

California Cascade: Woodland



1492 Churchill Downs
Woodland, CA 95776

California State Board of Equalization
Appeal Presentation
July 13, 2010

Overview of Presentation

● Timeline and History

- 1978-2000
 - Chromium Copper Arsenate (CCA)
 - Environmental Protection Agency
- 2001-2004
 - Research into Azoles, Borates and ACQ
 - Introduction of ACQ (First-Third Generations)
- 2001-Present
 - Development of Pre-Stain Line

Chromated Copper Arsenate

◉ CCA Knowns:

- Standard Treating Chemical and Process for 20+ Years
- (Percentage Solution Amounts; Treating Pressure; Treating Time; Moldecide Amounts; Incision Spacing; etc...)

◉ Redwood Stain and CCA

- With CCA, Redwood Stain could be combined into one step treating/staining process.

Azoles, Borates, ACQ

- Coming Environmental Protection Agency regulatory changes required investigation into alternative treating chemicals.
 - Azoles
 - Borates
 - Not a complete replacement for CCA because wood treated with Borates is limited to above-ground use only.
 - ACQ

Treating Area





Treating Cylinders (Retorts)



Treating Cylinder Input



Mixing Connection from Tanks to Retorts



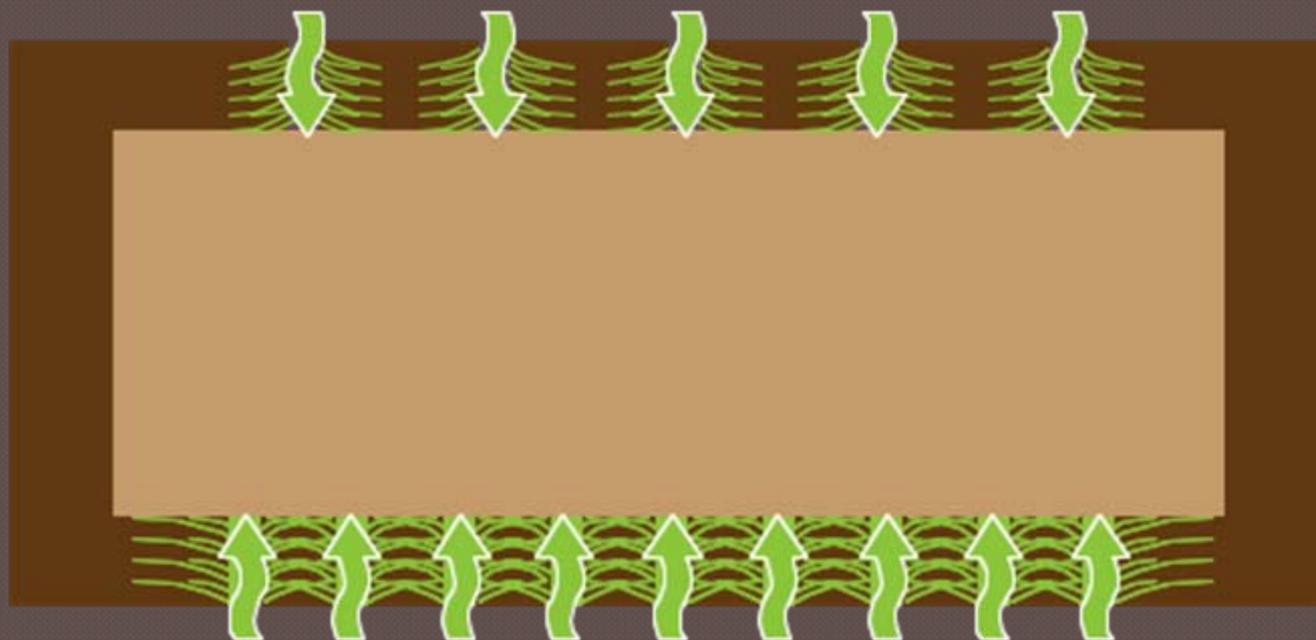
Treating Room

Development of ACQ Treatment Process

Alkaline Copper Quaternary (ACQ)

- **Alkaline Copper Quaternary is a non-arsenical pressure-treatment for use in residential, industrial and agricultural applications.**
- **Uses include protection against decay, rot and termites .**
- **Osmose, Inc., approached California Cascade with ACQ product it licensed from a third party.**

Problems Inherent with ACQ and Treating of Hardwood Species (Douglas Fir/Hem Fir)



- Due to larger micron size of ACQ compared to CCA, and the dense nature of the wood species treated by California Cascade, cross linkage of the treating chemical was not achievable using the process methods previously employed by California Cascade or used by others in the treatment of Southern Yellow Pine.

