Executive Summary
The Strategic Review Team recommends that Manufacturing and Technology activities be focused on areas AISI is uniquely positioned to influence. Four such areas are: Advances in safety, advances in product performance, advances in process performance, and the identification and development of disruptive technologies. Because these areas are so intertwined with market success as well as leadership in environment and energy matters, they are appropriate to conduct under AISI. Further, the ability to conduct technical activities which are strategically aligned with industry goals is an important differentiating factor between AISI and AIST committee work. For example:

- This Strategic Plan calls for even greater emphasis on benchmarking to achieve advances in process performance, specifically cost and yield improvement. The operating data collected by AISI [AIST does not collect operating data] and the online benchmarking tools provided by AISI for analysis of this data make AISI Manufacturing Committees uniquely qualified for this activity.

- The ability to assess the impact of market trends on steel plant operations and to proactively adapt plant operations in AISI Manufacturing Committees is unique to AISI and a major differentiating factor to AIST committees. For example, if automotive market trends indicate that martensitic steels would increase from 5% of the automotive product mix to 40% over the next three years, this would have a significant impact on steel plant operations [difficult-to-make grades often present operating challenges]. This type of market knowledge enables COMT to put programs in place with the appropriate Manufacturing Committees [in this case Hot Strip Mills, Sheet Mill Products and possibly Metallic Coated Sheet], to ease the transition to a more technically challenging product mix.

There are also demographic differences between AISI and AIST committees, e.g., AISI committees consist almost entirely of producer members which producer members feel enables more focused and open discussions of operating issues and problems; and AISI committee reps are usually the person responsible for the plant unit [typical titles of representatives include Area Manager, General Manager, Superintendent, Coach], as opposed to a process unit technologist [typical AIST demographic]. There are several areas of cooperation with AIST that are explained in the Strategic Plan document.

The Strategic Review Team feels benchmarking is the key to advances in process performance. While benchmarking may not immediately identify the tactic to close a member’s performance gap to best-in-industry, it does clearly point out the size of the performance gap and allows an objective assessment of where to focus improvement activity. The fact that no one company will be best-in-industry in all areas creates the compelling mutual benefit sought in AISI cooperative activities. In fact, not participating in benchmarking activities can create a competitive disadvantage.

Collaborative R & D will continue to be a cornerstone of COMT activity. Because the costs for enabling technology development can be high, the collaborative nature of pre-competitive research and development will help allow AISI members to acquire the platform technologies at lower cost and customize the application of that technology in each member company. These programs leverage not only member dollars but those of
the Department of Energy [up to 70%] as well as other stakeholders such as customers and suppliers.

Many new process technologies, such as the low-energy, high-productivity Paired Straight Hearth Furnace, will continue to be the subject of AISI collaborative R & D under the new program to be launched in 2006. Similarly, collaborative R & D plays a key role in support of our Market Development activities [e.g., research into the properties of advanced high strength steels in support of ULSAB-AVC]. The COMT-Market Development key interfaces are in the following areas:

- **Product Needs**—Are there defined technological needs in the key markets being focused on? For example, have we failed to meet a market growth goal because of a technology gap? Is there a list of market technological needs [e.g., lightweighting, more durability, corrosion resistance, formability, uniformity, life cycle performance, etc.] already compiled per market which can be fed back to COMT for action?

- **Competing Materials Information**—Is competing materials information up-to-date in all markets MDC is focusing on? Is there a data and or intelligence gathering activity needed regarding competing materials? For example, do we fully understand the properties of the newest competing materials and our competitors’ production capabilities?

The Strategic Review Team also recommends that COMT strengthen its ties with IISI, as is done in several other areas of AISI, e.g., Market Development, Energy and Environment. As our members become more global, increased cooperation with IISI through their Techco Committee and COMT will open up opportunities to leverage project resources and benchmark with international steel groups, as appropriate.

In summary, the Strategic Review Team has carefully and thoroughly deconstructed all Manufacturing and Technology activities at AISI. The purpose, need for and value of these activities have been tested against the needs of the membership in 2005 and beyond. The results and recommendations going forward are explained further in the attached.
The Strategic Review Team recommends that Manufacturing and Technology activities be focused on areas AISI is uniquely positioned to influence. Four such areas are shown in the chart below: Advances in safety, advances in product performance, advances in process performance, and the identification and development of disruptive technologies. Because these areas are so intertwined with market success as well as leadership in environment and energy matters, they are appropriate to conduct under AISI.

