HSE MANAGEMENT
INFORMATION SYSTEMS PLANNING:

# MOVING INTO THE 21ST CENTURY

GEMI PRIMER
HSE-MIS WORK GROUP

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# ACKNOWLEDGMENTS

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Susan G. Grider of Law Companies, Inc. facilitated Work Group discussions, authored the text based on the group's input, and provided editorial assistance as needed. Audrey E. Bamberger provided additional editorial assistance to the text.

# INTRODUCTION: A PLANNED APPROACH TO HEALTH, SAFETY AND ENVIRONMENTAL (HSE[1]) INFORMATION MANAGEMENT

***Today's corporate and regulatory climate is a mix of scarce resources, tight deadlines, fierce competition, and complex regulatory requirements. It is affected by global competition, shortened business cycles, rapidly changing software and technology developments, complex HSE regulations, and horizontal integration. "Just-in-time production" forces a standard of rapid response to global market changes. As a result, this climate has created unprecedented demand for HSE information and a need to better understand how responses should be undertaken.***

Accomplishing HSE goals requires a well prepared plan of action. This Primer focuses on the necessary planning cycle, beginning with a strategic business plan and ending with an HSE Management Information Systems Implementation Plan. This approach, the HSE Business-Driven Systems Planning Model, is introduced in Chapter 1. The model forms the foundation of this Primer, inviting the reader to explore one method that provides concrete direction to the topic of HSE information management. This Primer is designed to help Health, Safety and Environmental managers reach new levels of performance by partnering their expertise with that of Management Information Systems (MIS) professionals and Manufacturing & Operations, Marketing, Research & Development, Finance and Legal experts across the company. The overall goal of this Primer is to provide HSE managers some insight on eliminating information silos, integrating their work with the rest of the enterprise, and, as a result, improving corporate performance.

## Setting the Stage for the Model

Before beginning this journey through the six-phase model, there are three key items to bear in mind: People, A Common Language, and the Value of Planning.

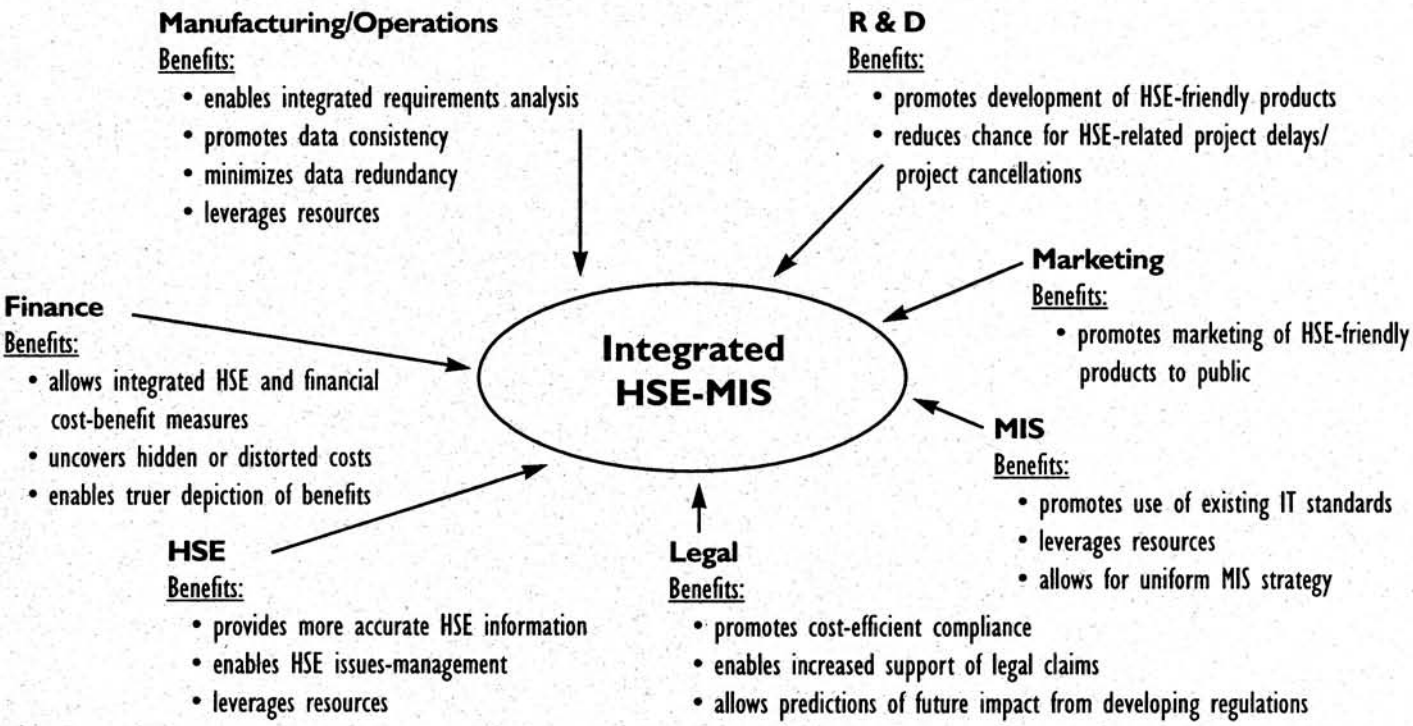
### People

***People First Integration:*** An easy miss within the MIS and HSE communities is to pursue partnership development or integration through a technological lens. "Computer systems integration" is a major responsibility for many HSE and MIS professionals. However, the reality is that integration begins with and succeeds through people, not technology. Putting the focus on people first minimizes the difficulties arising from work process integration, maximizing partnerships between functional areas and reducing inefficiencies from functional overlap. While the benefits of integration are real — minimized duplication of effort, maximized efficiency, enhanced communication, cost reduction — achieving these goals requires pronounced individual and departmental behavioral changes, as well as technological applications and innovations.

[1] To maintain consistency "HSE" is used throughout this Primer to represent "Health, Safety and Environmental." Some GEMI member companies may use in their internal literature or vernacular "EHS", "EH&S" or "HS&E" to represent the same.

***The Cross-Functional Team:*** If the problems encompass multiple business functional areas, as HSE does, then the response must be far-reaching and the solution must include participation by each one of those business areas. This Primer refers to this collective group as the Cross-Functional Team. The Cross-Functional Team is a group of expert representatives from HSE, MIS, Manufacturing & Operations, Marketing, Research & Development, Finance, and Legal who are very important to the success of the HSE-Management Information System (HSE-MIS)[2]. Listed below are some benefits that the Cross-Functional Team members provide to the effort.

**Cross-Functional Team: Benefits from Integrated HSE-MIS Planning**




The team must answer pertinent questions and focus on key issues up front. This way problems are solved more cost-effectively with the benefit of combined problem-solving skills. Strong and deliberate people partnering during the planning process enables maximum integration of the HSE- MIS between functional areas of the corporation.

***Process and Information Ownership:*** The Cross-Functional Team represents the stakeholder organizations for the HSE initiative. Stakeholder involvement is critical to planning a system that will work, sell, and receive support over time. Stakeholders need to understand "What's in it for me, my department, my organization?" before they can become proponents of the new system. Stakeholders must understand the value of process and information ownership to their organization. Eastman Kodak used stakeholder involvement to arrive at a set of HSE initiatives:

[2] HSE-MIS refers to Health, Safety and Environmental - Management Information Systems. HSE-MIS generally references an integrated and enterprise-wide system to address HSE objectives which is developed via partnership with a company's HSE and MIS functions. Throughout this Primer "HSE-MIS" is used to refer both to the technology of such a system. The partnership which forms its foundation is referred to as "HSE&MIS".