ACQ-First Generation

- ACQ was first introduced to California Cascade: Woodland by Osrose, Inc., in 2001.
- Based on prior usage with Southern Yellow Pine, it was thought was that ACQ could be substituted into California Cascade's existing Treating/Staining Process for Hem Fir and Douglas Fir.
- With the First Generation of ACQ, the one-step treating and staining process quickly revealed issues with:
 - Stain/Blackening
 - Mold
 - Lack of Required Penetration, Cross Linkage and Absorption

Stain/Blackening

Stain/Blackening:

- These redwood stained wood products represent more than half of California Cascade's total yearly sales.
- Prior to 2001, and the introduction of ACQ, the staining process at California Cascade was one and the same with the treating process.
- With ACQ, it was quickly determined that the redwood stain could no longer be mixed in the Treating Cylinders.



Stain/Blackening



Stain/Blackening (cont.)



Stain/Blackening (cont.)

Mold

Mold

- With introduction of the First Generation of ACQ, California Cascade also experienced mold embedded in two (2) million feet of lumber.
 - As a result of this mold, California Cascade had to pressure wash every inch of this lumber to eradicate the mold build-up.
 - The appearance of this especially formidable mold placed California Cascade in the position of having to completely modify its process to account for the introduction of additional moldicides.



Embedded Mold



Embedded Mold (cont.)



Embedded Mold (cont.)

