



SFSA CASTEEL REPORTER

Steel Founders' Society of America

a monthly publication
serving SFSA steel casting industry Members

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March — 2006

Casteel Commentary Highlights:

The Casteel Commentary this month concerns the ongoing need for newer staff. Each Company in our industry needs to hire a new staff person each year. After we do this for a few years then we will be able to go back to our current practice of trying to hire experienced staff from others.

Safety Meeting

SFSA is hosting a safety meeting for steel foundries March 22 in Longview, TX. Each participating foundry will be expected to share their program with other attendees. There will be a tour of Southwest Steel. We have 10 member companies already signed up. Please contact SFSA for details if you are interested.

AFS Texas Regional

Malcolm and Raymond will be speaking at the AFS Texas Regional in Ft. Worth, TX on March 24 on troubleshooting the steel casting process. If you are interested you would need to register with the AFS Texas Group.

AFS Texas Regional

At the National AFS Conference in Columbus, OH, Malcolm and Raymond will be presenting an overview of SFSA Technology development on April 20.

AMC Program Kickoff

The AMC kickoff for the next round of research sponsored by DoD-DLA will be held in Charleston, SC on March 30-31. Details and registration are available online here:

<http://amc.aticorp.org/cirkickoff/index.html>

SFSA T&O Committee

The SFSA T&O Committee will be meeting in Chicago on April 7. They will be planning for the 2006 National T&O Conference. Any suggested speakers or topics are welcome.

Spring Technical Session

SFSA is planning a Spring Technical Session combined with the Marketing Committee and the Board meetings. This will be in Muskegon, MI. on May 9-11. The Technical session and Marketing Committee will meet on May 9. Plant tours will be offered on May 10 and will be followed by the Board Meetings. All members are invited to the technical sessions and the tours.

Spring Management Meeting

SFSA sponsored a Spring Management meeting on March 9, in Chicago. We had 7 member companies in attendance. The program was on an economic assessment for the coming year. Bernie Lashinsky presented data showing that the near future trends are all positive and projects that we are early in the economic upturn for our industry. R. Monroe presented capacity and productivity trends in the industry. These presentations are available for download on the Casteel Reporter page on the SFSA website.

China Tour

The planned SFSA tour of China was postponed until October to allow a better tour. We will be trying to locate and visit the leading steel foundries in China. Any

suggestions for plants or locations are welcome. As the tour takes shape we will circulate the plan and encourage you to attend.

Innovation

Controlling the temperature and uniformity in heat treatment operations is not trivial. One common fault is the erratic behavior of the control thermocouple during its failure period. This can require reheat treatment of even scrap depending on the thermal cycle. One innovative idea is to have two control thermocouples, one on each side of the furnace. Normally they can help demonstrate uniformity. They can pick up burner failures or seal failures as their values drift apart. Finally they can check each other to catch a thermocouple failure early and before any harm is done to the load.

Specifications Note

The US will be hosting the ISO TC17/SC11 meetings in Washington DC, April 24-25. Since ISO standards are not frequently mentioned or required, why should the US participate? Reasons for involvement in ISO are many. One benefit to SFSA members is the contact of SFSA staff with specification writers for steel castings from most industrialized countries. We are able to ask experts questions about foreign specifications based on our past work. We can email and often get a complete explanation in less than 24 hours. This is a benefit that many members have received. If you have an unknown specification, we try to find the requirements and intent for you.

Regulatory Reminder

In conjunction with Keramida, SFSA is going to include a regulatory reminder each month. Environmental compliance deadlines for January have passed. Were you on time? January 31, 2006 was the Iron and Steel MACT deadline for semi-annual reporting on the scrap selection and inspection program. Also, don't forget March 1, 2006 is the deadline for Tier II reports and Biennial Hazardous Waste reports. Deadlines, permits, recordkeeping, monitoring... All of these are constant legal

obligations for any manufacturer. The opportunities for enforcement at all levels of management are higher than ever. Information about common errors in environmental compliance programs is attached to this newsletter.

The US OSHA final rule for lowering the permissible exposure level to hexavalent Chromium has been submitted. Melting but especially welding or arc air operators may be affected by this new limit. The details of the rule are attached to this newsletter. This may be difficult to meet with stick or flux-cored wire welding stainless. Respirators, local capture or air supply helmets may be required.

The US EPA is beginning to formulate the area source rule to cover plants that are not subject to the MACT requirements. It is not clear how broadly this will affect the steel casting industry. The principle interest in the rule is to reduce air toxics in urban area.

Capital Investment

Several members responded to our request to share their experience in adding incremental capacity. For a steel minimill, a new site can be constructed for a cost of about \$350 per ton per year. To add a ton of capacity to the steel foundry the costs ranged from \$600 to \$2,800 per ton per year. Most responses were from \$1,500 to \$2,000. At a normal 5% return on sales, the capital cost of \$2,000 would require \$40,000 in added sales to recover the investment. As you can see better profitability or lower costs for added capacity will be key to a successful recapitalization.