***Eastman Kodak Company Resolves Obstacles with Cross-Functional Approach:*** In developing a high level HSE strategy at Kodak, HSE management worked closely with a Cross-Functional Team of twenty-five high level professionals to develop a list of Initiatives. A Review Board, a subset of the Cross-Functional Team, reviewed the Initiatives and identified obstacles. The Cross-Functional Team then developed alternative solutions to each of the obstacles identified. Scenarios were defined with technical, resource and cultural considerations. Based on obstacle resolution alternatives, the Review Board selected the best implementation scenario for each Initiative and create a Prioritized Initiatives List.

***Levels of Integration:*** The reach of the Cross-Functional Team should correlate to the degree of work process integration of the developing HSE-MIS. The goal is to integrate HSE functionality into existing business processes. While the level of integration may vary, a fully integrated HSE-MIS enables the appropriate use of leading and lagging indicators in the corporate planning process. DuPont's Cross-Functional Team make sure this integration happens:

***DuPont's Cross-Functional Team Ensures Alignment with Business Goals:*** At DuPont, an HSE Information Leadership Team meets regularly to provide guidance and direction on newly leveraged information technology products and services. Corporate representatives, Information Systems representatives and HSE representatives from DuPont businesses serve on the Team. These regular meetings ensure better alignment with business goals and objectives and promote implementation of the most efficient and effective HSE information management systems.

## Common Language

The second point involves setting standards in three areas: Language for communication; Architecture enabling the system to work corporate-wide into the future; and Data Definition to ensure integrity of data and information.

***Language:*** Before embarking on this planning process, HSE managers should be sure to use language that the entire Cross-Functional Team can understand. The acronyms and complex jargon used by MIS and HSE will alienate many members. The goal is to use one language, the language of business, for all activities during planning.

***Architecture:*** Similarly, MIS must take an active role in ensuring the enterprise is equipped with a standard architecture or platform to serve the initiatives resulting from the planning process. This architecture must reflect the current status, centralized or decentralized.

***Data Definitions:*** Adherence to HSE data standards — data dictionaries or data definitions on chemicals, equipment, processes, roles, etc. — allows the organization to be more adaptive to change. Industry-wide HSE standards, such as ISO 14001 and EMAS, are available and widely used. The HSE standard an organization chooses to adopt is not as critical as adopting and maintaining a standard over time.

## The Value of Planning

As a final note before introducing the model, planning creates value. Once the communication lines are opened and constructive discussion of relative integration issues begins, managers, sponsors, and participants should encourage the debate to continue and evolve to resolution. The long and painstaking process that companies in all the examples in this Primer undergo is necessary. Colgate-Palmolive, like many other companies, forces this debate to build team relationships, uncover issues, and demonstrate the value of the process and the results:

> ***Constructive Debate of the Issues at Colgate-Palmolive:***[3] Colgate-Palmolive formed a Cross-Functional Team of twenty people tasked with designing a new chemical management process and supporting computer system. Members, representing R&D, Manufacturing, Facilities Management, Product Safety, Information Technology and HSE, first met in a two-day off-site meeting. Participants became fully engaged in representing their organization's concerns at this meeting . As issues surfaced, team members challenged each other in a constructive and professional manner on key topics. Over the next four months, the team developed a proposed chemical management process, presented the proposal to management and obtained approval to move forward.

Planning provides five key values to HSE and the organization:

- Calibrates agendas of multiple organizations within the company;
- Leads to fewer reworks and scope adjustments; saving money and time;
- Enables HSE to focus on supporting company-wide needs and goals;
- Helps focus and prioritize MIS resources;
- Internalizes HSE objectives and values throughout the company.

## What's Ahead

Chapter One introduces the HSE Business-Driven Systems Planning Model. Chapters Two through Seven detail each of the six phases of the Planning Model. Chapter Eight provides insight on the model as a whole: benefit measurement and the planning model as a continuous process. The Conclusion provides some practical advice about the planning process.

[3] "Constructive Debate of the Issues At Colgate-Palmolive" example provided by Bill Faraday of Colgate-Palmolive.

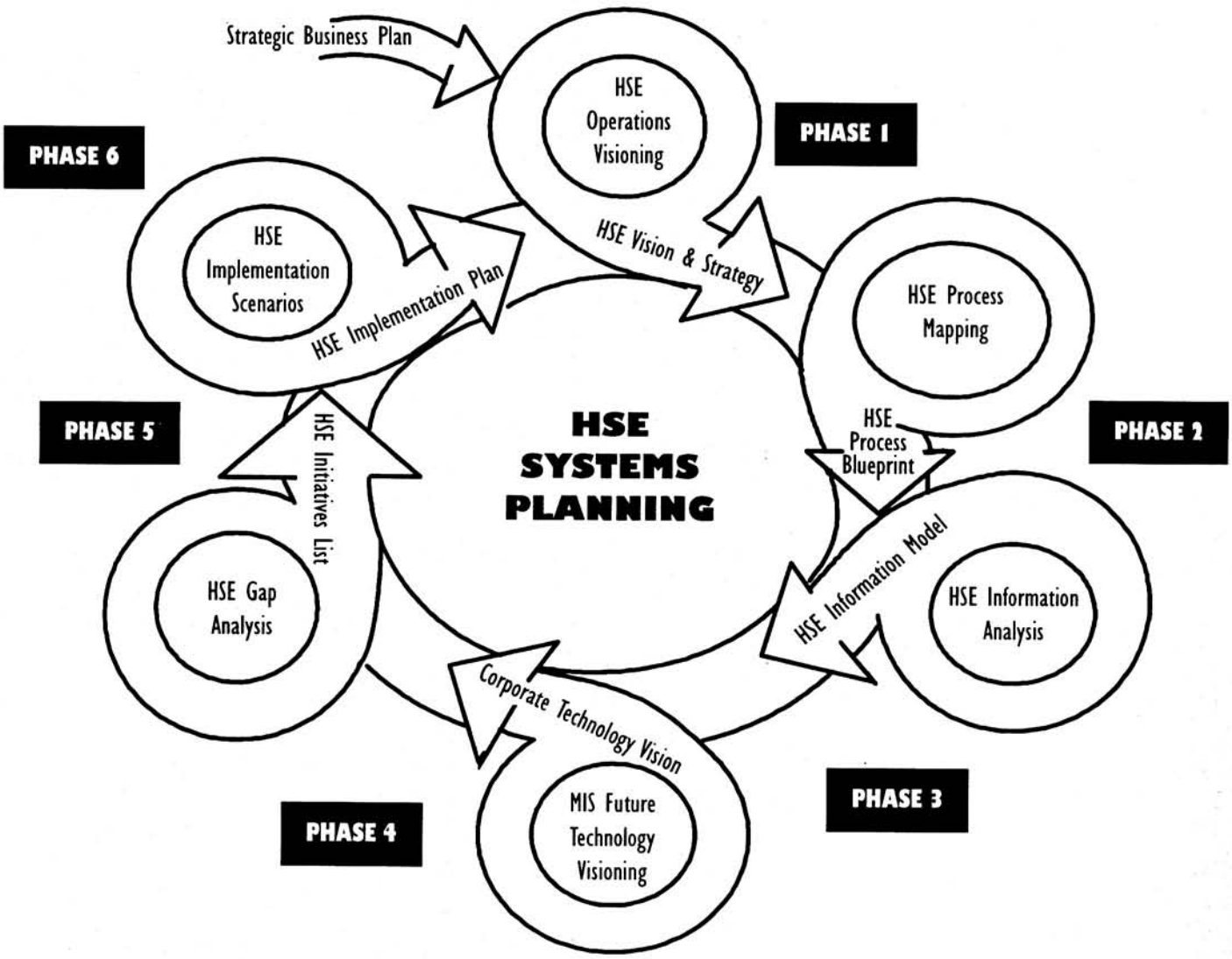
# CHAPTER 1: THE BUSINESS – DRIVEN HSE SYSTEMS PLANNING MODEL

***The Business-Driven HSE Systems Planning Model (Planning Model) is a tool to guide the planning process for HSE-MIS development. When the Cross-Functional Team and executive management support a shared planning process, they are more willing to wait for the planning process to conclude before selecting the implementation scenarios. All too often critical steps in the planning process are skipped.***