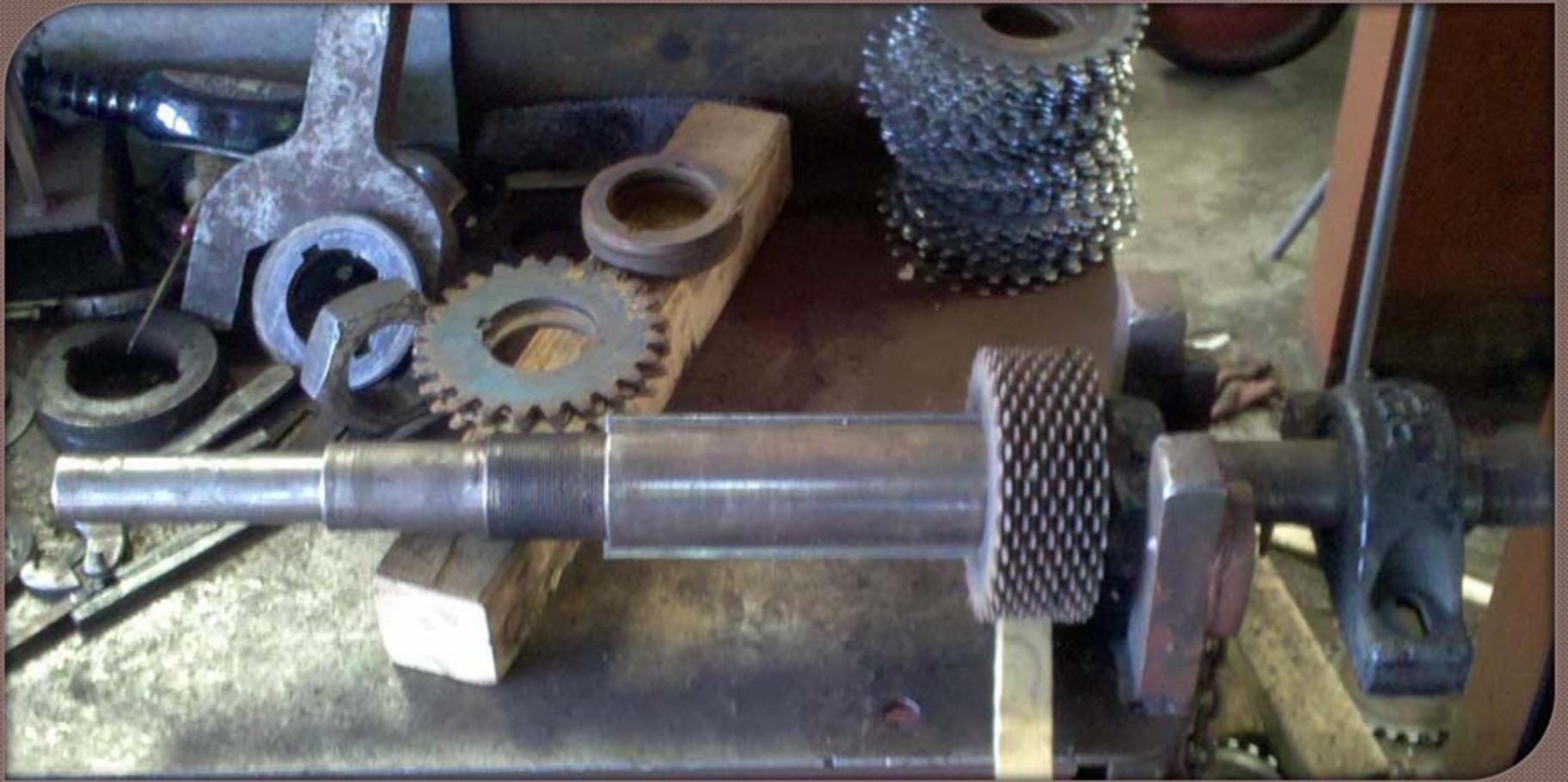
ACQ Penetration and Absorption

Penetration & Retention (Incisor)

- With CCA, California Cascade had all but perfected the process for achieving the required treating penetration, cross linkage and absorption.
- Specifically, the incision widths and pattern required for optimum absorption, cross linkage and retention of CCA had been set for years.
- Development of High Density Incisor
 - To address the penetration and retention issues, California Cascade had to completely redesign its incising equipment and tooling.



Development Area for High Density Incisor



Development Area for High Density Incisor (cont.)



High Density Incisor

Quality Control Laboratory

- In addition to development of the High Density Incisor, the introduction of ACQ also required a complete redesign of California Cascade's standard chemical treating process procedures.
- ACQ Unknowns:
 - Solution Percentages (ACQ, Water, Moldecide Levels, etc...); Treating Pressures; Treating Times; Treating Temperatures (Prior process worked at ambient temperatures).
- Scott Mace-Quality Control
 - Mr. Mace was charged with running tests to identify penetration and retention amounts for all ACQ process runs.
 - These test results were reviewed and analyzed by Mr. Mace, Mr. Galbraith, Mr. Molatore, Mr. Feenstra and others on the Treating Staff to evaluate solution mixture alternatives, revisions to pressure applications and temperature modifications.

Quality Control Laboratory



Testing Documentation/Test Borings

Plant No. : 1

Address

WESTERN WOOD TREATING
 1492 Churchill Downs Road
 Woodland, CA 95776
 PH: 530-666-1261
 Fax: 530-666-0171
 Unknown
 Unknown

Treatment : .40 NATURE WOOD CYL 2

Date : 6/29/2004 8:30:43AM

Chemical : ACQ

Target Retention : .40

Cylinder : 2 (16.771)

Tank : 2

Operator : MARK

Total Time : 3:50:24

Turn Around Time (min) : 251

Time/Date Off Drip Pad :

Total Cubic Ft : 1,730
 Total Treatable Cubic Ft : 1,730
 Displaced Volume In : 1,273
 Displaced Volume Out : 1,451
 Volume Start : 13,860
 Volume Finish : 12,166
 Volume Used : 1,694
 Penetration Sampled : 0
 Penetration Failed : 0
 Treat By Tally : True

