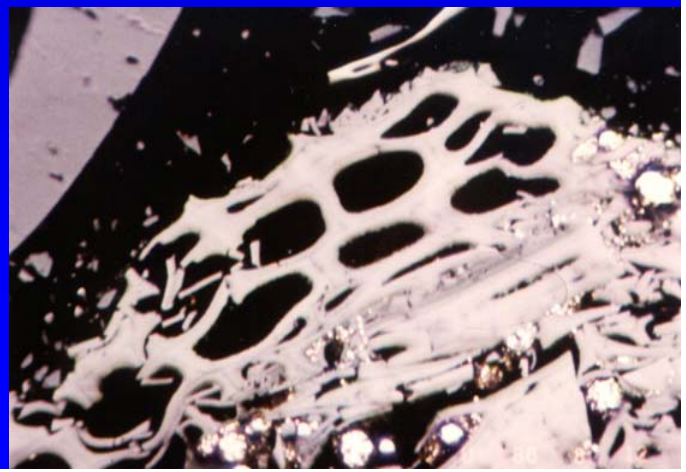
Hardarshan S. Valia

Coal Science Inc., Highland, IN, U.S.A.

Hvalia@comnetcom.net

(Shortened Version of AIST2005 Presentation for CCTR)





OBJECTIVE

To emphasize the significance of

LOW RANK - LOW COST COALS

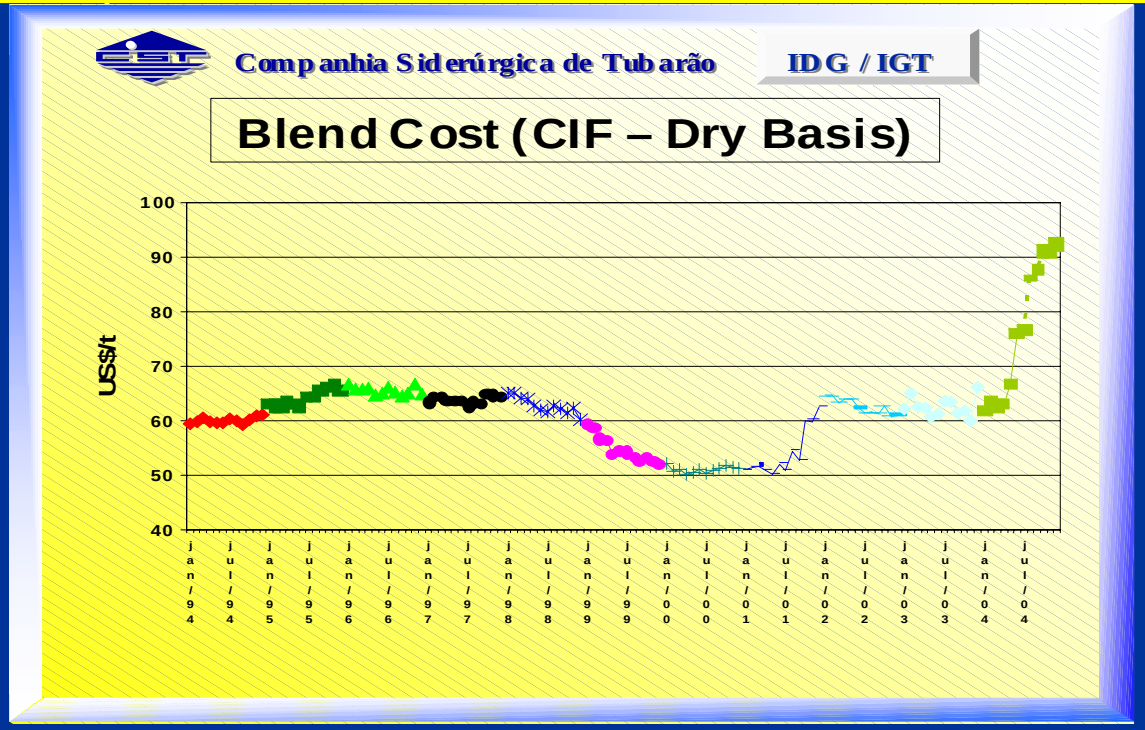
for coke-making during current coal crisis