Market News

Business remains strong with no slowdown in sight. The consumer economy should slowdown toward the end of the year as a result of higher energy prices and interest rates. This may have a small effect on steel casting demand but as long as commodities and energy prices remain well above historic prices and remain in limited supply, the demand for capital equipment should continue. This will continue to push our industry to maximum production.

Commodities producers need capital equipment to capture the profits of higher prices due to limited demand. In the same way we need to capture the profits of limited supply to recapitalize our industry.

The SFSA Business Trend survey shows continued strong bookings and shipments at the end of last year. The SFSA Trend Survey indicates for participants that shipments for 2005 were 26.5% over 2004. This can also be seen in the Census numbers for iron and steel castings with shipments at the high end. Steel products

have seen some slowdown as the global capacity for steel ramps up and in many products exceeds demand. For capital goods orders remain strong and inventories remain low relative to orders.

We have begun to collect lead-time data in conjunction with our monthly business trends survey. For January 2006, median order backlogs are 11 weeks for carbon & low alloy production and 10 weeks for high alloy. We will continue to collect and analyze the lead-time data as we move forward.

Casteel Commentary

Our industry is in a growing crisis of staffing. We are currently limited in many facilities by our lack of trained and capable staffing. An examination of the senior positions at many facilities shows a preponderance of late career personnel. Our lack of growth as an industry over the past twenty years has led to the situation where we could not afford to hire new staff. Relying on our existing staff proved an effective cost cutting strategy. Now, however, we do not have a pool of potential recruits.

Our entire industry has been slow to react to the growing shortfall of people available. Since none of us hired much for twenty years, we have not brought new people into the industry. This is understandable but is no longer sustainable. Given the near capacity demand for steel castings we can no longer stretch our existing people thinner to cover. We can no longer afford to miss any production due to a lack of staffing.

Each management position in the plant should have 1.5 people to cover it. This allows the redundancy needed for illness, travel, vacation and training. Now is the time to bring in younger staff that can overlap with our capable senior staff. Allowing this overlap gives us the opportunity to select and evaluate the younger staff in position with the senior staff still in place. It gives us coverage in case the senior staff for personal or health reasons becomes less available. We can afford it because this type coverage will allow us more flexibility and better decision-making and should lead to increased production and profits.

It has been so long since we have hired staff we are slow to act and not sophisticated in our salary expectations. A new BS in Mechanical Engineering has an average starting salary of \$50,000 and a BS in Industrial Engineering gets \$49,500. In talking to some of our research professors, our companies frequently offer noncompetitive salaries and are slow to respond to their student prospects. Often the student likes our industry but cannot turn down a more attractive offer while we decide. We need to rediscover the value of newly hired young engineers who don't know what can't be done. We need new ways of thinking and doing. It is time for each member company to plan to hire one new hire for leadership each year.

Raymond

STEEL FOUNDERS' SOCIETY OF AMERICA

MEETINGS CALENDAR

2006

March

22 Safety Meeting & Plant Tour, Longview, TX

May

9/10 Spring Meeting & Plant Tour, Muskegon, MI

16 Specifications Committee Meeting, Toronto, Ontario

20/27 China Tour, TBD, China

September

9/12 SFSA Annual Meeting, Eldorado Hotel, Santa Fe, NM

December

13/16 National Technical & Operating Conference, The Drake Hotel, Chicago, IL

2007

December

12/15 National Technical & Operating Conference, The Drake Hotel, Chicago, IL

**STEEL FOUNDERS' SOCIETY OF AMERICA
BUSINESS REPORT**

SFSA Trend Cards 3 Mo Avg Dec Nov
(%-12 mos. Ago)

Carbon & Low Alloy

Shipments	19.7	4.2	25.0
Bookings	20.0	10.0	31.0

High Alloy

Shipments	-2.5	13.0	-20.0
Bookings	30.5	24.0	-27.0

**Department of Commerce
Census Data**

Iron & Steel Foundries (million \$)

Shipments	1,719	1,724	1,715
New Orders	1,726	1,723	1,734
Inventories	2,016	2,017	2,010

Nondefense Capital Goods (billion \$)