Step	Time			Pressure			Injection			Retention			Flow Rate			Ramp	Time		Volume	Reason
	Min	Max	Act	Min	Max	Act	Min	Max	Act	Min	Max	Act	Min	Max	Act		Start	End		
Initial Vacuum	0	30	30	0	-24	-22	0.00	0.00	0.00	.00	.00	.00	0.00	0.00	0.00	0	8:30:43	9:00:45	13,919	Time
Fill	0	5	3	0	-24	35	0.00	0.00	1.97	.00	.00	.36	0.00	0.00	0.00	0	9:00:46	9:04:00	6,612	Full
Raise Press	0	0	0	0	35	36	0.00	0.00	1.99	.00	.00	.36	0.00	0.00	0.00	0	9:04:01	9:04:02	6,583	PSI
Pressure	0	180	180	0	180	140	0.00	3.00	2.76	.00	.00	.50	0.00	0.00	0.00	0	9:04:03	12:04:05	5,258	Time
Press Relief	0	1	1	20	20	20	0.00	0.00	2.71	.00	.00	.49	0.00	0.00	0.00	1	12:04:05	12:05:07	5,332	Time
Empty	0	6	3	0	0	0	0.00	0.00	1.51	.00	.00	.27	0.00	0.00	0.00	0	12:05:08	12:08:26	11,251	Empty
Final Vacuum	0	10	10	0	-24	-23	0.00	1.00	1.00	.00	.00	.18	0.00	0.00	0.02	0	12:08:26	12:18:27	12,125	Time
Final Empty	0	3	1	-1	-1	-1	0.00	0.00	0.98	.00	.00	.18	0.00	0.00	0.00	0	12:18:28	12:19:05	12,159	Empty
Finish	0	2	2	0	-1	1	0.00	0.00	0.98	.00	.00	.18	0.00	0.00	0.00	0	12:19:05	12:21:07	12,166	Time

Chemical	Solution Percent		Lbs. Per Gallon			Total Lbs.		Retention		Assay	
	Start	Finish	Start	Finish	Absorbed	Gauge	Absorbed	Gauge	Absorbed	Min Reten	Wood
ACQ	1.40 %	1.15 %	.1204	.0991	.2734	204	463	.118	.268	.210	-
Quat	.70 %	.70 %	.0602	.0600	.0616	102	104	.059	.060	.110	-
Totals :	2.10 %	1.85 %	.1806	.1591	.3350	306	568	.177	.328	.40	-

Additive List

Additives	Solution %
Mold	45 PPM

Automatic Mix Information

Chemical	Current Value	Target Value	Required	Actual	Difference
Water	Gals	- Gals	Gals	Gals	Gals
ACQ	%	1.40 %	Gals	Gals	Gals
Quat	%	.70 %	Gals	Gals	Gals
Mold	PPM	45 PPM	Ozs	Ozs	Ozs

1	DF2B4GI	Pieces: 64	Packs/Size: 4 @ 16	Desc: DOUG FIR #2/BTR S4S	BF: 5,120	CF: 569	HW: - %	Moist. Cont.: - %
	Std.: CCI	Mill: 07268	Cust Num: CCI	Order Num:	Retreat?: False	Chg#: 0	Rem1: D2404Q 4@16 4X12X20	
2	DF2B4GI	Pieces: 64	Packs/Size: 4 @ 16	Desc: DOUG FIR #2/BTR S4S	BF: 4,096	CF: 455	HW: - %	Moist. Cont.: - %
	Std.: CCI	Mill: 07268	Cust Num: CCI	Order Num:	Retreat?: False	Chg#: 0	Rem1: D2404Q 4@16 4X12X16	
3	DF2B4GI	Pieces: 96	Packs/Size: 4 @ 24	Desc: DOUG FIR #2/BTR S4S	BF: 4,096	CF: 271	HW: - %	Moist. Cont.: - %
	Std.: CCI	Mill: 07268	Cust Num: CCI	Order Num:	Retreat?: False	Chg#: 0	Rem1: D2404Q 4@24 4X8X16	
4	DF2B4GI	Pieces: 60	Packs/Size: 1 @ 60	Desc: DOUG FIR 2/BTR S4S	BF: 2,880	CF: 202	HW: - %	Moist. Cont.: - %
	Std.: CCI	Mill: 07268	Cust Num: CCI	Order Num:	Retreat?: False	Chg#: 0	Rem1: D2404Q 1@32&28 6X6X16	
5	DFSB4GI	Pieces: 240	Packs/Size: 5 @ 48	Desc: DOUG FIR STD/BTR S4S GRN	BF: 3,840	CF: 233	HW: - %	Moist. Cont.: - %
	Std.: CCI	Mill: 07268	Cust Num: CCI	Order Num:	Retreat?: False	Chg#: 0	Rem1: DS404Q 5@48 3X4X16	