GENERALIZED COAL PRICE INCREASE 2005 versus 2004

Australian Coal	U.S. Coal
↓	↓
120% Increase	100% Increase

INCREASED COAL BLEND COSTS

BLEND COST (CIF,db) - A.A.R.Ferreira, L.A.de Andrade, M.T.Alves, O.J.da Silva - ABM 2nd Intl Mtg on Ironmaking,Brazil,2004.



PARTIAL RELIEF

Introduce Low Rank - Low Cost coals

and optimize their use in the blend

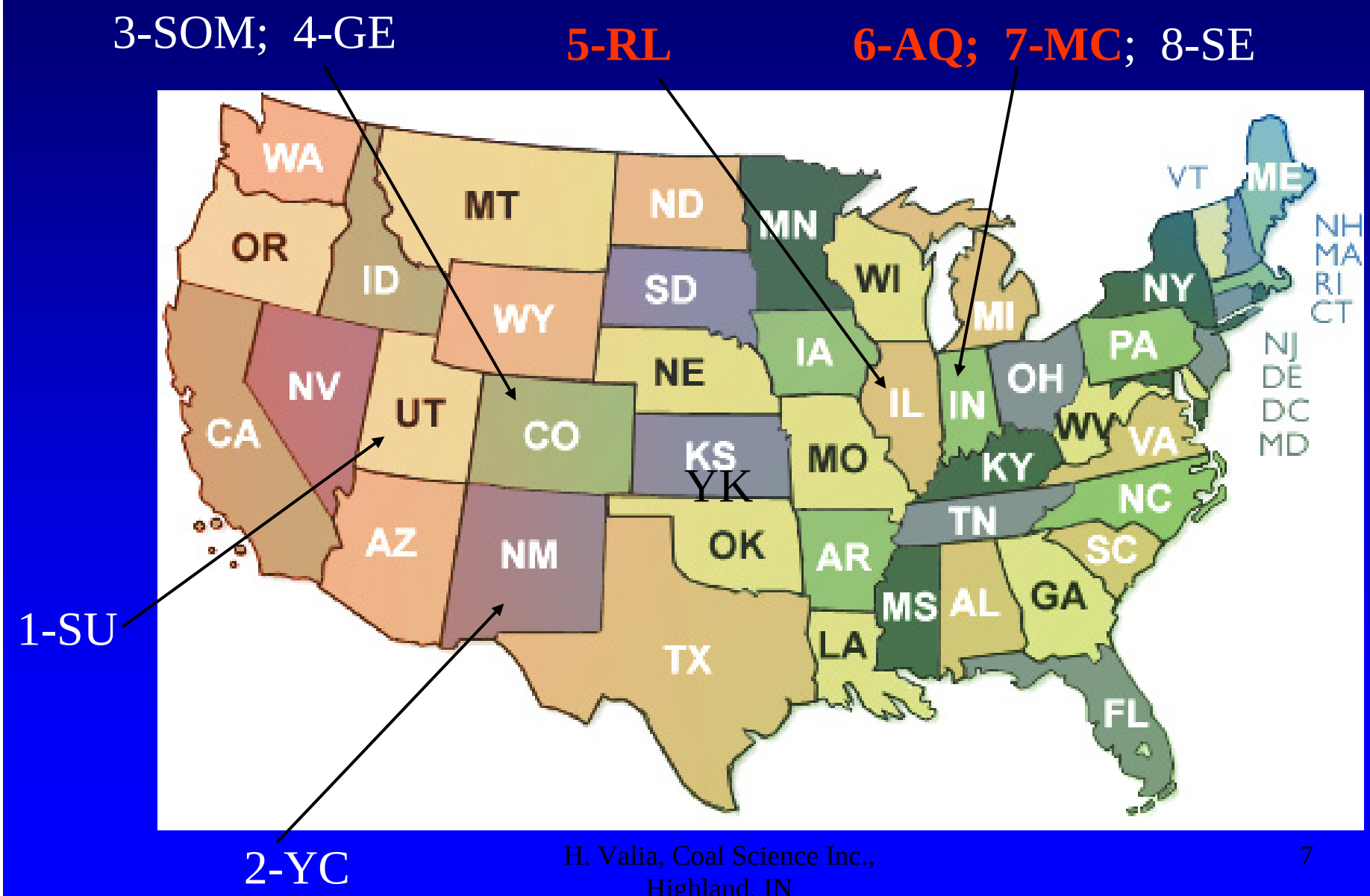
DEFINITION

Poor Coking Coals*	Poor Coking Coals**
Roga Index < 45	Rom = 0.68% - 0.85%
FSI <4	FSI <6

* Colin Ward

** Schapiro & Gray

EIGHT LOW RANK COALS ANALYZED



SELECTED QUALITY PARAMETERS OF LOW RANK COALS FROM WESTERN & MID WESTERN STATES

	1SU	2YC	3SOM	4GE	5RL	6AQ	7MC	8SE
Rom	0.73	0.77	0.68	0.83	0.65	0.59	0.63	0.56
VM	39.7	38.8	37.8	36.8	35.8	36.5	37	37.5
FSI	5.5	6.5	3.5	6.0	2.0	2.0	4.0	1.5
M.F.	47	29844	3	30000	3	5	24	48
F.R.	66	98	45	109	41	53	54	64
P.CSR	45	62(38)	35(37)	60(56)	28(27)	35(30)	42(46)	50(48)

SLOT OVEN (PILOT-450 KG) RESULTS SHOWING SELECTED PARAMETERS FOR INDIVIDUAL COALS

	5RL	7MC	6AQ	2YC	4GE	3SOM
CSR	27	46	30	38	56	37
Stability	31	25	33	30	30	11
Hardness	71	65	69	59	70	58
Size,mm	49	58	55	69	66	29
Yield	68	60	67	71	74	66
Contraction*	-2.1	-10.10	-3.67	-18.5	-24	-14