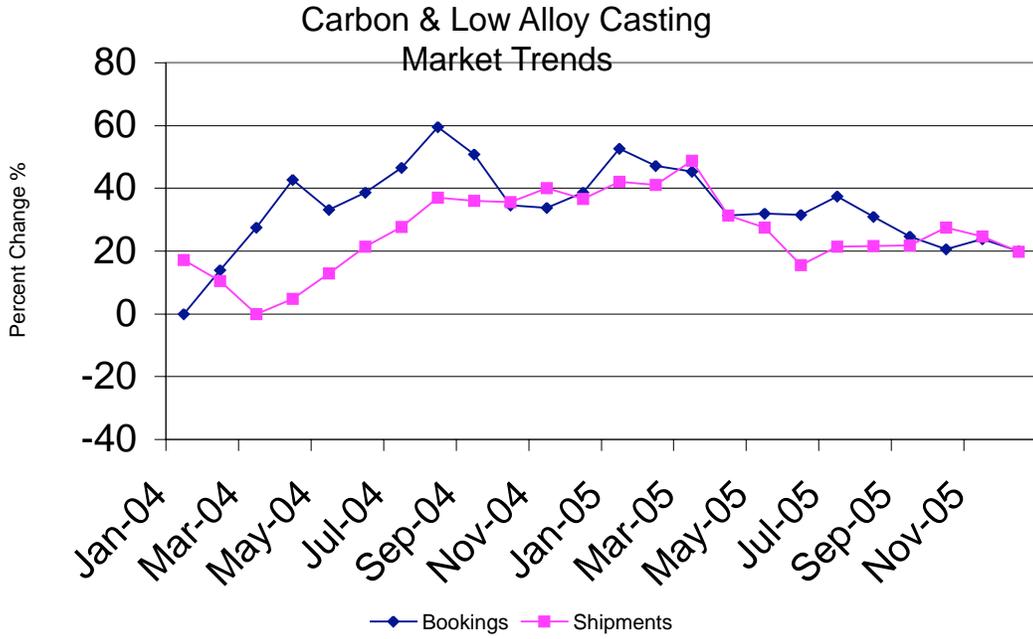
Shipments	69.8	73.3	68.8
New Orders	82.3	89.3	85.8
Inventories	113.1	113.5	113.3

**Nondefense Capital Goods
less Aircraft (billion \$)**

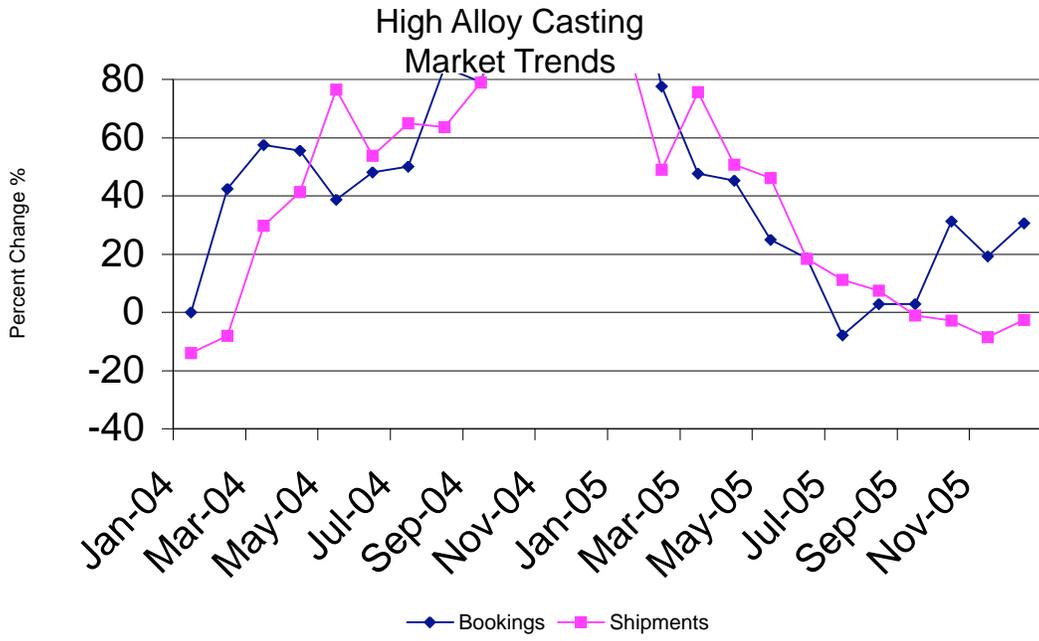
Shipments	63.5	65.3	62.6
New Orders	64.3	66.8	62.3
Inventories	94.9	95.0	95.3
Inventory/Orders	1.48	1.42	1.53
Inventory/Shipments	1.49	1.45	1.52
Orders/Shipments	1.01	1.02	0.99