Plant No. : 1

Address
 WESTERN WOOD TREATING
 1492 Churchill Downs Road
 Woodland, CA 95775
 PH: 530-666-1261
 Fax: 530-666-0171
 Unknown
 Unknown

Treatment : 40 NATURE WOOD CYL 1

Date : 7/22/2004 8:10:54AM

Chemical : ACQ

Target Retention : 40

Cylinder : 1 (12.900)

Tank : 1

Operator : MARK

Total Time : 3:55:34

Turn Around Time (min) : 532

Time/Date Off Drip Pad :

Total Cubic Ft : 802
 Total Treatable Cubic Ft : 802
 Displaced Volume In : 873
 Displaced Volume Out : 831
 Volume Start : 11,889
 Volume Finish : 10,764
 Volume Used : 1,125
 Penetration Sampled : 0
 Penetration Failed : 0
 Treat By Tally : True

Step	Time			Pressure			Injection			Retention			Flow Rate			Ramp	Time		Volume End	Reason
	Min	Max	Act	Min	Max	Act	Min	Max	Act	Min	Max	Act	Min	Max	Act		Start	End		
Initial Vacuum	0	30	30	0	-20	-18	0.00	0.00	0.00	.00	.00	.00	0.00	0.00	0.00	0	8:10:53	8:40:56	11,889	Time
Fill	0	5	4	0	-20	10	0.00	0.00	0.00	.00	.00	.00	0.00	0.00	0.00	0	8:40:57	8:44:59	5,520	Full
Raise Press	0	0	1	0	75	75	0.00	0.00	0.37	.00	.00	.07	0.00	0.00	0.90	0	8:44:59	8:45:59	4,697	PSI
Pressure	0	180	180	0	140	118	0.00	2.50	1.57	.00	.00	.28	0.00	0.00	0.00	0	8:45:59	11:46:00	3,731	Time
Press Relief	0	1	2	20	20	20	0.00	0.00	1.39	.00	.00	.25	0.00	0.00	0.00	1	11:46:01	11:47:54	3,878	Time
Empty	0	6	6	0	0	2	0.00	0.00	1.65	.00	.00	.30	0.00	0.00	0.00	0	11:47:54	11:53:56	10,564	Time
Final Vacuum	0	10	10	0	-22	-19	0.00	1.00	1.42	.00	.00	.26	0.00	0.00	0.01	0	11:53:56	12:03:58	10,753	Time
Final Empty	0	3	0	-1	-1	0	0.00	0.00	1.42	.00	.00	.26	0.00	0.00	0.00	0	12:03:58	12:04:26	10,749	Empty
Finish	0	2	2	0	-1	2	0.00	0.00	1.40	.00	.00	.25	0.00	0.00	0.00	0	12:04:27	12:06:28	10,764	Time

	Solution Percent		Lbs. Per Gallon			Total Lbs.		Retention		Assay	
ACQ	1.40 %	1.39 %	.1204	.1193	.1309	135	147	.169	.184	.210	-
Quat	.70 %	.70 %	.0602	.0602	.0602	68	68	.084	.084	.110	-
Totals :	2.10 %	2.09 %	.1806	.1795	.1911	203	215	.253	.268	.40	-

Additive List

Material	Concentration
Mold	45 PPM

Automatic Mix Information

Chemical	Concentration	Target Value	Required	Actual	Difference
Water	Gals.	- Gals.	Gals.	Gals.	Gals.
ACQ	%	1.40 %	Gals.	Gals.	Gals.
Quat	%	.70 %	Gals.	Gals.	Gals.
Mold	PPM	45 PPM	Ozs.	Ozs.	Ozs.