* SHO Contraction @52,2%

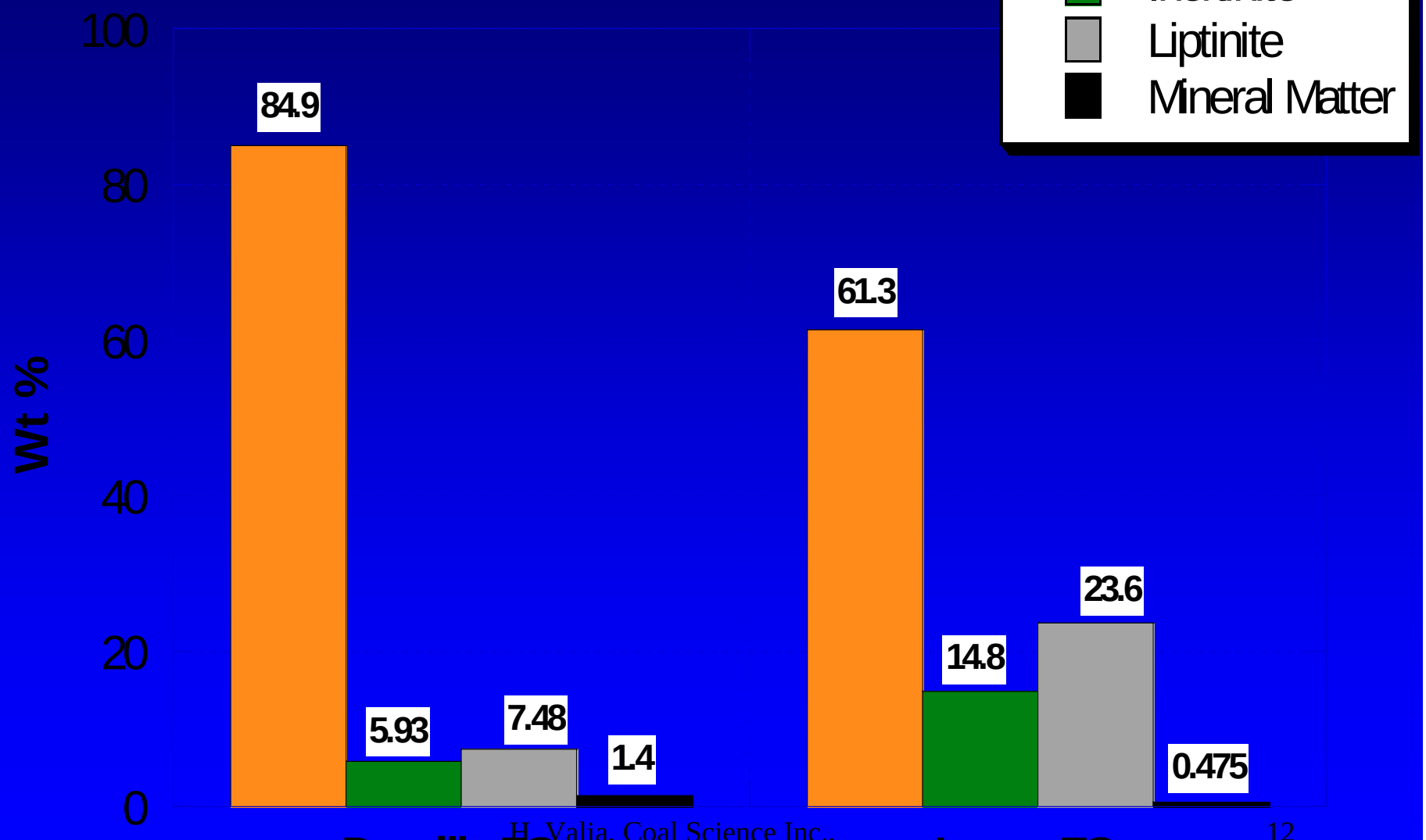
SLOT OVEN RESULTS FOR BLENDS

	TC1931	TC1933	TC1940	TC1941
CSR	61	68	57	65
CRI	30	22	32	24
Stability	61	60	58	63
Hardness	70	70	70	68
M.O.W.P,kPa	5.65	6.27	4.62	ND
SHO Contr.	-7.99	-9.57	-11.13	-10.14
Blend Comp:	30%IL	30%IND	45%IND	45%IN
	30%EHV	30%EHV	15%EHV	15%EH
	40%EMV	40%EMV	40%EMV	40WC

NON RECOVERY TEST RESULTS

	65%HVM 35%MVM/LVM (contains 12%Indy)	64%HVM 36%MVM/LVM
CSR	70	71
CRI	21	20
Stability	64	64
Hardness	70	72

Valia&Mastalerz, 2003)



POTENTIAL SAVINGS USING LOW RANK COAL AT A LARGE COKE PLANT

60% EHV	**30% IN/IL HV**	**Cost Diff.**	**Savings**
40% MVM	**30% EHV**	**A – B**	**@2MTPY**
	40% MVM		**Coal Usage**
$ A/t	**$ B/t**	**10$/t**	**20 Mill$/yr**

CONCLUSIONS

- Lower Rank Coals (ROM=0.5-0.83) possess varying degree of coke-making quality
- With proper blend design about 30% can be used in slot oven or Non Recovery ovens
- Coke quality is good to excellent and contraction values are high

CONCLUSIONS (continued)

- Abnormally high coking properties in some may be due to the presence of higher exinitic components
- These coals command lower price than the good steam coals of higher heating value
- Coal crisis time demands that to lower the coke making cost, these coals should be included in the blend