The four core areas of COMT activity positively influence cost reduction and revenue improvement. The above schematic illustrates our belief that greater member participation (more companies and people) brings value in all four core areas of activity. By pooling resources and sharing knowledge in these areas, we will achieve greater cost-reduction velocity and margin growth.

As the above chart shows, greater member participation [more companies and people] in these activities [x-axis], will result in more cost reduction and higher margins due to knowledge-sharing among AISI members.

I. Disruptive Technologies and Advances in Product Performance
“Disruptive Technologies” means those technologies with the potential to alter the cost of steelmaking operations and/or the performance of our material in the customer’s plant. The identification and development of disruptive technologies and advances in product performance are two key means of driving cost down and value up. Because the costs for many of these advancements can be high, the collaborative nature of pre-competitive research and development will help allow our membership to acquire the platform technologies at lower cost and customize the application of that technology in each
member company. For example, almost all of the early work in strip casting was done in collaborative teams. They advanced the technology in a very cost effective manner to the point it was clear strip casting would be commercially viable. From there, developments took place on a more individual and proprietary basis resulting in the technologies in commercial use today.

Development of disruptive technologies and advances in product performance are presently accomplished by three methods:

- First, collaborative research under AISI. For example, the success of the Technology Roadmap Program [TRP] in developing and delivering new technology to the plant floor is well known. TRP’s successes include enabling technologies for the Ultra-Light Steel Auto Body [ULSAB] and Ultra-Light Steel Auto Body—Advanced Vehicle Concepts [ULSAB-AVC], and various patented and licensed sensor and model technologies. These programs leverage not only member dollars but those of the Department of Energy [up to 70%] as well as other stakeholders such as customers and suppliers.

- Second, technology surveillance projects such as the present ones on alternative ironmaking and galvanizing which convene industry peer groups in order that members have the up-to-date information on emerging processes for their internal planning.

- Lastly, AISI members participate in cooperative projects with IISI such as the CO\textsubscript{2} Breakthrough Program.

The Strategic Review Team recommends all these above efforts continue.

The identification, development and deployment of Disruptive Technology comes mainly through AISI’s collaborative R & D programs. The Technology Roadmap Program is in its final two years and plans are underway to launch a new program under the working theme “Saving a barrel of oil while producing a ton of steel”. Structurally, it will be similar to TRP in that there will be regular solicitations which will result in a menu of projects for member’s opt-in consideration. The existing CO2 Breakthrough Program [a subset of projects funded under TRP] is an example of a program seeking to develop disruptive technology.

The Strategic Review Team recommends two specific new tactics—the convening of a brainstorming session among industry and academic technologists to stimulate fresh thinking on the subject of steelmaking technology; and discussions with leading steel plant suppliers to capture their ideas on the future of melting, casting and rolling technology.

II. Benchmarking, the path to Advances in Process Performance

The Strategic Review Team feels benchmarking is the key to advances in process performance. While benchmarking may not immediately identify the tactic to close a
member’s performance gap to best-in-industry, it does clearly point out the size of the performance gap and allows an objective assessment of where to focus improvement activity. The fact that no one company will be best-in-industry in all areas creates the compelling mutual benefit sought in AISI cooperative activities. In fact, not participating in benchmarking activities can create a competitive disadvantage.

In AISI’s Manufacturing Committees, new tools are becoming available now to take performance benchmarking to another level—one that permits the ready identification of the top performers and facilitates the scoping, prioritization, and execution of process improvement projects.

Operating data has been collected by AISI Manufacturing Committees for many years. The new Online Benchmarking Software will utilize data from the Operating Reports to create comparative tables and charts on key variables [selected by each committee] for analysis. The analysis of these reports will bring to light improvement projects that can be undertaken by the individual Manufacturing Committees and/or by COMT.

A second source of identifying process improvement projects will be the data from the Market Development Committee anticipating growth in demand for certain types of steels. The “difficult to make” steels impact the cost and yield of steel plant operations and anticipating higher demand for these steels will lead to projects to proactively improve mill’s abilities to process these grades.