American Iron and Steel Institute

Raw Steel Shipments (million net tons)	8.7	8.5	8.7
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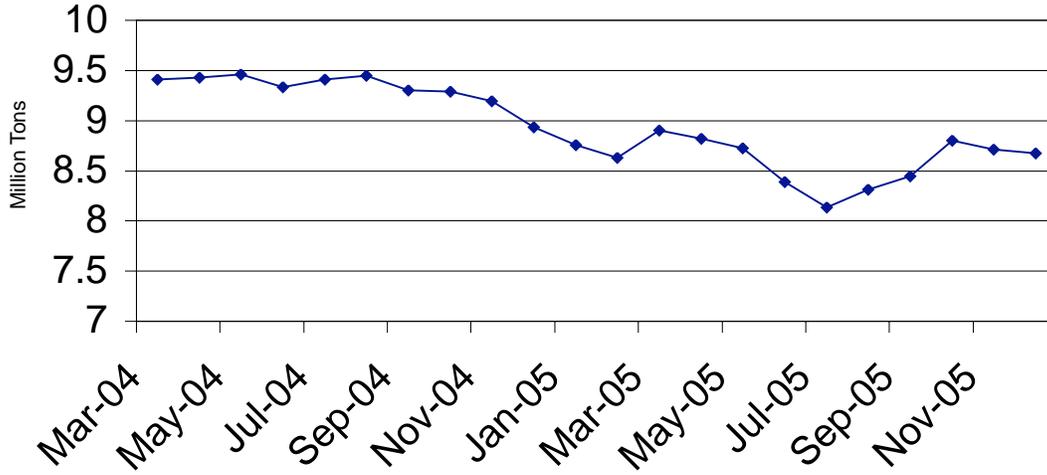
SFSA Postcards