1	DF2B4GI	Pieces: 224	Packs/Size : 8 @ 28	Desc: DOUG FIR 2/BTR S4S	BF: 7,168	CF: 420	HW: - %	Moist. Cont.: - %
	Std.: CCI	Mill: 09532	Cust Num: CCI	Order Num:	Retreat?: False	Chg#: 0	Rem1: D2404Q 8@28 2X12X16	
2	DF2B4GI	Pieces: 112	Packs/Size : 4 @ 28	Desc: DOUG FIR 2/BTR S4S	BF: 1,792	CF: 105	HW: - %	Moist. Cont.: - %
	Std.: CCI	Mill: 09532	Cust Num: CCI	Order Num:	Retreat?: False	Chg#: 0	Rem1: D2404Q 4@28 2X12X8	
3	DF2B4GI	Pieces: 240	Packs/Size : 1 @ 240	Desc: DOUG FIR 2/BTR S4S	BF: 4,800	CF: 277	HW: - %	Moist. Cont.: - %
	Std.: CCI	Mill: 09532	Cust Num: CCI	Order Num:	Retreat?: False	Chg#: 0	Rem1: D2404Q 6@35,1@30 2X10X12	

Treating Menu

- With the information uncovered from the Quality Control Department's Testing Documentation and follow-up Test Borings, Gary Galbraith (with the support of the Treating Staff) set about to develop Specific Treating Menus (Operating Procedures) for each of the wood products (species and type) treated by California Cascade:
- Each of these Treating Menus required California Cascade to determine the appropriate:
 - Solution Mixtures (ACQ and Quat)
 - Vacuum Periods (Initial & Final Vacuum Times)
 - Pressure Periods (Raise Pressure, Pressure, and Pressure Relief)
 - Flow Rates
- Example:
 - Peeler Core
 - Plywood

ACQ-Second/Third Generations



● Corrosion Issues

- Destroyed Metal Bindings and Treating Equipment
- Nails and Fasteners

Development of Pre-Stain Line

Development of Pre-Stain Line

- Faced with the fact it could no longer treat and stain its products in one single step, California Cascade had to design and develop a completely new Pre-Staining Process for application of the redwood stains prior to treating.
- Sunwood™ versus Eco-Chemical

CCA Treatment: Preparation



CCA Treatment: Preparation (cont.)



Hurdles to Design and Development of Pre-Stain Process

- Method to Include Stain Box in Existing Incisor Line
- Track Speed Ratios
 - Achieve Adequate Stain Application without Inhibiting Process Times
- Stain Application Methods
 - Spray-on; Brush; Waterfall
- Drying Methods
 - Air Dry; Drying Brushes; Air Knives

ACQ Treatment: Preparation



ACQ Treatment: Preparation (cont.)





End of Stain Line (Stacker) (2002-2004)



End of Stain Line (Stacker) (2002-2004) (cont.)



