

Quality Metals Since 1789



Nathan Trotter & Co. Inc
241 W. Stewart Huston Dr.
Coatesville, PA 19320
610-524-1440
www.nathantrotter.com

Replacing the Vale INCO S / R Rounds

Contents

- Background

- Timeframe

- Options for replacing the Inco R Round
 - Inco Chip
 - Inco Pellet
 - 1x1" Cathode
 - Xstrata Crown

- Options for replacing the Inco S Round
 - S Pellet
 - Xstrata D Crown

- Cost Variance

- Things to Consider

Background

Vale Nickel has announced that S Round and R Round products will no longer be produced

- Current S/R Round users will soon be unable to obtain these products for use and must consider using alternatives.
- Vale Plant in Manitoba that produces the S and R Rounds will be closed.
 - Declining mineral resources in the region
 - New Federal Emissions Standards in 2015 which would have required significant investment
- Operations will be moved to Sudbury, Canada and Clydach, UK location utilizing a Carbonyl manufacturing process.
 - Carbonyl process results in different shaped anodes than the traditional rounds
 - Resulting chemistry in “new” anodes will also vary from traditional Rounds
- Carbonyl Nickel is produced by refining impure nickel through a gaseous state to remove the impurities.
 - Carbonyl products will contain higher carbon levels
 - Spherical shape required for output

Timeframe

- Vale S Rounds will be phased out by **mid-2013**
- Vale R Rounds will be phased out by the **end of 2013**
- No firm dates have been provided by Vale – only the above guidelines.
 - Signs have been pointing to the “cut-off” possibly occurring sooner

| January 2013 | | | | | | |
|--------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

| February 2013 | | | | | | |
|---------------|----|----|----|----|----|-----|
| S | M | T | W | T | F | S |
| | | | | | | 1 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | | |

| March 2013 | | | | | | |
|------------|----|----|----|----|-----|----|
| S | M | T | W | T | F | S |
| | | | | | 1 2 | |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

| April 2013 | | | | | | |
|------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

| May 2013 | | | | | | |
|----------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | 1 | 2 | 3 | 4 | |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

| June 2013 | | | | | | |
|-----------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | | | | | | |

| July 2013 | | | | | | |
|-----------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

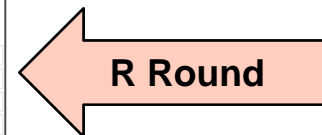
| August 2013 | | | | | | |
|-------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

| September 2013 | | | | | | |
|----------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

| October 2013 | | | | | | |
|--------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

| November 2013 | | | | | | |
|---------------|----|----|----|----|-----|----|
| S | M | T | W | T | F | S |
| | | | | | 1 2 | |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |

| December 2013 | | | | | | |
|---------------|----|----|----|----|----|----|
| S | M | T | W | T | F | S |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |



Options for Replacing the Inco R Round

| Options | Inco Chip | Inco P Pellet | 1x1" Cathode | Xstrata Crown |
|-------------------|--|---|--|---|
| Notable Changes | <ul style="list-style-type: none"> - Carbonyl product - Flattened pellet - Produced by Inco in UK - Increased sludge from higher carbon content | <ul style="list-style-type: none"> - Carbonyl product - Produced by Inco in UK - Reduced bridging due to spherical shape - Higher packing density (5.24 kg/L to 4.32 for R Rounds) - Increased sludge from higher carbon content - Smaller basket mesh size is recommended (1/4 x 3/8") | <ul style="list-style-type: none"> - Virgin Electrolytic nickel - Produced in Russia/Finland by Norilsk - Reduced packing density | <ul style="list-style-type: none"> - Similar button shape as R Round - Produced by Xstrata in Norway - Equivalent performance as R Round |
| Typical Chemistry | <p>Ni -- >99.9800 Co -- <0.0002 Cu -- <0.0004 C -- <0.0070 Fe -- <0.0001 S -- <0.0001 Pb - <0.0001 Zn - <0.0001</p> | <p>Ni -- >99.9800 Co -- <0.0002 Cu -- <0.0004 C -- <0.0070 Fe -- <0.0001 S -- <0.0001 Pb - <0.0001 Zn - <0.0001</p> | <p>Ni -- >99.9400 Co -- <0.0394 Cu -- <0.0004 C -- <0.0070 Fe -- <0.0002 S -- <0.0024 Pb - <0.0001 Zn - <0.0001</p> | <p>Ni -- >99.9800 Co -- <0.0002 Cu -- <0.0001 C -- <0.0020 Fe -- <0.001 S -- <0.0020 Pb - <0.0002 Zn - <0.0002</p> |



Options for Replacing the Inco S Round

| Options | Inco S Pellet | Xstrata D Crown |
|--------------------------|--|--|
| <p>Notable Changes</p> | <ul style="list-style-type: none"> - Carbonyl product - Produced by Inco in UK - Reduced bridging due to spherical shape - Higher packing density (5.24 kg/L to 3.81 for S Rounds) - Increased sludge from higher carbon content which may require bags to be changed more often - Smaller basket mesh size is recommended (1/4 x 3/8") - **No S Chip Available | <ul style="list-style-type: none"> - Similar button shape as S Round - Produced by Xstrata in Norway - Equivalent performance as S Round - Sulfur activation comparable to S Round - Can be used interchangeably with S Round |
| <p>Typical Chemistry</p> | <p>Ni -- >99.900 Co -- <0.0001 Cu -- <0.0001 C -- <0.0050 Fe -- <0.0040 S -- <0.019 – 0.025 Pb - <0.0001 Zn - <0.0001</p> | <p>Ni -- >99.9500 Co -- <0.0002 Cu -- <0.0009 C -- <0.0020 Fe -- <0.001 S -- 0.0175 – 0.030 Pb - <0.0001 Zn - <0.0001</p> |



Cost Variance

- R Round Transition
 - Minimal change in cost to transition to P Pellet or Chip.
 - 1x1" Cathode will remain a less expensive option.
- S Round Transition
 - Xstrata D Crowns have historically been less expensive than S pellets
 - Transition to S Pellets may include additional cost of new baskets to account for smaller size.
 - Consider additional basket maintenance due to sludging with S Pellets.
- Your Nathan Trotter rep can provide you with current pricing on all options for your evaluation.

Things to Consider

- Actual Transition Date
- Availability of S Rounds while you are transitioning. Check with Nathan Trotter to stay apprised of short and long term supply
- Determine specification or approval requirements with quality department. NT can provide samples of any or all alternative products as required.
- Consider any additional costs or savings
- Start trials sooner rather than later