SFSA Postcards

Raw Steel Shipments

3 month average



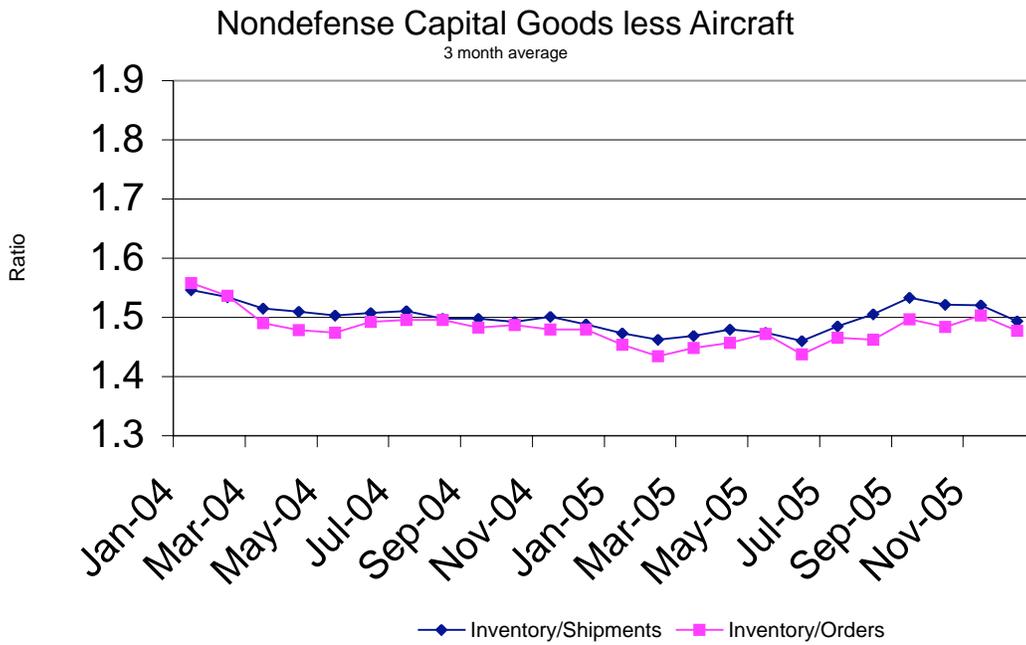
AISI Data

Iron and Steel Castings

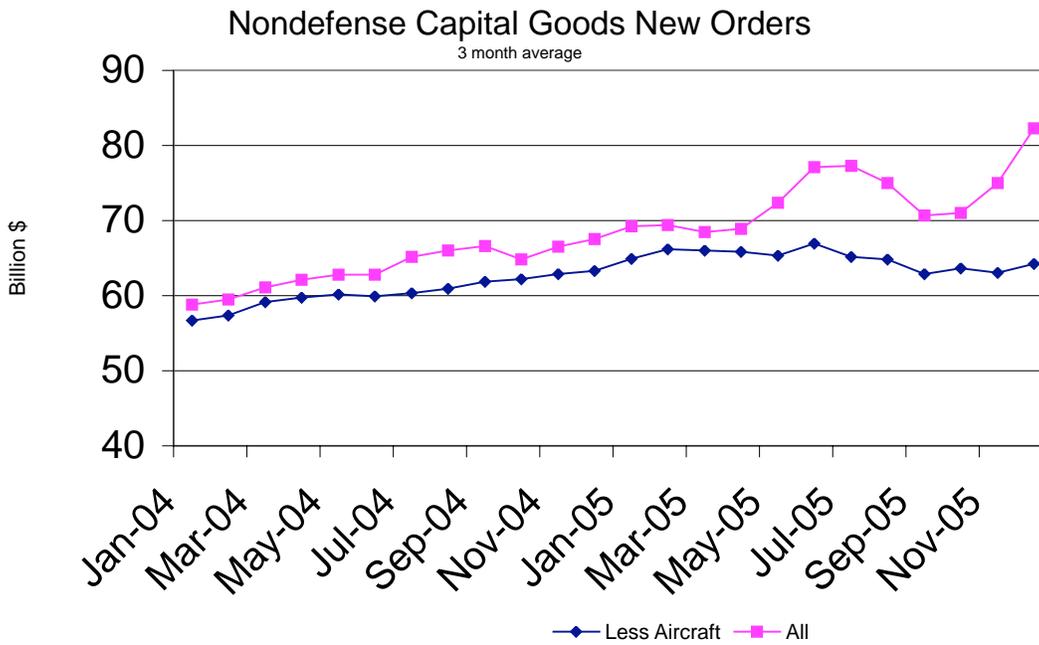
3 month average



SFSA

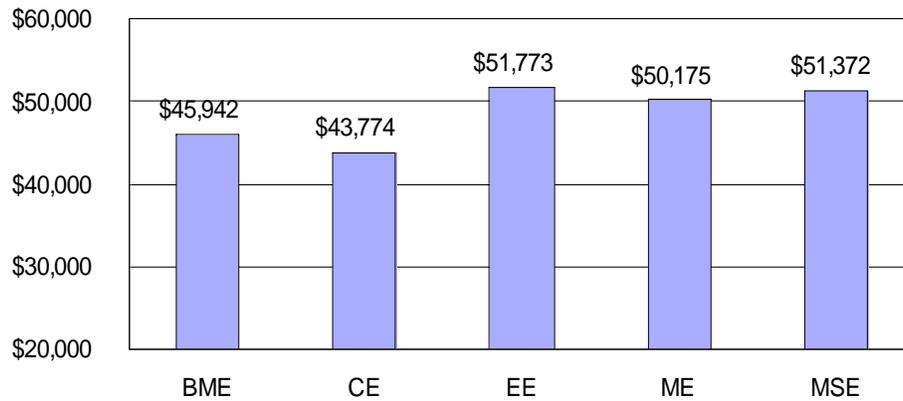


Department of Commerce

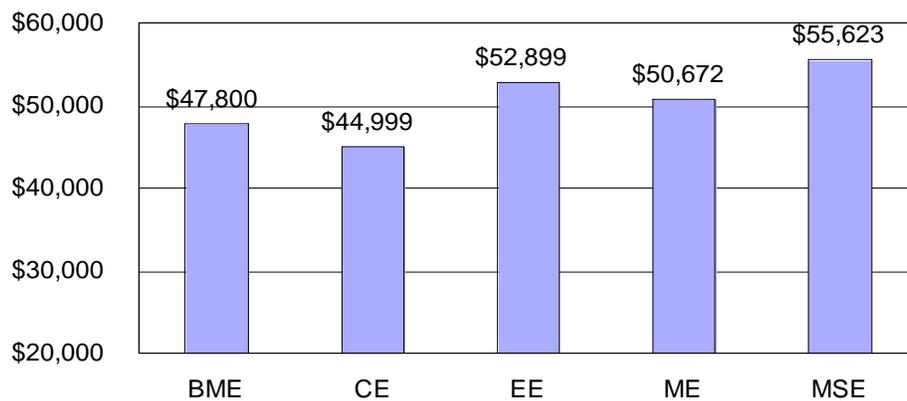


Department of Commerce

**2005 National Association of Colleges and Employers
Starting Salaries with BS Degree**



**Winter 2006 National Association of Colleges and
Employers Starting Salaries with BS Degree**



Environmental Audits in the Primary Metals Sector

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Discussion Topics

- **Environmental Audits**
 - What are they?
 - Why?
 - What are typical findings?
 - **Environmental Disclosure**
-

Environmental Compliance Audit

- **What is a compliance audit?**
 - Can be a snapshot of current compliance status
 - OR
 - A more detailed compliance assessment.
 - Record searches
 - Findings/corrective Actions
 - Risk/Costs
 - Can be “in-house” or “3rd Party”
-

Why?

- To assess the overall Environmental Management System or compliance status of a metalcasting facility
 - To develop an environmental improvement plan
 - To assess the environmental risk or future liabilities
 - Can be performed as a part of a compliance settlement
-

The Process

- Should be performed under the direction of Legal Counsel
 - Pre-audit
 - Set audit Scope
 - Conference call with participants
 - Record searches
 - Site Visit
 - Opening Conference
 - Site Tour
 - Records Review
 - Develop Preliminary Findings
 - Closing Conference
 - Audit Report
 - Verify Findings
 - Written Report including recommended Corrective Actions
-

Compliance Audit Findings

The most common problems found during foundry compliance audits can in most cases be traced back to the same “root causes”, lack of, or incomplete, monitoring, recordkeeping and reporting practices.