## The Six Phases of the Planning Model[4]

The Planning Model is driven by a company's strategic business plan. The clockwise execution of Phases 1 through 6 represents the HSE organization's efforts to direct this process in keeping with the goals of the strategic business plan.

### Business-Driven HSE Systems Planning Model




[4] "Business-Driven HSE Systems Planning Model" concept contributed by Sven W. Vetter of Kodak.

***Synopsis of Planning Model Phases 1-6:***

***Strategic Business Plan:*** This is the beginning point of the model in which an external driver, the Strategic Business Plan, initiates the planning cycle. This Primer assumes the plan is at the Corporate level, however the model works just as effectively at the Business Unit or Facility level.

***Phase 1 - HSE Operations Visioning:*** Activity within this phase is driven by the HSE manager but relies on input from the Cross-Functional Team. During the Visioning phase, the HSE manager breaks the Strategic Business Plan into elements relevant to HSE Operations during the next five to ten years. The output is the HSE Vision and Strategy at a high level. The Vision and Strategy are HSE-specific but coordinate with relevant visions and strategies developed throughout the enterprise.

***Phase 2 - HSE Process Mapping:*** Activity within this phase involves strong input from the Cross-Functional Team. The entire HSE organization, both centralized and decentralized, and any related processes are included. Measures obtained through cost-benefit analyses, are adopted here. The output is the HSE Process Blueprint.

***Phase 3 - HSE Information Analysis:*** Activity within this phase involves issues such as data requirements, standards & measures, report delivery, and security. Analysis is based on the input from the HSE Process Blueprint (Phase 2). The output is the HSE Information Model which is specific to HSE information only.

***Phase 4 - MIS Future Technology Visioning :*** Activity within this phase is driven by MIS management and involves assessment of current and future technology trends. Participation by other business areas in this vision creates a more accepted and well-defined product. The output is the Corporate Technology Vision which is owned by the MIS department. The scope is generally corporation-wide.

***Phase 5 - HSE Gap Analysis***: Activity within this phase is driven by the HSE professional or the HSE&MIS partnership. This phase involves a Gap Analysis between the current state of the business and its intended future direction as represented in the HSE Process Blueprint (Phase 2), Information Model (Phase 3) and the Corporate Technology Vision (Phase 4). The output is a Prioritized List of HSE Initiatives.

***Phase 6 - HSE Implementation Scenario Development:*** Activity within this phase is driven by the HSE manager, who uses the Cross-Functional Team to develop scenarios for each of the HSE Initiatives (Phase 5). The team chooses which Initiatives and Implementation Scenarios will be used. The output is the HSE Implementation Plan which includes an Implementation Plan for each Initiative to be executed.

**Benefits of the Business-Driven HSE Systems Planning Model**

As companies implement an HSE-MIS under ISO 14001, EMAS, or some other standard, aligning business objectives from multiple stakeholders becomes key. The Business-Driven HSE Systems Planning Model (Introduced in Chapter One) fosters this alignment in several ways:

- HSE planning is driven by the Strategic Business Plan;
- The MIS and HSE partnership is operative throughout all phases;
- The Cross-Functional Team provides key input at multiple phases.

# CHAPTER 2: PHASE 1 – HSE OPERATIONS VISIONING

***A vision is a mental picture of where you want to be. Strategy is how you will achieve the vision. Visioning helps HSE managers develop an HSE management strategy based on the needs of the business enabling them to direct planning and resource allocation efforts toward the greatest benefit to the organization. The development of a long-term (5 to 10 years) HSE Vision, driven by the Strategic Business Plan, is the critical first step of the Planning Model. It is followed closely by a set of strategies necessary to achieve the HSE Vision.***

## Vision Ownership and Input

The existence and communication of the Corporate Strategic Business Plan kickstarts the HSE Operations Visioning process (Phase 1). The HSE manager owns the HSE Vision development process and, once developed, the HSE Vision itself. The breadth of the Vision must be consistent with the scope of the Strategic Plan ensuring that the HSE Vision encompasses corporate, business unit and facility level planning. The HSE manager develops the HSE Vision with the Cross-Functional Team (see Introduction). Members tapped for their expertise during planning become champions or, at minimum, major players throughout implementation. When the Cross-Functional Team is involved, HSE Vision and Strategy development is more effective and the HSE-MIS is more comprehensive. Without such involvement, agendas and issues require constant rework and an opportunity is missed to integrate HSE practice into operational activity.

## MIS is a Key Player

The HSE Vision and Strategy should in all cases be developed in close coordination with MIS management. HSE initiatives frequently depend on MIS resource allocation, technology vision, MIS and project knowledge, architectural integration, and day-to-day information exchange.

## Benefits of Stakeholder Involvement

The Vision serves to communicate the unifying concept behind the HSE strategy and to motivate players across the enterprise who are critical to the HSE-MIS success. When stakeholder positions are considered in developing the HSE Vision and Strategy:

- Alignment with corporate strategies and standards results;
- Resources are leveraged to the full advantage of the organization;
- Information needs are realized;
- User activity migrates from data management to informed decision-making;
- HSE integrates most fully with the functional business processes.

AT&T values stakeholder involvement in realizing its vision:

***Instilling the Vision in AT&T Employees:***[5] At AT&T, HSE vision, policy, goals, and guidelines are part of a single document. This document is one of the six key HSE messages to be communicated throughout the corporation in 1997. Each key message is reinforced via hardcopy (posters, newsletters) and electronic (e-mail, world wide web) media. The goal is to expose employees to each message six to nine times. Technical jargon is translated to reader-friendly language. The text focuses on day-to-day activities; the tone is personal and informal.

**Developing Vision and Strategy: The Impact of Company Culture**

Company culture, budgetary constraints and management profiles influence the scope of vision development. Globalization creates unique issues, both with people and technology, that need to be addressed. Vision and strategy development requires team involvement. Though there are many ways to approach this, two of them are interviewing and group sessions.

One method to develop vision and strategy is through a series of group session workshops. The HSE manager selects appropriate personnel to participate. Ideally, these individuals are high level managers with the ability to envision where their area of the business will be in five to ten years. These managers should represent each functional area and be well positioned to sell and promote ideas. During the workshops, the HSE manager facilitates discussion and generates input from the Cross-Functional Team. Team members are prompted to describe, at a high level of detail, the information capability needed to support the current and future business operations as detailed in the Strategic Business Plan.

