

VRG Monitoring Tools for Oilfield Related Assets

As part of our appraisal practice, evaluating wholesale and distribution inventories of all types for the asset-based lending community, we are encountering an upsurge in collateral-based loans secured by oilfield assets. The economic drivers are easily enough understood -- \$60 + a barrel, and all of the vagaries that impact the value of the infrastructures upon which our client base maintains in its various portfolios.

In the late 1970's and early 1980's, the practices prevailing in the lending climate in almost every way paralleled what we are seeing now – a plethora of loans, both secured and unsecured, whose underlying premise was an unabated appetite for the assets needed for continual drilling of oil and gas wells.

The fallout of the relative ease in which collateral-based loans were secured in this prior climate was, of course, liquidation of assets that had been neither correctly valued, nor monitored. In the late 1980's, it was not uncommon for oilfield assets to be liquidated for, literally, pennies on their “appraised” values. More common among our clients who have observed both the old and the current market conditions is a “here we go again” approach to consideration of these assets.

As both appraisers and liquidators in the last cycle and in preparation for the next, we have created a set of monitoring tools that will, at the very least, provide our client base a method of monitoring the value of this type of collateral.

SOFTWARE ENHANCEMENTS & ON-LINE LIQUIDATIONS

The development of these new software tools allows for a more precise analysis of this type of collateral in extremely large data sets and bears no resemblance whatsoever to the tools available in the last cycle. As with most markets since that time, there has been a great deal of consolidation that has drastically changed the liquidation environment, limited the number of potential buyers, and altered the general sales landscape. The movement to on-line liquidations is affecting this landscape in far-reaching, but unexpected ways.

VRG routinely monitors virtually every auction sale of significance conducted in the oil patch. For certain assets, however, particularly tubular goods, we have noticed a marked trend toward on-line liquidations. At least in the initial offering stages, this is more often the most cost efficient means of exposing assets to the general market; this method applies even to those items that ultimately move into traditional auctions.

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VRG DISTRIBUTION INDEX

Consider as an example the tubular market: drill pipe, tubing, casing, and even down-hole equipment such as the broad spectrum of “fishing tools”. Due to the extremely complex nature of the oilfield tubular market, as well as the absence of a universally agreed upon set of valuation tools for market pricing, **Value Resource Group, Inc.** has developed a Price Index from all of its sources, which is referred to as the **VRG Distribution Index**.

Information provided by a valuation prospect for a tubing inventory will be more in depth and compact than the information provided for a casing inventory. Where available, we will utilize internal and external information gained from the market and post it accordingly. Our sourcing includes, but is not limited to: other pipe appraisals in which we had new pricing by grade; auction sales from every major auction conducted over the past year; web sites such as Pipe Logix, an industry “blue book” for new prices; and discussions with tubular contacts we have developed over the last twenty years. Consideration of the price of both domestic and import steel of the types and grades from which OCTG tubulars are made is also factored in, where applicable.

SAMPLE LISTING BY GRADE (SEGREGATED INTO VALUATION GROUP)

VRG Tubing Grade by Group:

Group 1	Group 2	Group 3	Group 4
J-55	13CR-80 13CR-85 C-75 L-80 N-80	13CR-110 P105 P110	C-95 T-95 13CR-95

VRG Casing Grade by Group:

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7 (Unidentified)
H40	13CR-L-80	C-90	13CR-110	Q125	C-95	AC95
J55	13CR-80	FSS-95	P110		T-95	BC-90
K55	13CR-85	USS 95			T-95 MIXED	CF-95
13CR	L-80	S95			13CR-95	KO-95
MIXED	N80 MIXED	13CRS95			C-100	M-80
	N-80				C-110	M-95
	C-75					NK-140
	N-80 6.250					NT-CRS-110