+

Permitting issues caused by outdated permits or equipment listings

Air Findings

- **Construction Permits**
 - **Operating Permits / Title V**
 - **Prevention of Significant Deterioration (PSD) / New Source Review (NSR)**
 - **MACT / Air Toxics**
 - **SARA 313 Reporting**
-

Air – Construction Permits

- **Construction permits either have not been obtained for source modifications, or**
 - **Proper documentation of the need for a construction permit not evaluated and/or documented**
 - **All emission units are not properly permitted**
-

Air Operating Permits / Title V

- **Do all sources at the facility have either:**
 - An operating permit, or
 - Documentation as to why an operating permit is NOT required
 - **Has the facility determined it's major source status**
 - PTE > 100 TPY for any criteria pollutant
 - Including “fugitive emissions”
 - 10/25 TPY for Hazardous Air Pollutants (Title V and MACT Applicability)
-

Air Operating Permits / Title V

- **Emission Factors?**
 - Many emission factors were developed during the last 10 years
 - VOCs
 - CO
 - HAPs
 - **Annual Compliance Certification and Reporting Requirements**
-

Air Findings – PSD/NSR

- **Determination of major source status**
PTE > 100 TPY for listed source categories
PTE > 250 TPY for non-listed source categories
 - Per existing guidance gray iron foundries are not part of the “iron and steel” listed source category, however they are considered “secondary metal production plants” if scrap is melted to produce the iron.
 - **Modification**
 - **PSD/NSR look-back**
-

Air Findings - MACT

- **Major source status**
 - Was the PTE for HAPs from all operations at the facility included when determining whether the source is major for HAPs?
 - Do existing permits adequately limit PTE for HAPs?
 - Did the facility:
 - Submit Notifications and Required Plans for Approval?
 - Notifications for all MACTs?
 - Is there a PLAN?
 - Is there a PLAN?
 - Is there a PLAN?
-

Air Findings – SARA 313

- Does the facility have a complete and up-to-date chemical inventory?
 - Is the raw material data accurate?
 - ID, wt% reportable components, usage
 - Is the waste stream data accurate?
 - Does the facility have test data/analysis for all waste streams potentially containing reportable chemicals?
 - Have the lower reporting thresholds for PBT chemicals been considered?
 - i.e. lower threshold for Pb and Pb compounds
 - Dioxins/Furans?
 - Mercury?
-

What about CFCs?

- **Certifications?**
 - Maintenance activities both equipment and personnel
 - **CFC Inventories (or lack of inventories)**
 - **Additional recordkeeping and maintenance requirements when equipment exceeds 50 pounds CFC/HCFC**
-

Water Findings

- **National Pollutant Discharge Elimination System (NPDES) Permit**
 - **Stormwater Pollution Prevention Plan (SWPPP)**
 - **Stormwater Sampling**
-

NPDES

- **Do the Categorical Standards/Effluent Guidelines (Pretreatment) apply to the facility?**
 - **Can be required for processes such as casting quench operations.**
 - **Are you're a direct discharger?**
 - **Are you discharging to a POTW?**
-

NPDES

- Are all sources of process water listed in the permit?
 - Are Discharge Monitoring Reports (DMRs) for process water discharges:
 - Consistently submitted, and/or
 - Accurately completed
 - Are proper notifications regarding exceedances in discharges of wastewater being made, including:
 - Documentation of the event and actions taken
-

POTW

- Is the plant meeting the requirements of the local sewer ordinance?
 - Do you have a copy of the local ordinance?
 - Is required monitoring being performed?
 - Are there prohibitions of certain types of discharges?
 - Noncontact Cooling Water
 - Stormwater
 - Metals
 - Chlorine
-

SWPPP

- **Has the plan been updated to reflect current operations and Best management practices (BMPs)?**
 - Include all stormwater and contamination sources
 - Identify all stormwater discharge points
 - Identify and evaluate all current BMPs
 - **Have annual compliance evaluations been completed and documented?**
-

SWPPP (cont'd)

- **Poor housekeeping with regard to areas that may impact stormwater drainage areas.**
 - **Has the facility identified the destination of all drains?**
 - **Has a water balance been completed for all flows into and out of the facility?**
 - **Is training on the SWPPP up-to-date?**
-

Stormwater Sampling

- **Has stormwater sampling/analysis been completed correctly?**
 - Type of sampling (grab versus composite)
 - Monitoring parameters adequately reported?
 - i.e. precipitation amount and duration
 - Are the correct parameters being reported?
 - **Is the SWPPP signed by the responsible corporate official?**
-

Solid Waste

- **Solid waste testing**
 - **Disposal / Recycle Activities**
 - **Hazardous Waste Requirements**
-

Solid Waste Testing

- **Are wastes properly classified?**
 - Initial and routine profiles
 - Use generator knowledge infrequently
 - **Point of generation**
 - Are you testing mixed waste streams?
 - **Are you properly reporting hazardous waste treatment?**
-