Stain Box Build-Up

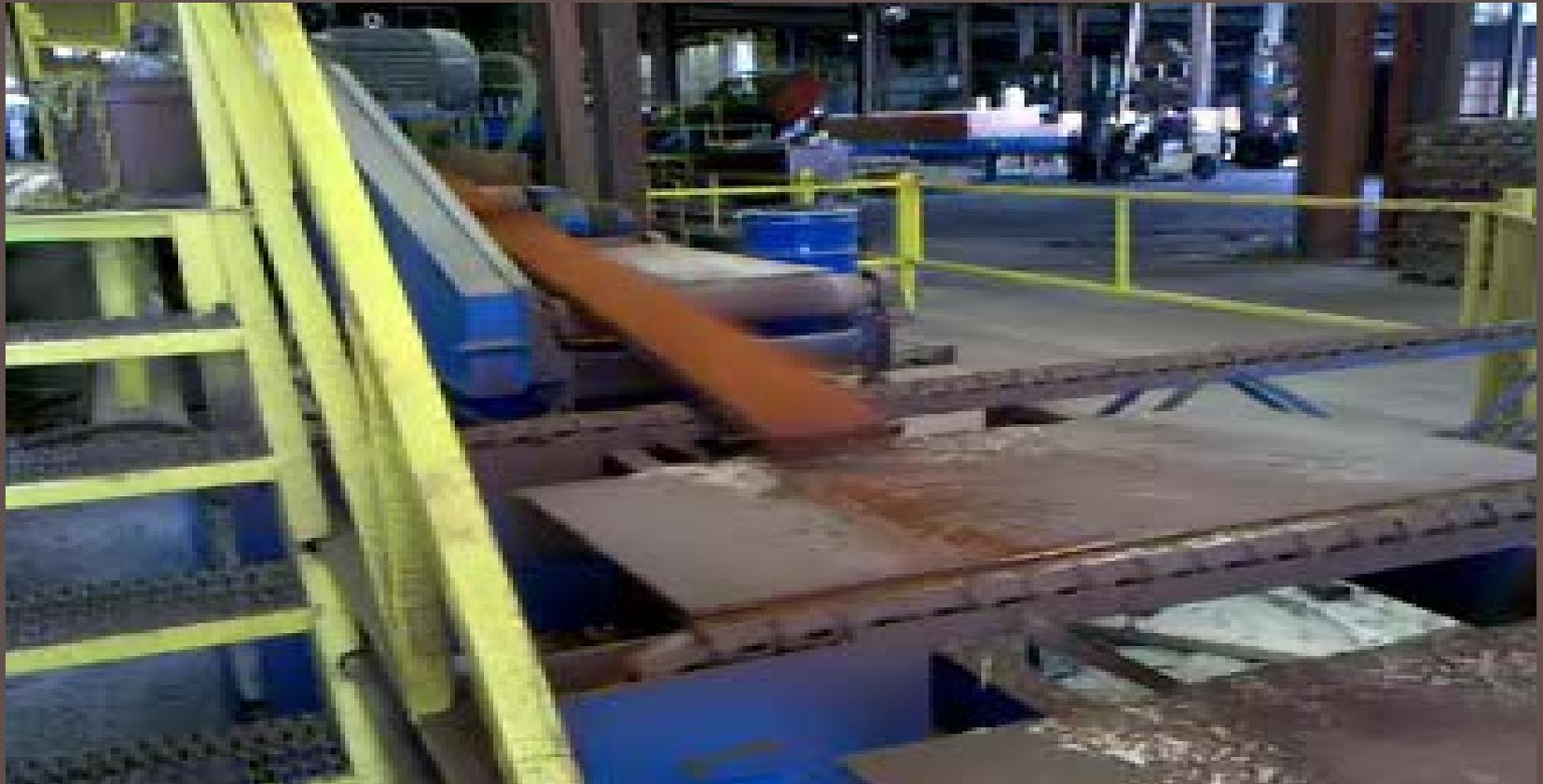


Stain Box (Trials)



Stain Box (Trials)(cont.)

End of Pre-Stain Process





End of Stain Line (Stacker)(July 9, 2010)

Internal Revenue Code Section 41

○ Requirements for Qualification

- 1. Development of New or Improved Business Component (*i.e.*, product, process, technique, formula, invention or computer software) that is held for sale, lease or license or used in a taxpayer's business;
- 2. Technological in Nature;
- 3. Eliminate Uncertainty (Capability, Methodology, or Design);
- 4. Process of Experimentation
 - A process of experimentation is a process designed to evaluate one or more alternatives to achieve a result where the capability or the method of achieving that result, or the appropriate design of that result, is uncertain as of the beginning of the taxpayer's research activities.

Evidence Available to Substantiate Research Activities

- Pictures (Mold Build-Up, Blackening Issues, Stain Line Issues)
- Treatment Testing Records
- Process Menus
- Stain Box
- Invoices (Stain Line Removal/Chip Out)
- Testimony of:
 - Gary Galbraith (30+ Years Experience)
 - Harvey Molatore (50+ Years Experience)
 - Hank Feenstra (30+ Years Experience)
 - Doug Molatore (25+ Years Experience)
 - Scott Mace, Treating Staff and Others