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VALUATION FACTORS

Where information is not precisely available, we use our proprietary system to create a Price Index founded on the average price for the lowest grade of tubing or casing, adjusted incrementally for each successive grade. Because the casing information is generally so diffuse and the market information so inconsistent, we apply our tubing index principles to the casing inventory, except for grades not defined by API or where no direct correlation could be made to an API defined grade. Once a distributor index price is established, we next apply the values based on inventory type; condition; banding codes (red band, yellow band, et. al.); grade, new versus used, and any proprietary threads; chrome coating deep well; or any other inflationary or depreciable conditions that could affect value, with adjustments made for factors such as:

- high degree of specialization, such as odd or defaced threading, with little, if any, alternative use;
- fluctuation of historic resale value, generally based on grade; tremendously over the prior eighteen-month period;
- industry economics, which in the OCTG market have changed physical location;
- overall actual, assumed, or observed appearance of condition;
- total psychological appeal, based on quantities to be absorbed;
- quantities and desirability of mix;
- specific obsolescence, where identified;
- possible draw for remarketing through all “causes and effects” associated with the applied value concept (marketability); and
- a determination of which portion of the subject inventory is used or new, as it applies to prior in-ground usage. In the case of most OCTG inventory valuations, separate adjustments have been made for both new and used, utilizing any internal classification; banding colorations will be observed and noted by the appraisers.

Once factors such as these are addressed, a review and analysis of the subject inventory is accomplished to establish mix, so that a more accurate estimate of the percentage of return could be ascertained for each segment or class. The appraiser's recovery is typically based upon **Value Resource Group, Inc.'s** internally developed

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VALUATION FACTORS (CONTD.)

VRG Distribution Index for tubular goods. Once this index price is established, the proper percentage from Index to Value can be calculated.

AMERICAN PETROLEUM INSTITUTE GRADING

Although this system is theoretically voluntary, the American Petroleum Institute Grading System (API) is by far the most accepted method of separating tubular inventories by condition. This system consists of painted, colored bands placed at the ends of each joint of tube or casing.

COLOR BANDING EXAMPLES



GRADING SYSTEM

Used Tubing/Casing	New Tubing/Casing (and Plain End Drill Pipe)	Used Drill Pipe
*Yellow Band: 0-15% body wall reduction (85% min. remaining)	*White Band: suitable for all inspections performed (incl. min. 87.5% body wall).	Double White Band (Premium): 80% minimum wall remaining
*Blue Band: 16-30% body wall reduction (70% min. remaining)	*Yellow Band: Repairable reject. 87.5% body wall remaining after repair. Locate bands on either side and circle around defect.	Yellow Band: 70% to 80% (min.) of nominal wall remaining.
*Green Band: 31-50% body wall reduction (50% min. remaining)	*Blue Band: Imperfections of undetermined depth. Identified as above.	Orange Band: <70% (min.) of nominal wall remaining.
*Red Band: 50%+ body wall reduction (<50% remaining)	*Red Band: Defective length. Identified as above. Body wall defects must be cut out of tube.	Red Band: Any tube with a hole or a fatigue crack.

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AMERICAN PETROLEUM INSTITUTE GRADING (CONTD.)

Used Tubing/Casing	New Tubing/Casing (and Plain End Drill Pipe)	Used Drill Pipe
Damaged pin or box ends marked with red bands next to pin or on coupling	Damaged pin or box ends marked with red bands next to pin or on coupling	Tool joint classification color bands appear on the pin or box. Shoulder condition color codes are adjacent to the threads.
Drift restrictions indicated by green bands on either side of restriction and another next to body wall color band near box	Drift restrictions indicated by red bands on either side of restriction - just like other defects.	N/A
*Bands on tube body next to box end or coupling	Tube classification bands appear in same location (box end) as on used material.	Tube classification color bands appear next to the pin

TUBING & CASING STANDARD USES

API J55: General purpose pipe manufactured to API specification 5CT. Similar to K55 except the minimum tensile strength is lower. Usually, this grade is used in tubing applications.

API H40: General purpose pipe manufactured to API specification 5CT.

API K55: General purpose pipe manufactured to API specification 5CT. Usually, this grade is used in casing applications.

USS FS80: A quenched and tempered proprietary USS casing grade for high collapse applications. Inspections are the same as for API K55 with hardness testing to the requirements of API L80. Collapse testing is required for each heat and/or lot.