Disposal and Recycle

- **Disposal or recycle issues**
 - Where does it all go? Does $2 + 2 = 4$
 - Make a waste table listing
 - List all wastes generated
 - List profiles and determination method
 - List recycle or disposal method / facility
 - **If disposed is your landfill are you permitted to accept the waste streams?**
 - Limited to certain types of waste
 - Foundry sands
 - Construction waste
 - Dry waste? (Paint filter test)
-

Hazardous Waste

- **Satellite areas not properly labeled**
 - **Hazardous Waste Storage Area**
 - **Labeling**
 - **Inspections**
 - **Shipping within 90 days**
-

Environmental Risk/Cost

- **Environmental Compliance Audits can go beyond compliance and identify BMPs to reduce risk.**
 - **Additional record searches and assessments can assist facilities in determining environmental liability and risk associated with current and past practices**
-

Why?

- **Environmental disclosure rules have changed**
 - **Sarbanes-Oxley Act 2002**
 - “Enron”, Enacted to require better financial disclosure and oversight of publicly owned companies. Includes additional environmental reporting requirements. (SEC and EPA)
 - **Be prepared to provide additional information to CFO on environmental liabilities both present and future.**
 - **Will require environmental cost projections for idled facilities**
-

Sarbanes-Oxley Act 2002

- **S-K Item 101**
 - “companies must disclose the material effects of compliance with federal, state, and local environmental provisions on their capital expenditures and competitive position;”
-

Sarbanes-Oxley Act 2002

- **S-K item 103 – “companies must describe certain administrative or judicial legal proceedings arising from federal, state, or local environmental provisions;”**
-

Sarbanes-Oxley Act 2002

- **S-K item 303 – “companies must discuss their liquidity, capital resources, and results of operations.” “must identify known trends, demands, commitments, events, or uncertainties” “that may result in a change in the companies liquidity”**
-

Sarbanes-Oxley Act 2002

- **How far will the reporting requirement go?**
 - **Discuss this new requirement with CFO prior the 2006 reporting period**
-

Summary

- **Environmental Audits can be an important tool for identifying “gaps” in plant Environmental Management Systems**
 - **Audit can be a simple or detailed as required to fit site specific requirements**
 - **Most findings can be corrected with little cost to foundries**
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Full Text can found at:

http://www.osha.gov/FedReg_oshapdf/FED20060228.pdf

or

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=18599

*National News Release: 06-342-NAT**

Date: February 27, 2006

Contact: Sharon Worthy, Al Belsky

*Phone: (202) 693-4676**

OSHA Issues Final Standard on Hexavalent Chromium

WASHINGTON -- The Occupational Safety and Health Administration (OSHA) will publish a final standard for occupational exposure to hexavalent chromium in the Feb. 28, 2006, Federal Register. The standard covers occupational exposure to hexavalent chromium (Cr(VI)) in general industry, construction and shipyards.

"OSHA has worked hard to produce a final standard that substantially reduces the significant health risks for employees exposed to hexavalent chromium. Our new standard protects workers to the extent feasible, while providing employers, especially small employers, adequate time to transition to the new requirements," said Jonathan L. Snare, acting assistant secretary for occupational safety and health.

The standard will be published in accord with the timetable established by the U.S. Court of Appeals for the Third Circuit, which in April 2003 ordered OSHA to promulgate a standard governing workplace exposure to hexavalent chromium.

The new standard lowers OSHA's permissible exposure limit (PEL) for hexavalent chromium, and for all Cr(VI) compounds, from 52 to 5 micrograms of Cr(VI) per cubic meter of air as an 8-hour time-weighted average. The standard also includes provisions relating to preferred methods for controlling exposure, respiratory protection, protective work clothing and equipment, hygiene areas and practices, medical surveillance, hazard communication and recordkeeping.

Hexavalent chromium compounds are widely used in the chemical industry as ingredients and catalysts in pigments, metal plating and chemical synthesis. Cr(VI) can also be produced when welding on stainless steel or Cr(VI)-painted surfaces. The major health effects associated with exposure to Cr(VI) include lung cancer, nasal septum ulcerations and perforations, skin ulcerations, and allergic and irritant contact dermatitis.

Employers are responsible for providing a safe and healthful workplace for their employees. OSHA's role is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health.

For more information, visit <http://www.osha.gov>.

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(NOTE: A fact sheet on the hexavalent chromium standard follows this release).

The Final Standard on Hexavalent Chromium Effective and Practical Protection for Workers

Summary

On February 28, 2006, pursuant to a 2003 court order, the Department of Labor issued a final standard addressing occupational exposure to hexavalent chromium, also known as Cr(VI), a natural metal used in a wide variety of industrial activities, including the manufacture of stainless steel, welding, painting and pigment application, electroplating, and other surface coating processes.