Anheuser-Busch maintains and communicates its vision to employees using different methods that are part of the company culture:

***Communicating the Vision at Anheuser-Busch:*** At Anheuser-Busch, corporate distribution of the new environmental policy and the updated Corporate Mission enables the environmental vision to be communicated. These documents demonstrate corporate support and commitment for environmental and information management changes. Documents provide the foundation for helping all employees understand the importance of environmental responsibility. Written and electronic materials are reinforced through day-to-day, face-to-face exchanges.

**Phase I Output: A Vision and Strategy**

At the completion of Phase 1, an HSE Vision and Strategy are developed.

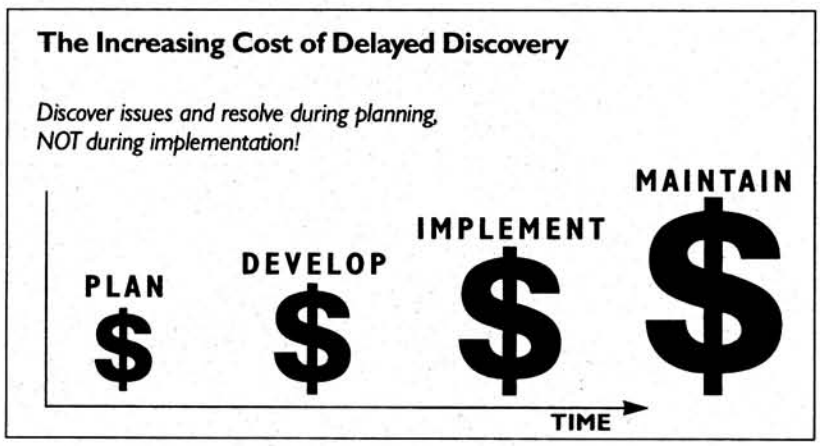
[5] "Instilling the Vision in AT&T Employees" example provided by Joe Roitz of AT&T.

## CHAPTER 3: PHASE 2 - HSE PROCESS MAPPING

***Enterprise-wide data management solutions offer a powerful new tool to HSE managers. Activities ranging from chemical management to tracking HSE costs are handled readily by currently available standard systems. Taking advantage of these opportunities requires that HSE managers first understand their workflow processes and then determine how those processes must evolve.***

### What is Process Mapping?

Process mapping breaks down the activities of a selected area into definable and repeatable steps. This makes the vision and strategy physical and understandable. A defined process also translates technical activities into business language, making complex activities clearer. Mapping enables the team to identify workflow processes, how the activities and processes are organized and fit together, needing improvement or elimination. This step creates the largest opportunity for cost savings, before implementation. Discovering issues and resolving them early in planning is substantially less costly than waiting to discover and address them later. [6]




The more process analysis completed up-front during mapping or throughout the planning cycle, the less likely the Cross-Functional Team will encounter costly process reworks during implementation. Regulatory changes prompted AT&T to revisit their HSE business processes:

***HSE Restructured into Corporate-Wide Processes at AT&T:***[7] As part of the split-up of AT&T, all HSE functions, activities and budgets were inventoried and a new, process-based organization was developed from Baldrige and ISO principles. Now, all activities are managed by cross-functional Process Management Teams. These teams document and improve the sub-processes they manage. All HSE work within AT&T is part of these HSE process and sub-processes.

[6] "Increasing Cost of Delayed Discovery" graphic contributed by Philip O'Connell of Digital Equipment Corporation.

[7] "HSE Restructured into Corporate-Wide Processes at AT&T" example provided by Joe Roitz of AT&T.

**HSE Process Evaluation**[8]

With the HSE Vision and Strategy (Phase 1) as input, the HSE manager drives the Cross-Functional Team to map and evaluate existing HSE work routines. When opportunities for process improvement arise, the team may recommend process improvements. Involvement from all members of the Cross-Functional Team is critical. Further, input from non-management workers within the functional areas is important to ensure process map details are groundtruthed by end-users. DuPont addressed business process definition through a series of planned steps:

***DuPont Cross-Functional Team Analyzes MSDS Workflows:*** In developing a global MSDS system, DuPont's Cross-Functional Team analyzed existing workflows to determine functional requirements. The Cross-Functional Team included representatives of businesses in the U.S. and Europe. The team (1) defined the working environment of the proposed system, (2) reviewed existing workflows, (3) isolated opportunities for process improvements and (4) established the new workflow model. A sub-team then developed the detailed functional requirements. Once the functional requirements for the global MSDS system were developed, the team continued to serve a key role in evaluating the system's effectiveness and in selecting candidate MSDS systems.

Support from the MIS organization is also valuable. If HSE operates in a fragmented and non-standard computing infrastructure, process improvements may require MIS architecture development. If the HSE-MIS requires a change from existing architecture standards, new standards should be established in adherence to MIS future directions. Browning-Ferris Industries has also undergone business process definition. Note the effective use of front line facility employees:

***HSE Process Definition at Browning-Ferris Industries (BFI):***[9] Defining HSE processes at BFI began with a Cross-Functional Team. This team (Team A), composed largely of non-HSE front line employees, identified specific steps of the HSE input/reporting process. Activity was facilitated by an unbiased third party with workflow definition and blueprint mapping experience. Team A also identified barriers to effective management of HSE information in the current system. A second team (Team B) was assembled to define HSE workflows in an ideal world. Team B compared their results (to be) with that of the Team A (as is). Based on this comparison and an evaluation of implementation barriers, Team B developed a set of recommendations. These recommendations were used as the basis for the new system configuration.

[8] This Chapter underscores the importance of process analysis in the planning cycle and provides some high level examples of work in that area. The reader is encouraged to seek other literature for detailed instruction on or examples of process evaluation.

[9] "HSE Process Definition at Browning-Ferris Industries (BFI)" example provided by John R. Hayworth of BFI.

**Developing the HSE Process Blueprint**

As HSE processes are mapped and evaluated, an HSE Process Blueprint is developed. This Blueprint details work processes required to fulfill the HSE Vision and Strategy and conveys any interdependencies with other business processes. Measures are developed to quantify increased efficiency, increased cost-savings, and even improved morale. Measures are tied directly to individual business objectives. Functional ownership of HSE work processes, if not established in HSE Visioning (Phase 1), is established.

**Phase 2 Output: the HSE Process Blueprint**

At the conclusion of Phase 2, the HSE Process Blueprint is developed. It should be consistent with the Vision and Strategy. Once a company has gone through this planning cycle, a Process Blueprint exists for the current state (as is) and effort may be focused more on future (to be) processes. The first time through, if no Blueprint exists, both the current and the future processes should be created.

# CHAPTER 4: PHASE 3 – HSE INFORMATION ANALYSIS

***Activity in this phase is shared between the HSE and MIS organizations. HSE Information Analysis involves defining data requirements and architecture, standards and measures, report delivery, and security. The result is a "bulked up" version of the HSE Process Blueprint, known at the end of this process as the HSE Information Model.***

## Moving from a Blueprint to an Information Model

The main difference between the HSE Process Blueprint and the HSE Information Model is that the Blueprint identifies HSE business processes only. For example, answer the questions: 'What are the steps we take today to manage HSE issues?' and 'What are the steps we want to take in the future to manage HSE issues?'. The answers identify business processes.

The Information Model indicates the data that must be collected to support HSE processes today and in the future. The Information Model includes report management, data architecture and standards, information security and other information necessary to support the processes.

The delineation of the HSE Process Mapping (Phase 2) and HSE Information Analysis (Phase 3) are clear within the HSE Systems Planning Model. In reality, the line between the two may be blurry. For example, at Anheuser-Busch, Process Mapping and HSE Information Analysis were carried out concurrently. As future state processes were mapped out, defining the data requirements was a natural progression.