USS C75: A proprietary USS tubing and casing grade established when API removed C75 from the 5CT specification. Inspection and processing are in accordance with API grade L80.

API L80: Manufactured to API specification 5CT. This is a controlled yield strength material with a hardness testing requirement. L80 is usually used in wells with sour (H₂S) environments.

API N80 (or N80 Q&T): General purpose pipe manufactured to API specification 5CT.

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TUBING & CASING STANDARD USES (CONTD.)

API Normalized: A lower cost alternative to standard Quench and Tempered API N80 (walls less than 0.500 inch). Inspection, testing, and dimensions are in accordance with API 5CT for grade N80. Charpy v-notch impact test absorbed energy results meet API SR16 and are lower than Quench and Tempered N80.

GT-80S: A proprietary controlled yield strength USS grade generally for use in more severe sour service wells. Inspection, testing, and dimensions are in accordance with API L80. NACE (SSC), Method A, qualification testing is required to meet a threshold stress of 90% of specified minimum yield strength. API C90 couplings are used on threaded and coupled products.

USS FSS-95: A proprietary controlled yield strength USS grade for high collapse applications. Frequency of testing, inspection requirements and dimensional tolerances of API L80, and with the exception of collapse, performance properties are based on formulae in API Bulletin 5C3. Collapse testing is required for each heat and/or lot.

API C90: API controlled yield strength grade generally for use in sour condensate wells. Extensive hardness testing is required along with SSCC testing per NACE Standard TM-0177, Method A. The minimum threshold stress required is 80% of specified minimum yield strength.

USS C90: Proprietary restricted yield strength USS grade for use in sour condensate wells. Resistance to sulfide stress cracking is achieved by precise controls of chemical composition, heat treatment, and hardness levels. Inspection requirements and dimensional tolerances are in accordance with API 5CT for grade C90. Performance properties are the same as for API grade C90.

Hardness testing is conducted as required for API C90, with the exception of frequency (Casing and Non-Upset Tubing - First and last and every tenth joint in between, Upset Tubing - First and last and every 25th joint in between). To reduce order lead time, sulphide stress corrosion cracking (SSCC) testing is not required for every order. If required by the customer, SSCC testing can be performed to USS Standard Mill Practice P-1004 (NACE Standard TM-0177, Method A) with a guaranteed minimum threshold stress of 85% specified minimum yield strength.

USS SC90: Proprietary restricted yield strength USS grade for use in sour condensate wells. This product is the same as USS C90 except impact testing is required and hardness testing is done on each end of each joint for casing and non-upset tubing.
USS-95

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TUBING & CASING STANDARD USES (CONTD.)

USS-95: Proprietary USS grade for high collapse applications. Inspection, testing, and dimensional tolerances are as required for API 5CT Group 3 (P110) material. With the exception of collapse, performance properties are based on formulae in API Bulletin 5C3 (The 110,000 psi minimum yield strength is an internal control requirement and guaranteed performance properties are based on 95,000 psi minimum yield strength). Collapse testing is required for each heat and/or lot.

USS C95: Proprietary restricted yield strength USS grade for use in sour condensate wells. Resistance to sulfide stress cracking is achieved by precise controls of chemical composition, heat treatment, and hardness levels. Inspection requirements and dimensional tolerances are in accordance with API 5CT for grade T95. Performance properties are the same as for API grade T95.

Hardness testing is conducted as required for API T95, with the exception of frequency (Casing and Non-Upset Tubing - First and last and every tenth joint in between, Upset Tubing - First and last and every 25th joint in between). To reduce order lead time, sulphide stress corrosion cracking (SSCC) testing is not required for every order. If required by the customer, SSCC testing can be performed to USS Standard Mill Practice P-1004 (NACE Standard TM-0177, Method A) with a guaranteed minimum threshold stress of 85% specified minimum yield strength.

API C95: API grade with the same strength range as T95 and USS C95, but without a hardness requirement. This grade is not generally considered for use in sour condensate wells since no hardness restrictions or testing is required and no SSCC testing is required.