Identifying cost and yield improvement projects by benchmarking based on operating data and by analyzing market demand for certain grades are key areas of differentiation with AIST committees and are tasks AISI is uniquely qualified to perform due to its ability to align market, operations, environment and energy functions.

III. Advances in Safety Performance
Advances in safety performance has been a core function of AISI for many years. Starting in Manufacturing Committees, knowledge sharing concerning safety equipment, practices and incidents takes place. At each meeting safety is discussed—serious accidents and fatalities are examined in great detail, including any remedial actions and/or practice changes that occur as a result of a particular incident.

In addition, safety practices from company to company are compared within each plant unit, as are the types of equipment used.

At the COMT level, discussion will take place about overall industry performance. The Safety Statistics compiled by AISI will be disseminated annually to COMT for review along with other data the Committee on Occupational Health and Safety feels is appropriate. COMT’s main concern is that the Manufacturing Committees are giving enough time to safety matters, specifically the discussion of serious accidents and preventive measures. “Safety systems”, i.e. plant-wide safety systems and programs will be discussed among the Plant Managers Group as will any discussion of comparable safety systems in other industries.
IV. Organization/Governance

The Strategic Review Team proposes to establish, within COMT, a liaison to each Manufacturing Committee. A general guideline will be that a COMT member will be the liaison to a Manufacturing Committee for which his company holds the chair [see below].

![Depiction of COMT Liaisons](image)

**Figure 1: Depiction of COMT Liaisons to Manufacturing Committees**

This facilitates easy and regular communication but has the disadvantage that a single COMT member may have multiple liaisons [because his/her company holds several chairs], thus limiting the level of engagement of other COMT members with Manufacturing Committees. The liaisons to Manufacturing Committees will be established at the beginning of each calendar year and will be set considering both Manufacturing Committee chairs and the broadest participation of COMT members.

**COMT member duties**

COMT members are the responsible individuals regarding AISI Goal 1 “Enhance the Comparative Value of Steel” and thus define and help carry out the programs aimed at the Goal. As this Strategic Plan is implemented, it is important for each COMT member to communicate the strategies and goals in his/her company, especially with their Manufacturing Committee reps. Some specific duties include:

- seeing to the entry of operating data for the company or plant in the appropriate report[s] on the AISI website;

- communication about the Plan to appropriate individuals in the company and
• assisting committees for which he/she is Liaison with development of workplans consistent with the Strategic Plan [benchmarking to achieve process improvement; safety, etc.]

Overall, COMT must continually highlight benchmarking of critical manufacturing performance indicators where possible to allow member companies to prioritize their improvement efforts. Similarly, COMT can assist by having the right kinds of surveillance activities in place to ensure that we are aware of the possible disruptive effects of new technologies, and where possible, position our industry to have first-mover advantages.

V. Working with the Market Development Committee:

Figure 2: Proposed Relationship of Market Development Committee and COMT

The relationship between the Committee on Manufacturing Technology and the Market Development Committee is very important in achieving AISI’s goals. The Strategic Review Team believes the important interfaces between MDC and COMT are in four areas:

1. Product Needs—Are there defined technological needs in the key markets being focused on? For example, have we failed to meet a market growth goal because of a technology gap or shortcoming? Is there a list of market technological needs [e.g., lightweighing, more durability, corrosion resistance, formability, uniformity, life cycle performance, etc.] already compiled per market which can be fed back to COMT for action?
2. Competing Materials Information—Is competing materials information up-to-date in all markets MDC is focusing on? Is there a data and or intelligence gathering activity needed regarding competing materials? For example, do we fully understand the properties of the newest competing materials and our competitor’s production capabilities?

3. Future Market Trends—The future demand for certain steel grades is very valuable information for COMT as it can drive yield improvement and cost reduction in the plant. For example, if automotive market trends indicate that martensitic steels would increase from 5% of the automotive product mix to 40% over the next three years, this would have a significant impact on steel plant operations. This type of advance knowledge would allow COMT to put programs in place with the appropriate Manufacturing Committees [in this case Hot Strip Mills, Sheet Mill Products and possibly Metallic Coated Sheet], to ease the transition to a more technically challenging product mix. The ability to assess the impact of market trends on steel plant operations and to proactively adapt plant operations in AISI Manufacturing Committees is unique to AISI and a major differentiating factor to AIST committees.