OSHA determined that the new standard is necessary to reduce significant health risks posed by occupational exposure to Cr(VI). The new standard is based on a careful, extensive analysis of all facts and evidence gathered during the Occupational Safety and Health Administration's (OSHA) rulemaking process, which included two weeks of public hearings and comment periods totaling more than five months. OSHA relied upon the best available, peer-reviewed science.

The new standard covers the general industry, construction, and shipyards sectors and will protect workers against exposure to hexavalent chromium, while providing employers with adequate time to transition to the new requirements.

Approximately 558,000 workers are covered by the provisions of the new standard.

What Does the Standard Do?

Reduces Worker Exposure to Cr(VI). The new standard provides greater protection against significant health effects, such as lung cancer, nasal septum ulcerations and perforations, and dermatitis by lowering the permissible exposure limit (PEL) from 52 micrograms of Cr(VI) per cubic meter of air (52 $\mu\text{g}/\text{m}^3$) to 5 $\mu\text{g}/\text{m}^3$ for all sectors.

Practical and Effective Requirements. The new standard requires covered industries to achieve the PEL through engineering and work practice controls to the extent that is technologically feasible. Additional provisions cover exposure determinations, respiratory protection, protective work clothing and equipment, medical surveillance and communication of hazards.

Supplemental Provision for Aerospace Painting. The new standard recognizes that, given available technology, the lowest level employers involved in aerospace painting operations of whole aircraft or large aircraft parts can reach through feasible engineering and work practice controls is 25 $\mu\text{g}/\text{m}^3$. For these types of aerospace painting, OSHA requires the use of engineering and work practice controls to reduce exposures to 25 $\mu\text{g}/\text{m}^3$, and allows the supplemental use of respirators to be used to achieve the PEL.

Protecting Workers Most at Risk. The new standard will focus protections on workers facing heightened health risks from airborne exposures. An exemption is provided for employers who can demonstrate that Cr(VI) exposures under any anticipated working conditions will not exceed 0.5 $\mu\text{g}/\text{m}^3$.

Reasonable Transition Time. Given the significant PEL reduction required by the new standard, OSHA is providing a reasonable transition period for employers to implement the technologies and practices needed for compliance.

Effective date of the standard: 90 days from publication.

- This period is intended to allow affected employers the opportunity to familiarize themselves with the standard.

Start-up date for all provisions, except engineering controls: 180 days from the effective date (one year for employers with fewer than 20 employees).

- This period is designed to allow employers sufficient time to complete initial exposure assessments, obtain appropriate work clothing and equipment, and comply with other provisions of the standard.

Start-up date for engineering controls: four years from the effective date for all employers.

- This period allows affected employers sufficient time to design, obtain, and install the necessary control equipment.

What Are the Major Differences Between the Proposed and Final Standards?

Permissible Exposure Limit

Proposed: A PEL of 1 µg/m was proposed.

Final: Based on the rulemaking record, OSHA determined that a PEL of 5 µg/m is the lowest level that is technologically and economically feasible for industries impacted by this standard.

Portland Cement Exclusion

Proposed: OSHA proposed to exclude exposures to portland cement in the construction industry because of data indicating that airborne exposures to Cr(VI) in construction activities involving portland cement were very low and posed little lung cancer risk. Risks from dermal exposure could be addressed through existing OSHA standards.

Final: OSHA expanded the exclusion for portland cement to general industry and shipyards, as well, because new data submitted during the public comment period indicated that airborne exposures to Cr(IV) from portland cement in these industries are comparable to exposures in construction.

Scope Exemption

Proposed: No proposed exemption.

Final: OSHA determined that there are certain work operations that may have low airborne Cr(VI) exposure levels comparable to those generated by portland cement and added an exemption for employers who can demonstrate that under no expected conditions will concentrations be above 0.5 µg/m.

Special Provision for Aerospace Painting

Proposed: OSHA proposed that all industries covered by the standard achieve the PEL through the use of engineering and work practice controls to the extent feasible.

Final: OSHA determined that it would not be technologically feasible to reduce exposures to the PEL through engineering and work practice controls when whole aircraft or large aircraft parts are being painted. Therefore, employers are only required to use engineering and work practice controls to reduce exposures to 25 µg/m and must then use respiratory protection to meet the PEL.

Exposure Determination

Proposed: In the proposal, OSHA did not include exposure determination provisions for construction or shipyards because of the practical difficulties in characterizing exposures in these work settings.

Final: The final standard covering general industry, construction, and shipyards all have identical provisions for exposure determination. The standard also adds a performance-oriented option in all industry sectors to increase employers' flexibility in making exposure determinations.

Medical Surveillance

Proposed: OSHA proposed that medical surveillance be offered to employees with signs and symptoms of Cr(VI)-related health effects, exposures in emergencies, or exposures for 30 or more days above the PEL.

Final: The standard takes into account the new PEL and changed the exposure-based trigger to 30 or more days above the action level (one-half the PEL). In addition, the standard adds this trigger to the construction and shipyard standards.