API T95: API controlled yield strength grade, the same as API C95 and USS C95. Generally for use in sour condensate wells. Extensive hardness testing is required along with SSCC testing per NACE Standard TM-0177, Method A. The minimum threshold stress required is 80% of specified minimum yield strength.

API P110: API grade for general use in deep wells. This grade is not generally considered suitable for sour condensate wells.

USS C100: A proprietary controlled yield strength USS grade generally for use in deep sour service wells. Inspection, testing, and dimensions are in accordance with API 5CT C90 and T95. NACE (SSC), Method A, testing is required for each heat to meet a threshold stress of 85% of specified minimum yield strength.

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TUBING & CASING STANDARD USES (CONTD.)

USS C110: A proprietary controlled yield strength USS grade generally for use in deeper sour condensate wells. Inspection, testing, and dimensions are in accordance with API T95. SSCC testing is required for each heat to meet a threshold stress of 85% of specified minimum yield strength.

API Q125: API grade for deep well service, not generally for use in sour condensate wells. Quadrant hardness testing is required without any specified limits other than the variation between readings. Impact testing is required for each heat and/or lot. NDT inspection is required with two methods of inspection (Typically EMI and UT are performed on this product).

USS-125: Proprietary USS grade for use in deep well applications. This grade is a lower cost alternative to API Q125 because two NDT inspections and hardness/impact testing are not required. Dimension and inspection requirements are in accordance with API 5CT Group 3 material.

USS-140: Proprietary USS grade for use in deep well applications. Dimensions and inspection are in accordance with API 5CT Group 3 requirements.

V150: Proprietary USS grade for use in deep well applications. Dimensions and inspection are in accordance with API 5CT Group 3 requirements.

TUBING & CASING COMMON SIZES

Tubing:

O. D. Sizes	Weight/Ft. (EUE)	Wall Thickness	I. D.	Normal Drift	Alternate Normal Hydro-Test Pressure J or K	Alternate Normal Hydro-Test Pressure N-80
2-3/8" (2.375)	4.70 lb.	0.190	2.00	1.901	7,000 psi	10,000 psi
2-7/8" (2.875)	6.50 lb.	0.217	2.44	2.347	6,600 psi	9,700 psi
3-1/2" (3.500)	9.30 lb.	0.254	2.99	2.867	6,400 psi	9,300 psi

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TUBING & CASING COMMON SIZES (CONTD.)

Casing:

O. D. Sizes	Weight/Ft. (EUE)	Wall Thickness	I. D.	Normal Drift	Alternate Normal Hydro-Test Pressure J or K	Alternate Normal Hydro-Test Pressure N-80
4-1/2" (4.500)	9.50 lb.	0.205	4.09	3.965	4,000 psi	
4-1/2" (4.500)	10.50 lb.	0.224	4.05	3.927	4,400 psi	
4-1/2" (4.500)	11.60 lb.	0.250	4.00	3.875	4,900 psi	7,100 psi
5-1/2" (5.500)	14.00 lb.	0.244	5.01	4.887	3,900 psi	
5-1/2" (5.500)	15.50 lb.	0.275	4.95	4.825	4,400 psi	
5-1/2" (5.500)	17.00 lb.	0.304	4.89	4.767	4,900 psi	7,100 psi
8-5/8 (8.625)	24.00 lb.	0.264	8.10	7.972	2,700 psi	
9.5/8" (9.625)	36.00 lb.	0.352	8.92	8.765	3,200 psi	

Code Key:

EUE:	External Upset Ends
API:	American Petroleum Institute
PE:	Plain End
LTC or LT&C:	Long Thread & Coupling
STC or ST&C:	Short Thread & Coupling
PERC:	Plain End Roller Cut
PESC:	Plain End Square Cut, Machine Cut, or Saw Cut

TUBING, LINE PIPE, & CASING EXAMPLES

TUBING:



3465ft (110jts) 2-3/8in Chrome Tubing, 5.80#, Chrome L-80, w/ Mannesmann TDS Connections, R-2

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TUBING, LINE PIPE, & CASING EXAMPLES (CONTD.)