4. Customer’s Ability to Manufacture—How will our new steels impact customer manufacturing plants [raise or lower cost]? Do they have the right equipment to process them? How do we assist them in their use?

In addition to the close working relationships that must exist between AISI staff serving MDC and COMT, and between member company representatives in these committees, there must be a simple and effective procedure created to communicate the above information on an initial basis and on a periodic follow-up basis. COMT recommends a joint session between the Market Development Committee and COMT at a common location or event such as the Great Designs in Steel Seminar held in March of each year. At this meeting the exchange of data from items 1-4 above will take place and drive COMT and MDC action as appropriate.

It is envisaged COMT will meet three times in 2006 [Jan/Mar/Sep] as the new Plan is implemented with the goal of returning to a two meeting per year format in 2007 [Mar/Sep].

VI. Working with Plant Managers Group [PMG]:
The PMG is still missing key plant managers and needs consistent representation from AISI members to be effective. This will be reviewed with the AISI Board and one change we know is required is the need to schedule meetings 9-12 months in advance to ensure a high level of participation. This will be the standard practice in 2006.

COMT and the PMG are peer groups. As evidenced by their initial meetings, the PMG has the most interest in Safety Systems, Key Business Indicators/Metrics and Talent Development. Because there are areas of common interest with COMT, the two groups should at a minimum receive each other’s agendas and meeting reports and should be able to request each other to discuss items of interest.
In the broad area of safety, the PMG is concerned with Safety Systems while the COMT is concerned with safety performance of each plant unit through the Manufacturing Committees. Safety statistics and trends in safety performance will be communicated to both COMT and PMG members by the Occupational Health and Safety committee which collects the data.

COMT’s focus on process improvement and its oversight of the Ferrous Metallurgy Education Today [FeMET] Initiative creates two other areas of interaction with the PMG. PMG should be aware of process improvement projects underway at COMT or the Manufacturing Committees, for example in producing steels at the limit of mill capabilities or in extending those capabilities. Further, because of its interest in talent development, PMG should be kept informed of progress under FeMET in drawing graduate metallurgists to our industry. The PMG can be a resource for the placement of FeMET scholars for their company internships.

**VII. Working with other Steel Organizations**

**International Iron and Steel Institute:**
Due to the global nature of steel companies and customers, AISI and IISI committees have developed closer relationships in recent years. The chart below shows the areas of cooperation between AISI and IISI.

![Areas of AISI and IISI Cooperation](chart)

COMT’s relationship with IISI’s Techco committee provides an excellent networking opportunity with international peers and developing relationships with international peers opens up opportunities for collaborative projects such as benchmarking between AISI Techco meetings are a source of worldwide competing materials information and
intelligence. In addition to the participation of North American IISI member companies, the Strategic Review Team recommends that AISI staff and/or the COMT Chairman regularly attend the annual Techco meeting [a 2006 Business Plan budget item. The 2006 Techco meeting is in April in Buenos Aires, Argentina].

**Association for Iron and Steel Technology [AIST]**
AISI and AIST cooperate in two main areas; training courses and the Ferrous Metallurgy Education Today [FeMET] Initiative.

Regarding training courses, AISI Manufacturing Committees make recommendations to AIST when new training courses are needed in particular process areas and, regarding existing courses, consult with AIST on the agendas, course materials and instructors. AISI used to conduct training programs in partnership with the Iron and Steel Society, one of the predecessor organizations of AIST, and ceded this function to AIST when it was formed.