> ***Improved Business Processes at Anheuser-Busch:*** In 1994, Anheuser-Busch began developing an environmental process and information model. Through a series of meetings, a cross-functional team of facility and corporate staff helped to define 'to-be' processes and provide value-added by redefining inefficient processes. Task redundancy was eliminated. Process flows were streamlined. The team developed a standard blueprint for corporate-wide environmental management. The blueprint includes the environmental data necessary to implement the business processes.

## HSE Information Analysis

The HSE manager uses the output from Phase 2, the HSE Process Blueprint, and defines information technology needed to support the reengineered HSE processes contained in the Blueprint. HSE and MIS managers research and document the following:

- Data requirements: Data needs for process improvements.
- Existing capabilities: Current status of existing system capabilities.
- Architecture needs: Procedures for compliance to new standards.
- Security issues: Procedures to address security concerns.
- Commercial software needs: Linkages to existing applications.

- Measures for objectives: Measures necessary for HSE Process Blueprint.
- Reporting needs: Reporting requirements are considered.

**Phase 3 Output: An HSE Information Model**

At the back end of this analysis is a high-level roadmap of an implementation plan or HSE Information Model containing software, hardware and other information technology requirements to affect the HSE Process Blueprint. In subsequent phases, this HSE Information Model is reviewed and critiqued by the MIS organization and the Cross-Functional Team. As in Phase 2, once a company has gone through this planning cycle, a current HSE Information Model exists to compare against future needs. If no current Information Model exists, one must be created.

# CHAPTER 5: PHASE 4 – MIS FUTURE TECHNOLOGY VISIONING

***Developing the Corporate Future Technology Vision enables MIS and HSE professionals to think strategically about maximizing short- and long-term technology solutions to needs identified in the HSE Information Model.***

## Technology Vision Ownership

MIS Technology Visioning is a required input into the Model. The activity in Phase 4, driven by the MIS organization, happens independent of the HSE phases. Activity during this phase may be sequential to Phase 3 or concurrent with Phase 1 through 3 of the Planning Model. In Phase 4, the MIS manager assesses current and future trends in information technology and may or may not seek involvement from the Cross-Functional Team. However, the MIS manager should include the HSE manager in the MIS visioning process. If MIS does not seek out HSE, HSE should seek out the MIS process and provide current and future HSE requirements which would impact technology decisions.

The scope of the output, the Corporate Future Technology Vision, is quite broad. The output is a corporate vision of technology possibilities for the company for the next five to ten years. HSE is one of multiple corporate functions which should be included. Colgate's HSE professionals make sure this happens:

> ***Maintaining Global MIS Standards at Colgate-Palmolive:***[10] Colgate's HSE professionals maintain close contact with MIS professionals to ensure all HSE software developed or purchased is designed to run on platforms meeting the corporate MIS global standard and strategy.

### *Making the Right Call on Technology Options*

Technology visioning requires key insight from MIS professionals. Listed below are several impacting the decision-making process:

1. A technological breakthrough today may be outmoded in a few months, well before long-term planning is implemented.
2. A technological breakthrough in the marketplace does not ensure a good match with the company's business objectives.
3. Short-term business objectives may be met by existing technologies, while longer term objectives require new technology.
4. An accurate evaluation of benefits and costs of staying with an existing technology versus moving to a new technology is required.

[10] "Maintaining Global MIS Standards at Colgate-Palmolive" example provided by Bill Faraday of the Colgate-Palmolive Company.

As an example, the MIS organization may adopt a planned approach toward technology purchases, including hardware, software, network, etc. Such a steady purchase mode will keep the HSE-MIS initiative from bearing the costs of updating the user population to a technology baseline. Procter & Gamble professionals ask many questions to make sure they are moving in the right direction:

***Moving Toward Company-Wide Standards at Procter & Gamble:*** When new technology is evaluated at Procter & Gamble, MIS and HSE professionals ask two questions: Will this leapfrog other technology? Will this make any of our current systems obsolete? These questions enable MIS and HSE managers to create a corporate map or vision for technology. This vision includes a move toward company standards for hardware and software. With each new technology swing, there is a possibility that applications may become obsolete. The technology vision helps to guard against that possibility.

**Phase 4 Output: The Corporate Technology Vision**

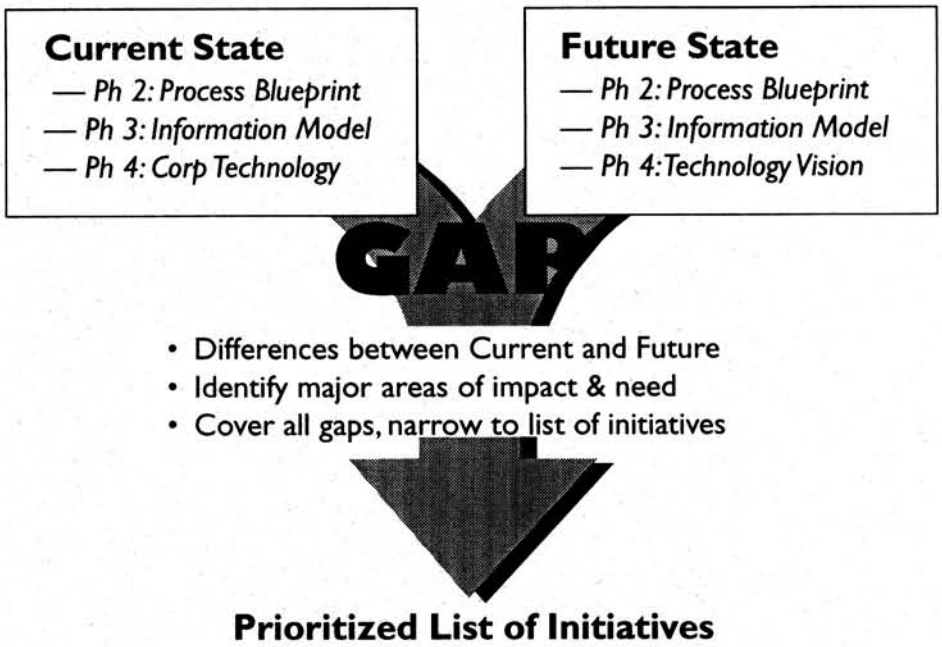
At the end of this phase, the MIS organization produces a Corporate Technology Vision detailing options to specific technology questions. The Corporate Technology Vision must be accessible to and understood by other corporate functional areas, including HSE. As in Phases 2 and 3, once a company has gone through this planning cycle, a current Technology Vision will exist. If none exists, the current technology status and the future Technology Vision must be created.

## CHAPTER 6: PHASE 5 – HSE GAP ANALYSIS

***During this phase a variance analysis is performed between the current state and future direction of the system as represented in the HSE Process Blueprint (Phase 2), the HSE Information Model (Phase 3) and the Corporate Technology Vision (Phase 4). The output is a prioritized list of HSE Initiatives. The gaps reveal discrepancies between the HSE-MIS of today and HSE-MIS of tomorrow.***

### What is the HSE Gap Analysis?

The Gap Analysis is a comparison of the current state and the future direction. The gaps are documented and used to identify a list of initiatives that will further the organization towards the future state or direction. The initiatives eventually become part of an Implementation Plan (Phase 6).




