96-0000067

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

JAN 08 1996

96-PAD-63284

Mr. Ralph Arcaro
DNFSB Technical Staff
625 Indiana Avenue, N.W.
Suite 700
Washington, D.C. 20004

Dear Mr. Arcaro:

UPDATE ON SITEWIDE SYSTEMS ENGINEERING PATH FORWARD

The enclosed note to you from Mr. Lloyd Piper, Assistant Manager for Facility Transition, U.S. Department of Energy's Richland Operations Office, transmits information regarding the Hanford Sitewide Systems Engineering efforts. This information is being provided as a follow-up to a verbal commitment made by Mr. Piper to the DNFSB on November 8, 1995, to provide planning information regarding Hanford Sitewide Systems Engineering.

If additional assistance or more information is desired, please contact me at 509-376-1890, or Mrs. Lola M. Morgan, of Professional Analysis Incorporated, at 509-372-1321.

Sincerely,

S. L. Trine, RL/DNFSB Liaison
Performance Assessment Division

PAD:SLT

Enclosure

cc w/ encl:
P. F. Gubanc, DNFSB
K. T. Lang, EM-30
D. M. Lucoff, WHC
L. M. Morgan, PAI
M. Whitaker, EH-9

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DNF SAFETY BOARD

DON'T SAY IT --- *Write It!*

DATE: January 4, 1996

TO: Ralph Arcaro, DNFSB

FROM: Lloyd Piper, DOE-RL

Telephone: (509) 376-7435

SUBJECT: UPDATE ON SITEWIDE SYSTEMS ENGINEERING PATH FORWARD

In discussions with Paul Gubanc on January 4, 1996, about how best to communicate with the Board the progress we have made recently and our path forward, he suggested that we transmit the attached material to you and then discuss with you further action. As you recall, I committed to update the Board on our path forward in my November 1995 presentation on the subject. At that meeting I presented some draft elements of our proposed approach. The following highlights the progress since the November meeting and the future plan.

PROGRESS

1. The Sitewide Systems Engineering (SWSE) goals, principles, process, deliverables, process document hierarchy, and technical document hierarchy were defined and documented. It is consistent with my November presentation. (See Attachment 2)

2. The SWSE plan and approach was approved for implementation by the DOE-RL Site Management Board on December 11, 1995. (See Attachment 1)

3. A SWSE Integration Group from all affected programs and contractors was established and is operating to assist in the detailed definition and development of the SWSE products. (See Attachments 1 and 2)

PLAN

1. Finalize a formal DOE-RL Systems Engineering Policy Document in January 1996 including:
   - Systems Engineering Criteria Document
   - Systems Engineering Implementation Plan
   - Risk Management Plan
   - Decision Management Plan
   - Information Management Plan

2. Issue contractor SWSE Management Plan by March 1996.

3. Produce the first set of SWSE products by May 1996.

We recognize that we are late on these 92-4 commitments. As indicated, we anticipate completing the requirements rapidly. We plan to report status and progress against the existing commitments.

Steve Wisness and I will call you to discuss further actions.

ATTACHMENT 1

Attachment 1

Recommendation for Sitewide Systems Engineering Plan and Implementation to

DOE-RL Site Management Board

December 11, 1995

Lloyd Piper, AMF

Sitewide Systems Engineering

Organization Structure

- DOE/RL - Lloyd Piper - AMF
  Steve Wisness - PMD
  Al Colburn - PMD

- WHC - George Jackson - Site Integration Group
  Mike Grygiel - Site Integration Group
  Patrick Baynes - Site Integration Group