The FeMET Initiative began in 2005 and is a partnership between AIST Foundation and AISI which jointly funds scholarships to metallurgy students as a first step in guiding such students to select our industry for employment. AISI and AIST Foundation now have a major expansion of the program under discussion for presentation to their mutual boards.
VIII. AISI Strategic Plan--Goal, Objectives, Tactics and Metrics

Goal 1:

Enhance the Comparative Value of North American Steel

Objective 1.1
Improve Steel Product Technology

Guiding Strategies
1. Conduct collaborative projects to close technical gaps which are barriers to market growth [gaps identified by AISI Market Development Committee]
2. Conduct collaborative projects to enhance the properties of steels
3. Maintain a current assessment of the value of competing materials and their plans to improve their cost/quality/service (anticipate competitive threats)

Tactics:

- Establish a procedure with MDC from which the technical barriers to market growth are identified; begin utilizing this procedure in 2006 to develop focused projects under COMT to address the barriers
- Maintain an up-to-date assessment of the value of competing materials
- Analyze the competing materials information to identify “gaps” and projects to narrow/widen them as appropriate.
- Build and maintain close relationships with customer technical experts

- Support product applications for manufacturability in the customer’s plant, in conjunction with the Market Development Committee
- Generate pull from MDC for product-related programs and research

Accountability for Objective 1.1
Primary: Manufacturing & Technology
Support: Market Development
Objective 1.2
Improve Steel Process Technology

Guiding Strategies
1. Conduct collaborative projects to identify, develop and deploy “disruptive technologies” [more longer term horizon]
2. Conduct collaborative studies to identify and understand emerging technologies worldwide which can have a near-term impact on steelmaking [technology surveillance]

Tactics:

- Establish the “new research program “Saving a barrel of oil while producing a ton of steel” partnership with the Department of Energy for the purpose of conducting collaborative R & D
- Utilize the CO₂ Breakthrough Program to identify, develop and deploy new CO₂ mitigation technologies and processes [another aspect of collaborative R & D]
- Strategic Planning for R & D Committee to plan “Technology Brainstorming Session” and to engage steel industry suppliers in discussion or future technology developments
- Maintain an awareness of technology developments around the world in ironmaking, galvanizing and continuous hot rolling and disseminate this information to the membership
- Develop relationships with universities that increase the number of students entering our industry

Accountability for Objective 1.2
Primary: Manufacturing & Technology
Support: Energy, Environment
**Objective 1.3**
Reduce cost of operations and improve yield

**Guiding Strategies**

1. Use benchmarking activities to identify process performance improvement projects which can be undertaken by member companies, COMT and Manufacturing Committees.

2. Share and discuss safety performance statistics, trends and accident reports among COMT, the Plant Manager’s Group and Manufacturing Committees.

3. Develop a closer relationship with IISI-Techco to facilitate international networking and benchmarking as may be deemed appropriate.

**Tactics:**

- **Benchmarking Tactics**
  - Participation in Operating Reports above 90%
  - Manufacturing Committees with Operating Reports to use the Benchmarking Software Package to help identify projects to improve cost and yield
  - Only Publish Benchmarking Data to those members who have submitted data for that area to insure a high level of participation
  - Benchmark with other industries in appropriate areas such as environmental and safety performance

- **Safety Tactics**
  - Manufacturing Committees to share safety practice and accident information with emphasis on review of serious accidents and fatalities including cause and any corrective actions taken
  - COMT to annually review industry safety performance statistics and inform Plant Managers Group of same

- **Product Tactics**
  - Plan and conduct Round Table on “Steel Company Approaches to Cost of Quality”
  - COMT and Manufacturing Committees to use information from Market Development about increased future demand for certain steel grades to create programs which anticipate operational changes to accommodate such demand

- **Communication tactics**
  - Keep the members-only website simple for members to use and up-to-date.
  - AISI staff and/or COMT chairman to be present at IISI Techco meetings

**Accountability for Objective 1.3**

**Primary:** Manufacturing & Technology

**Support:** Occupational Health and Safety
Metrics for Goal 1

- Energy utilization per ton shipped [industry composite number]
- Participation in Operating Reports 90% or greater
- Benchmarking activities active in each Manufacturing Committee
- A group of project specific metrics for process performance improvement projects [determined when projects established]
- Benchmarking activities have returned a “Top Five” actions/problems/issues per each appropriate committee; projects defined concerning these issues
- Safety Statistics and Trends Reviewed at COMT; Serious Accidents and Fatalities review in Manufacturing Committees
- The Manufacturing & Technology portion of the AISI website is simple and easy to use
- Future Demand for steel grades submitted by Market Development
- New research program on “Saving a barrel of oil while producing a ton of steel” launched and funding obtained

Accountability for Goal 1

Manufacturing & Technology