### Ownership of the HSE Gap Analysis

The HSE manager drives the Gap Analysis, however because the Corporate Technology Vision is corporate-wide, the MIS manager may be involved in key functions. The Gap Analysis uncovers the variance between the current information management system and the new functional requirements.

### Current State Assessment

If the current state of HSE information management systems has been captured during Phases 2, 3 and 4, the foundation for the Gap Analysis is complete. From here, the HSE manager pulls existing documentation together in comparison of the current system and its future direction. If the current state has not been documented, the Cross-Functional Team is assembled again to develop the current state analysis.

### Making the Business Case for the HSE-MIS

When the planning process reaches Gap Analysis, barriers surface. HSE and MIS managers understand the variance between the current and desired system and the required dollars to affect the change. When cost is articulated, executive management or functional area leaders may begin to withdraw support. The HSE manager must enumerate the tangible and intangible benefits of the planned HSE-MIS to retain stakeholder support. Tangible benefits translate easily into dollar savings: reduced person-hours for re-keying data or re-running reports. Intangible benefits include enhanced decision-making, increased reporting accuracy or improved ability to make deadlines. Whenever possible, intangible benefits should be converted to tangible benefits to bolster the business case justification. For example, "higher report accuracy" translates to the cost savings in person-hours for avoiding report reruns, recirculations, or misinformed decision-making.

### Uncovering Hidden Costs

"Hidden costs" are costs which are currently understated or unidentified by the existing cost system. For example, permits managed at multiple locations with no data formats or input standards can lead to understated permit management costs. At a higher level, when activities required by the parent company to bring data to one format are not captured by the current system, hidden costs exist. The goal is to uncover these hidden costs and demonstrate a cost-savings in permit management under the planned system, as compared to "real costs" of operating under the old, non-standardized system. "Real costs" are the sum of the existing stated costs and hidden costs. Hidden costs are often identified with face-to-face discussion with facility workers. If the benefits exceed the costs, the proposed HSE-MIS would likely receive executive management and functional area leadership support. Chapter Eight provides more detail on benefits and measures.

### Resolving Obstacles During the Gap Analysis Phase

Generally obstacles are identified and resolved early in the planning process. Any known obstacle which was not addressed earlier in the Planning Model should be addressed at this time. Obstacles, beyond hidden costs and financial justification, which the HSE manager may encounter include:

- Real-time problem solving: Business requirements may have evolved since the initial development of the Strategic Business Plan. New requirements may need to be evaluated and incorporated.

- Technology currently deployed: Technology deployed by the company and the current infrastructure may be inadequate to meet the requirements. Funding and timing issues for new technology need to be assessed.

- Technology in the marketplace: Technology available for purchase in the marketplace may not be mature or have the needed features and functions.

- Corporate mandates: Corporate direction may have shifted since the beginning of the planning process. This may impact goals, funds, and resources.

- Underestimation, scope increases and funding: The project scope may have expanded due to original underestimation of the work involved or because the objectives have shifted. Plans and finances may require reevaluation.

- Standards: Corporate architecture or data standards may be poorly defined and communicated.

- Security: The complexity of integrating multiple work processes and information systems may introduce unforeseen security challenges.

Procter & Gamble faced one of these challenges while searching for a training application:

***Technology Obstacle — Procter & Gamble Chooses Phase-In Approach:*** In developing scenarios for distributing training materials, Procter & Gamble found that the existing application was not technologically evolved enough to convey graphics. HSE managers opted for a phased-in approach. The text portion of the training materials was distributed via the preferred application. The decision was made to distribute hard-copy versions of the graphics until the technology for reading graphics became available to the user audience.

Anheuser-Busch faced another obstacle: underestimation, scope increases and funding. The obstacle was overcome, but not without impact to the project.

***Underestimation Obstacle Anheuser-Busch Chooses to Increase Scope and Fulfill Multi-level Wastewater Regulatory Requirements:*** HSE and MIS professionals selected a wastewater facility initiative to pilot their HSE-MIS planning process. Two wastewater sites were involved with intricate wastewater requirements. Data at one facility required correlation with that of the second facility where wastewater was used for agricultural purposes. The existing HSE information process required re-work; it was labor-intensive and data redundant. Roles and responsibilities required re-definition. Further, regulatory requirements were increasing in severity.

The largest obstacle which HSE and MIS encountered was underestimation of work involved. Facility personnel underestimated the amount of time required to perform certain information management tasks. The number of reports required was also underestimated.

HSE and MIS professionals found that precise definition of the information management tasks to all parties involved is critical in getting accurate base measures. They also found that increasing the scope of the project to include all levels of reporting needs provided a comprehensive solution to the wastewater facilities' information needs.

**Phase 5 Output: a Prioritized List of Initiatives**

As the HSE manager resolves obstacles at the Gap Analysis phase, a clear list of Prioritized HSE Initiatives, with up-to-date business requirements, results. Bristol-Myers Squibb has established their initiatives as goals for the year 2000:

***Bristol-Myers Squibb's Action Plan for Productivity:***[11] In 1995 Bristol-Myers Squibb's HSE function completed a comprehensive strategic planning effort encompassing all of global operations. The objective was to identify, refine and quantify key HSE initiatives in support of the Company's business strategy. The output of this effort was seven strategic HSE initiatives to implement before the year 2000. An eighth initiative — HSE information systems development — was established to enable the other seven initiatives.

The Prioritized List of Initiatives will be company specific, and therefore relevant to each unique HSE MIS.

- An Initiatives List may include such items as:
- Implement electronic training system for HSE;
- Implement vehicle emissions tracking system;
- Implement employee exposure tracking system;
- Implement self-audit system.

The key to developing a list that reflects the needs of the HSE and the company, is to begin the Gap Analysis with accurate and complete current and future state information.

[11] "Bristol-Myers Squibb's Action Plan for Productivity" - example provided by Lee Hanmer of the Bristol-Myers Squibb Company.

# CHAPTER 7: PHASE 6 - HSE IMPLEMENTATION SCENARIO DEVELOPMENT

***Activity in this final phase of the Planning Model, HSE Implementation Scenario Development, involves the Cross-Functional Team. Driven by the HSE manager, the Team reviews the Prioritized HSE Initiative List and develops multiple implementation scenarios for each Initiative. After the scenarios are developed, the Team selects the most appropriate scenario for each Initiative. The Implementation Plan results.***

**What is an Implementation Scenario?**

An Implementation Scenario is a detailed view of what is required to implement a specific initiative. The Team develops multiple implementation scenarios for each of the top items on the HSE Initiatives List. Scenario development is useful particularly when organizations are in flux or the number of unknowns is high. Developing multiple scenarios for each top Initiative provides choices in case a particular scenario is impractical. The HSE manager and Team selects the best scenario for each Initiative as organizational unknowns are clarified over time. The following is a brief example for one Initiative, actual scenarios should include more detail:

Initiative: Implement a vehicle emissions tracking system
Scenario 1: Implement a system for all cars, trucks and other vehicles owned.
Scenario 2: Implement a system at one facility (specify) to track all vehicles. (SELECTED)
Scenario 3: Implement a system at two facilities (specify) to track company-owned vehicles.

At the end of Phase 6, one Scenario from each key Initiative will be selected and become part of the Implementation Plan.

**Elapsed Time and Technology Changes**

The HSE manager should consider the effect of elapsed time on implementation planning. For long-term development and implementation efforts, given the rapid increase of emerging technologies, periodic re-evaluation of the implementation scenarios provides assurance that the perceived solutions will work.

**Step Approach to Implementation Planning**

A step approach to implementation planning is also helpful.