(Approx 7066ft) 1-1/4in Coiled Tubing, 0.110in Outer Wrap WT, 0.148in Bed Wrap WT, (Wall thicknesses are backwards on reel), 112in Spool Size, CGU 22-14, QTI# 27792, STR# Q27792

LINE PIPE:



Line Pipe, 20in to 36in, 0.282in WT to 0.60in WT, 71.5# to 2227.06#, FBE, Bare or Tape Wrapped, 64jts, Unused



Line Pipe, 6in, 41.14# & 45.39#, 0.719in WT, X-65, Bare/FBE, Plain End, 7985ft / 204jts, Unused

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TUBING, LINE PIPE, & CASING EXAMPLES (CONTD.)

CASING:



Casing, 5in to 30in, 18.0# to 234.0#, J-55 to Q-125, Assorted Connections, 5279ft / 122jts, Unused, w/Inspection Reports & MTRs

TUBING & CASING CONNECTIONS

Tubing:

Pipe Size	Cplg. Length, In.			Cplg. O.D., In.						Cplg. Weight, Lbs.			Cplg. "J" Factor, In.			Make-up Loss Multiplication Factors					
				EUE		NUE		BTC								EUE		NUE		BTC	
	EUE	NUE	BTC	Reg	SpCI	Reg	SpCI	Reg	SpCI	EUE	NUE	BTC	EUE	NUE	BTC	R1	R2	R1	R2	R1	R2
2-3/8	4.875	4.250	8.500	3.063	2.910	2.875	2.875	2.70		3.42	2.82	5.46	2.938	2.625	4.750	1.0073	1.0054	1.0062	1.0045	1.0161	1.0107
2-7/8	5.250	5.125	8.500	3.668	3.460	3.500	3.500	3.22		5.27	5.15	8.14	3.125	3.063	4.750	1.0080	1.0059	1.0078	1.0058	1.0161	1.0107
3-1/2	5.750	5.625	8.500	4.500	4.180	4.250	4.250	3.87		9.02	8.17	11.74	3.375	3.313	4.750	1.0090	1.0066	1.0087	1.0065	1.0161	1.0107
4	6.000	5.750	9.000	5.000		4.750	4.750	4.40		10.62	9.57	14.17	3.500	3.375	5.000	1.0095	1.0070	1.0090	1.0066	1.0172	1.0114
4-1/2	6.250	6.125	9.500	5.563		5.200	5.200	4.92		13.31	10.76	15.72	3.625	3.563	5.250	1.0099	1.0074	1.0097	1.0072	1.0183	1.0121

Casing:

Pipe Size	Cplg. Length, In.			Cplg. O.D., In.			Cplg. Weight, Lbs.			Cplg. "J" Factor, In.			Make-up Loss Multiplication Factors					
				STC	BTC								STC		BTC	STC		LTC
	STC	LTC	BTC	LTC	Reg	SpCI	STC	LTC	BTC	STC	LTC	BTC	R2	R3	R2	R3	R2	R3
4-1/2	6.250	7.000	8.875	5.000	5.000	4.875	8.05	9.07	10.11	3.625	4.000	4.938	1.0073	1.0055	1.0083	1.0062	1.0109	1.0082
5	6.500	7.750	9.125	5.563	5.563	5.375	10.18	12.56	12.99	3.750	4.375	5.063	1.0076	1.0057	1.0094	1.0070	1.0113	1.0085
5-1/2	6.750	8.000	9.250	6.050	6.050	5.875	11.44	14.03	14.14	3.875	4.500	5.125	1.0080	1.0060	1.0097	1.0073	1.0114	1.0086
5-3/4			9.375			6.375						5.188					1.0116	1.0087
6-5/8	7.250	8.750	9.625	7.390	7.390	7.000	19.97	24.82	24.46	4.125	4.875	5.313	1.0087	1.0065	1.0108	1.0081	1.0120	1.0090
7	7.250	9.000	10.000	7.656	7.656	7.375	18.34	23.67	23.22	4.125	5.000	5.500	1.0087	1.0065	1.0111	1.0083	1.0125	1.0094
7-5/8	7.500	9.250	10.375	8.500	8.500	8.125	26.93	34.23	34.84	4.250	5.125	5.688	1.0090	1.0068	1.0115	1.0086	1.0130	1.0098
8-5/8	7.750	10.000	10.625	9.625	9.625	9.125	35.58	47.48	45.94	4.375	5.500	5.813	1.0094	1.0070	1.0125	1.0094	1.0134	1.0100
9-5/8	7.750	10.500	10.625	10.625	10.625	10.125	39.51	55.77	50.99	4.375	5.750	5.813	1.0094	1.0070	1.0132	1.0099	1.0134	1.0100
10-3/4	8.000		10.625	11.750	11.750	11.250	45.53		56.68	4.500		5.813	1.0097	1.0073			1.0134	1.0100
11-3/4	8.000		10.625	12.750	12.750		49.61		61.74	4.500		5.813	1.0097	1.0073			1.0134	1.0100
13-3/8	8.000		10.625	14.375	14.375		56.23		69.95	4.500		5.813	1.0097	1.0073			1.0134	1.0100
16	9.000		10.625	17.000	17.000		78.98		87.56	5.000		5.813	1.0111	1.0083			1.0134	1.0100
18-5/8	9.000		10.625	20.000	20.000		118.94		138.03	5.000		5.813	1.0111	1.0083			1.0134	1.0100
20	9.000	11.500	10.625	21.000	21.000		98.25		110.33	5.000	6.250	5.813	1.0111	1.0083			1.0134	1.0100

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TUBING & CASING CONNECTION DEFINITIONS

Casing Connection CP-6: The CP-6 utilizes a durable integral joint connection, which is good where high torque is required. Multiple torque shoulders allow this connection to be made up several times and used in high torque applications with minimal fear of damage to the threads. The flush I.D. also helps keep turbulence to a minimum during high flow rates.

Tubing Connection CP-3SS: This is an integral joint connection with a seal ring for additional protection against corrosion. The result is a flush I.D. to help minimize turbulence and provide additional protection against corrosion. A large upper torque shoulder allows this connection to be used in high torque applications.

Flush Joint Connection SJ-2: The SJ-2 has a flush O.D. to ensure maximum clearance. The connection stabs easily, which helps minimize galling. This is a durable connection that can maintain its integrity after being made up several times. It has a seal ring that can easily be serviced in the field if necessary.

Flush Joint Connection SJ-3: The SJ-3 thread design is a flush O.D. connection that provides maximum dependability. Testing has shown that this connection has better performance data than many similar connections with a seal ring due to its new design that eliminates the need for a seal ring.

Casing Connection CP-4S: The CP-4S connection is a coupling connection with a seal ring. It has a flush I.D. design, which maximizes performance in corrosive, high temperature and high pressure applications.

Tubing Connection CP-4S: The CP-4S tubing connection is a coupling connection that has the same design as the CP-4S casing connection. Like the casing connection it too has a metal-to-metal pin nose and radial flank seal to ensure durability and reliability in extreme conditions.

Triple seal Connection CP-TS: The CP-TS coupling connection utilizes three sealing areas to help ensure integrity. This connection is recommended for all steel grades and can be used with materials with high yield strengths. This connection provides greater strength than formed connections for applications in deep wells.

Triple seal Integral Joint Connection CP-TS: The CP-TS integral joint connection utilizes three sealing areas to help ensure a good seal. It is designed for extreme service conditions where high pressure and strength are necessary. The elimination of the casing coupling reduces the number of potential leak paths by 1 at every connection. The seal placement ensures a tight seal if multiple runs are necessary.

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CURRENT SPOT PRICING

OCTG prices edged up 0.2% in April, as compared to March. ERW was up 0.4% and seamless was up 0.1%. Of the items that were monitored, there were nearly as many items advancing in price as there were for those which declined with none of them moving more than 2%.