- Step I: Address fundamental business needs with simple modules which form the foundations of the HSE-MIS. This is critical to establishing buy-in.
- Step II: Enhance simple modules, and develop new modules for addressing additional business needs. Consider the design of future enhancements.
- Step III: Address corporate needs for data summaries, program oversight, and trend analysis.

A key to overall success is to develop Implementation Plans that can be accomplished in a short enough amount of time to succeed, establish credibility, and gain buy-in. Smaller successes are easy to achieve, but the efforts must be balanced with the quality of results. Procter & Gamble addresses this problem by responding to a quick planning cycle:

***Procter & Gamble's Quick Planning Cycle:*** A relatively quick planning cycle at the corporate level is important to Procter & Gamble HSE professionals for two reasons. First, given the size of the company, it is important to keep a "real-time" approach to planning, with one quick cycle and perhaps several recyclings. If Procter & Gamble spends too much time in planning, implementation scenarios no longer reflect the existing work processes, architecture and company needs. Priorities and infrastructure change quickly. Further, quick planning and recyclings provides HSE managers flexibility in integrating an HSE technology into another company-wide system.

**Selecting Which Scenarios to Develop**

In selecting scenarios to develop, the HSE manager should consider the following criteria:

- What are the priorities as identified by the Cross-Functional Team?
- What are the HSE compliance risk factors?
- What criteria will be used to determine need for future enhancements?
- Can the existing infrastructure, HSE staffing, and established policies support the system?

Kodak uses an approach designed to include these considerations:

***Kodak - Selecting an Implementation Plan that Represents Company Objectives:*** At Kodak, the Implementation is focused on attaining the long-term vision of HSE. Projects are prioritized to address those areas that have the greatest need and are aligned with overall goals. Keeping the planning process as interactive as possible is key. Multiple iterations with the Review Board or user community enables solutions to be on target and to reflect developments in the company culture. Too often, Kodak finds that initiatives are prioritized based on specific needs of one department or one organization. This approach helps to eliminate that possibility and to keep the focus on the needs of the company as a whole.

**Phase 6 Output: an HSE Implementation Plan**

After HSE Implementation Scenarios are complete, HSE and other management select the most appropriate scenario for each Initiative. The selected scenarios form the Implementation Plan. The Implementation Plan includes clear measures which are communicated to the Cross-Functional Team before implementation begins. While the Implementation Plan is HSE-specific, system development and implementation must dovetail with existing and developing initiatives in non-HSE areas throughout the corporation.

The model ends here. After Phase 6, the next step is implementation of the plans.

## CHAPTER 8: MEASURING THE BENEFIT

***The primary purpose for measuring the benefit is to demonstrate to executive management the economic business case associated with developing an HSE-MIS. Measures should tie in with the defined processes and they should be measured consistently, at the facility and corporate roll-up levels. The planning model offers benefit at two levels: Creating and uncovering benefits at the project level and facilitating the integration of HSE values into the organization at a high level.***

### Project Benefits

Throughout the planning cycle, Phases 1 through 6, measures are defined and redefined. Each measure is tied directly to business objectives or goals as stated in the HSE Process Blueprint (Phase 2), HSE Information Model (Phase 3), Corporate Technology Vision (Phase 4) and the HSE Initiatives List (Phase 5). Measures finalized in the HSE Implementation Plan (Phase 6), offer additional value. As systems development and implementation begins, measurements defined during planning are taken. They are reported to stakeholders, including executive management, indicating the system's ability to provide actual versus planned benefits. Tenneco understands the value of communicating benefits:

> ***Tenneco Opts for Company-Wide Articulation of HSE Benefits:*** In 1994, an outside consultant was directed to estimate the cost of a comprehensive, integrated HSE-MIS. The system was intended to collapse several disparate "data silos" and manage functions performed by several divisions. Given time constraints, the budget submitted by the consultant articulated cost but did not fully articulate benefits in hard dollar equivalents. When the HSE-MIS was not approved, in part due to the lack of benefits, Tenneco's HSE organization resolved to utilize the expertise of a cross-functional team to define needs and benefits more thoroughly.

Benefits may be specific to the HSE organization, the functional areas, or the company as a whole. The better an HSE manager is able to articulate benefits to all areas, the more likely the business case can be made. The following case study, submitted by Colgate-Palmolive, shows the justification of an MSDS system:

***Automating MSDS at Colgate-Palmolive - Making the Business Case:*** [12] At Colgate-Palmolive, MSDS are distributed via a centralized customer service location. The cost savings benefits shown in the table below are based on the activity of this location. Before introducing electronic management software, Colgate-Palmolive distributed approximately 10,000 company Material Safety Data Sheets (MSDS) per year by fax (25%) and by mail (75%). These methods were labor-intensive, time consuming and costly.

With the installation of MSDS software, Colgate-Palmolive gained greater efficiency in handling customer requests and distributing MSDS. Under the new system, approximately 65% of MSDS are faxed and 35% are mailed. MSDS can be faxed directly from a computer library of MSDS, thus reducing cycle time. MSDS are printed directly from the computer library at the end of business day and channeled to the appropriate personnel. This process allows further labor cost-savings and reduced cycle time resulting in greater customer satisfaction.

| | **HSE - Specific** | **Functional Areas** | **Company-Wide** |
|---|---|---|---|
| ***Objective - Tangible:*** | 1) Cost-efficient compliance | 1) More efficient resourcing | 1) Project Impact |
| ***Objective - Intangible:*** | 2) Greater information reliability | 2) Enhanced decisions | 2) Increased goodwill |
| ***Measure - Tangible:*** | 1) Machine-hours saved | 1) Reduced labor costs | 1) Predict Staffing |
| ***Measure - Intangible:*** | 2) Cost of reworks | 2) Reduced management costs | 2) Favorable press |
| ***Benefits/Costs: Tracing*** | Avg Annual MSDS Distribution Costs- Pre-Automation | | Avg Annual MSDS Distribution Costs - Post Automation |
| ***Mailing Costs*** | | | |
| ***• Processing*** | $26,250 | | $ 6,125 |
| ***• Supplies*** | $ 2,250 | | $ 1,050 |
| ***• Postage*** | $ 4,175 | | $ 1,925 |
| ***Total*** | $32,625 | | $ 9,100 |
| ***Fax Costs*** | | | |
| ***• Processing*** | $ 8,750 | | $11,375 |
| ***• Supplies*** | $ 250 | | |
| ***• Postage*** | $ 3,750 | | $6,500 |
| ***Total*** | $12,750 | | $17,875 |
| ***System Maintenance*** | | | $ 2,500 |
| ***Implementation Costs*** | | | $ 500 |
| ***Total MSDS Dist Costs*** | $45,375 | | $29,975 |
| ***Net Benefit = $15,400 [13] for year one year*** | | | |

[12] "Automating MSDS at Colgate-Palmolive - Making the Business Case" example (text and chart) provided by Pat Peterson of the Colgate-Palmolive Company.

[13] "Net benefit" represents the cost-savings (pre-automation and post-automation) for the the first year of operation of the centralized customer service location.

As in the earlier example, each business objective is tied to a measure approximated by dollar values. Measures are tracked in the case of actual implementation throughout the calendar year (or projected in the case of the business justification process). Benefits of the new system are weighed against development and implementation costs. When the net benefit to the company is greater than the cost, the system should receive corporate support.

This example is simplified in that all costs are realized within the course of one calendar year. In most instances, integrated systems will encounter costs over more than one year and should produce benefits over many years. The true business case justification is based on the net costs and benefits that the system produces over its lifetime. Financial calculations should reflect this.

In some instances, the net benefit within the HSE organization may register more cost than benefit, yet the overall benefit to the functional areas and the company may be net positive. This underscores the need for HSE managers to articulate benefits enterprise-wide.

**Using the Budgeting Process to Make the Business Case**

When development costs are allocated to areas outside HSE, the HSE manager should use the company's budgeting process as the mechanism for making the business case. HSE-MIS development stays attuned to overall financial priorities by working within the framework of the company's strategic business plan and its budgeting process.

**Types of Measures: Tangible and Intangible**

Generally, those items easiest to measure and to equate to dollar values are time-sensitive: time for inputting data, time for each user to access, time for each user to complete the transaction. These are easily converted to a dollar value by quantifying the number of users involved and applying the proper labor rate. These are tangible benefits. Other benefits are more subjective and translated less easily to a dollar value: increased quality, increased safety, and enhanced company image. These are intangible benefits.

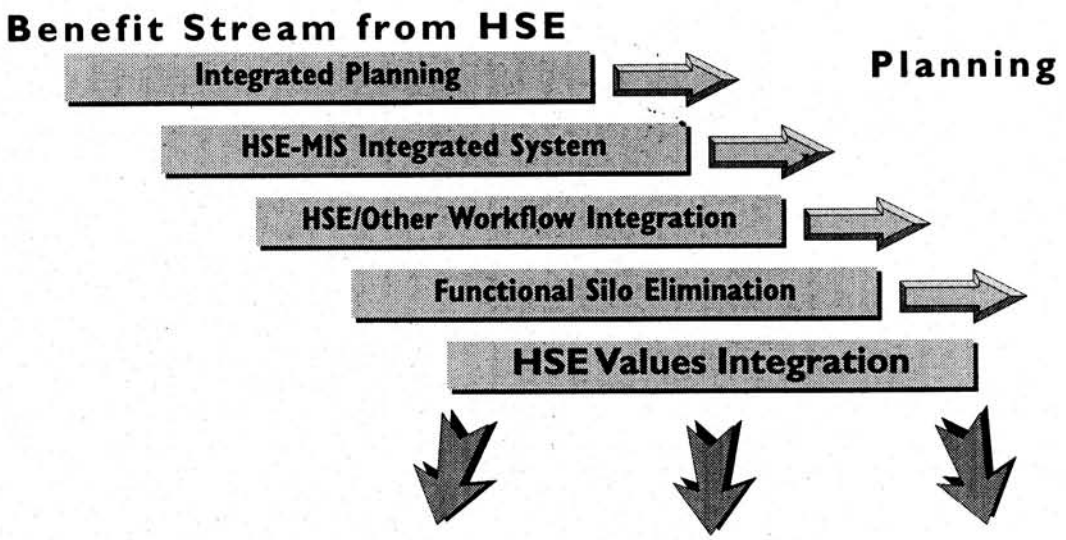
Tying measures to business objectives and converting intangible benefits to dollars enables greater:

- Ability to articulate benefits to HSE, functional areas and entire company;
- Potential for covering development and implementation costs;
- Business case justification;
- Likelihood for justifying budget increases due to project scope changes.

The more an HSE manager can convert intangible benefits to dollar values and articulate benefits company-wide, the more likely benefits will be adequate to cover the costs of the HSE-MIS.

**Integration Benefits**

The process of assembling a Cross-Functional Team and working together in a common process to achieve common goals promotes activities that lead to integration. The HSE Planning Model provides a common process that can enable HSE values integration throughout the organization. The following diagram shows the evolution from Integrated Planning to HSE Values Integration.




HSE values integration, in turn, enables organizational benefits — HSE, Function, and Company-wide — to be

**Organizational Benefits from HSE Values Integration**

| HSE | Integrated Functional Areas | Company-Wide |
|---|---|---|
| • more accurate HSE information<br>• faster relay of HSE information<br>• more focused exchange of HSE information<br>• increased ability to meet company HSE goals<br>• more cost-effective HSE regulatory compliance<br>• proactive HSE programs | • more efficient resource utilization<br>• less data redundancy<br>• more data consistency between functional areas<br>• more data reporting consistency between time periods<br>• enhanced decision-making between time periods<br>• enhanced decision-making at all staff levels:<br>- product stewardship<br>- product handling<br>• increased ability to support legal claims | • ability to lead in advocacy efforts, not react<br>• greater ability to predict impact of regulations on operations<br>• greater ability to move toward flat organizational structure<br>• greater ability to plan:<br>-plant loading<br>-product scheduling<br>• increased shareholder or stakeholder value, bottom line profits<br>• enhanced image, community goodwill<br>• increased HSE functionality throughout the business |

# CHAPTER 9: CONCLUSION

***This Primer provides an important planning tool for HSE managers developing integrated HSE-MIS systems. Partnership development with the Cross-Functional Team enables, among other items, benefits to be articulated and shared across the enterprise.***

## The Model as a Living Process

Though the conclusion marks the end of this Primer, it certainly does not mark the end of the model processes. While the strategies are defined, the gap analyses are conducted, and the implementation plans are carried out, change affecting that work is certain. As presented in this text, the phases flow logically in a simplified manner. In reality, the interactions within each of the phases and between phases are much more complex. As a result, the effort that takes place to make the model a reality is a continuous cycle. When one phase changes, such as the MIS Technology Vision or the HSE Strategy, the change has a ripple effect across the model. Changes such as these signal that it is time to reevaluate and update the outputs accordingly. The level of reevaluation is unique to a project and its objectives. Rarely will all the events and processes of the model fall neatly into place, providing plenty of challenges. Acknowledging and overcoming the challenges is a true measure of success.

## Practical Advice on HSE-MIS Planning

1. ***Ensure proper sponsorship or championship with senior business managers.*** Ensure back-up from the senior HSE business management and functional area sponsors. Assure that each implementation site has an HSE champion.

2. ***Communicate the HSE Vision effectively to HSE professionals in the plants.*** Invest time in conveying the vision and implementation strategies to HSE site personnel.

3. ***Use business language with the Cross-Functional Team and with executive management or those responsible for financing the system.*** Minimize functional area vocabularies and acronyms in favor of one shared business language. When the proposed system is scrutinized for funding, avoid technical and regulatory jargon.

4. ***Define measures early in the planning process and tie measures directly to business objectives or impact statements.*** Be sure business objectives are detailed for HSE, each of the functional areas and the company at large.

5. ***Capture and articulate benefits throughout the planning process.*** Articulate benefits, tangible and intangible, in terms of financial impact to assist with HSE-MIS justification.

6. ***Use technology that is most cost effective for your needs.*** Avoid chasing new technology. Realize old technology may be the desired solution for short- or mid-term business goals.

7. ***Avoid skipping steps and jumping to the point solution.*** Invest plenty of time up front to get buy-in and allow ideas to become accepted by functional owners.

8. ***Get to the solution. Avoid going too far into the planning mode.*** The objective is to build a system that will meet the company's stated goals, not to plan one.

9. ***Use a planning model when developing complex information systems.*** Use strategic thinking to coordinate, communicate and drive the Cross-Functional Team toward innovative HSE-MIS solutions.

10. ***Develop and maintain partnerships with functional area managers.*** Rely on the expertise of the Cross-Functional Team. Maintain partnerships to ensure that sponsorship and ownership definitions are kept functional during system implementation.

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