- Projects - Responsibility of appropriate DOE and contractor personnel

Sitewide Systems Engineering

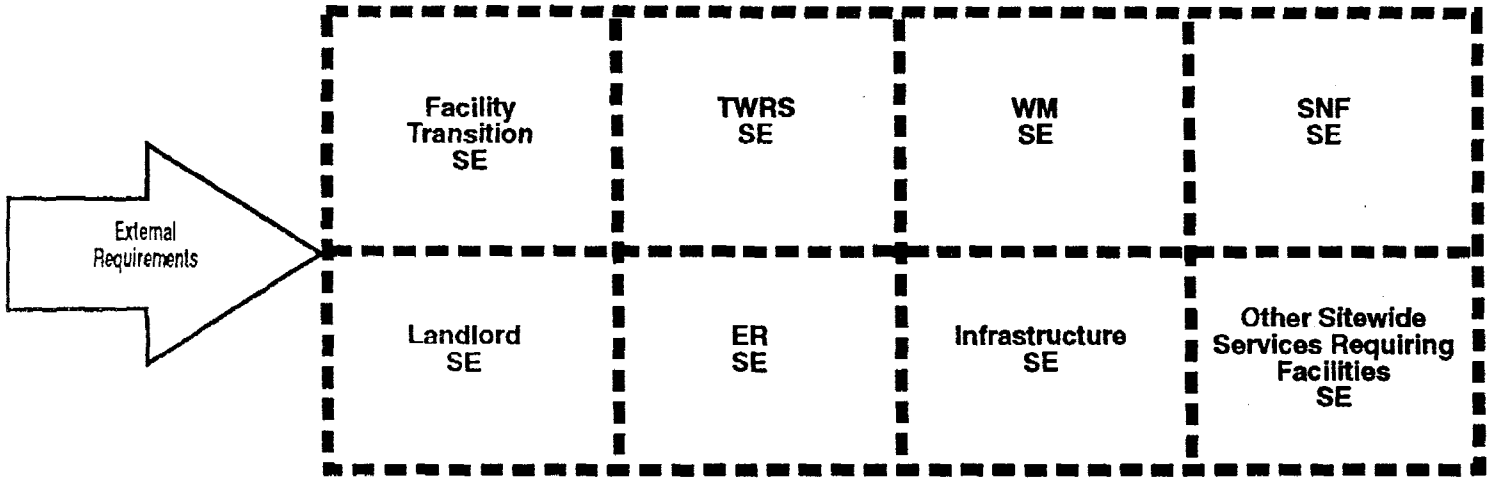
Goals

- Establish an iterative process to achieve a consistent top down set of management documents
- Produce usable results and products that support sitewide integration
- Define and manage
  - Requirements
  - Issues and assumptions
  - Interface control between projects, infrastructure
  - Waste management data tracked to intra-project level
- Provide high level technical and schedule baseline with consistent traceability from strategic plan to projects
- Projects continue systems engineering to level needed

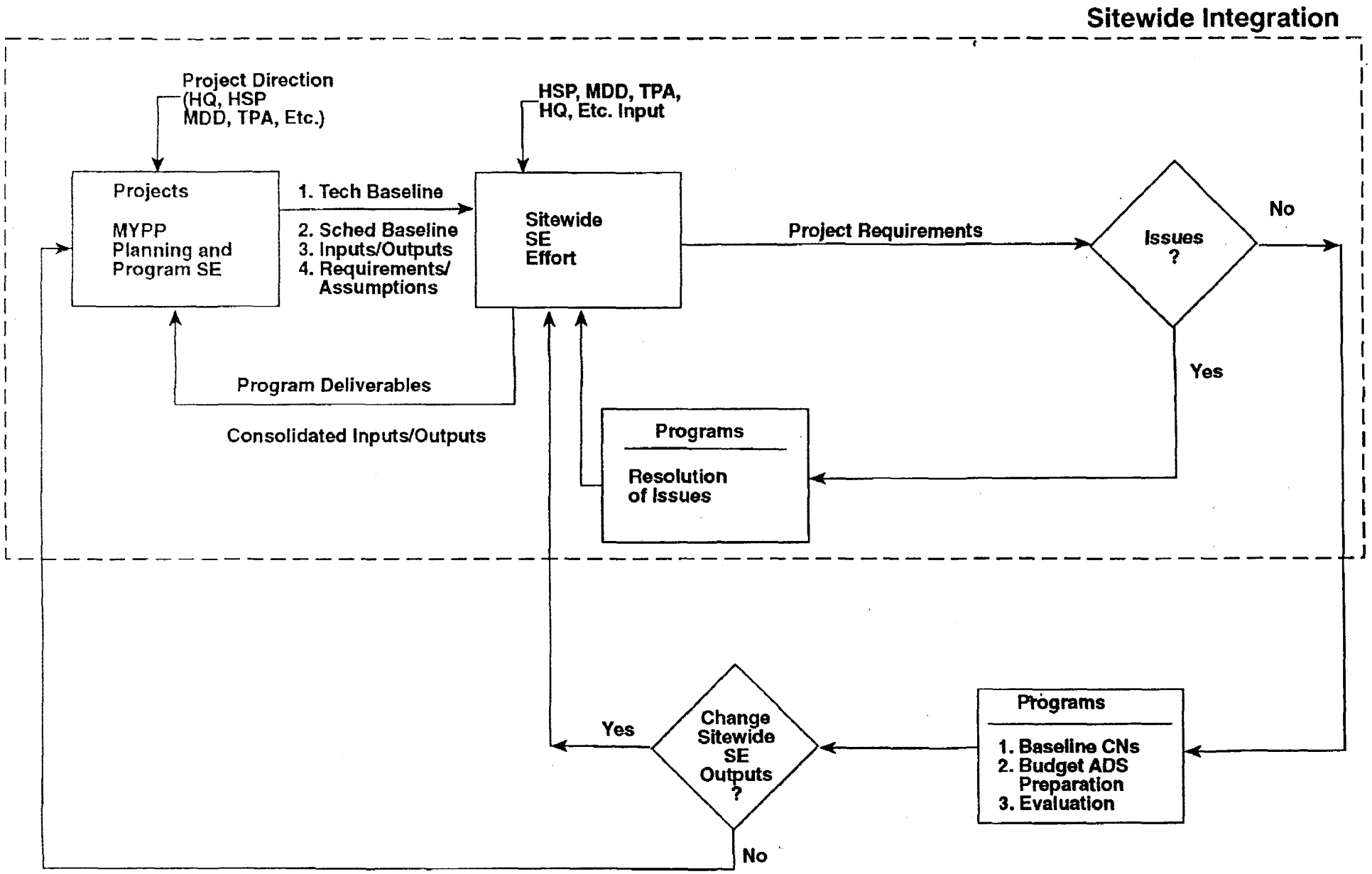
Sitewide Systems Engineering

Framework

Sitewide Systems Engineering



- Sitewide Systems Engineering is a framework focused on capturing and managing the boundary requirements for sitewide services requiring physical facilities and the boundary inputs/outputs requirements for projects.
- Project Systems Engineering is done by the projects at the level of detail appropriate for the dollar value of the project, complexity, sensitivity to changes, and impact on other projects. Detailed analysis, all trade studies, and initial change management is done at the project level.



Hanford Systems Engineering (SE) Process

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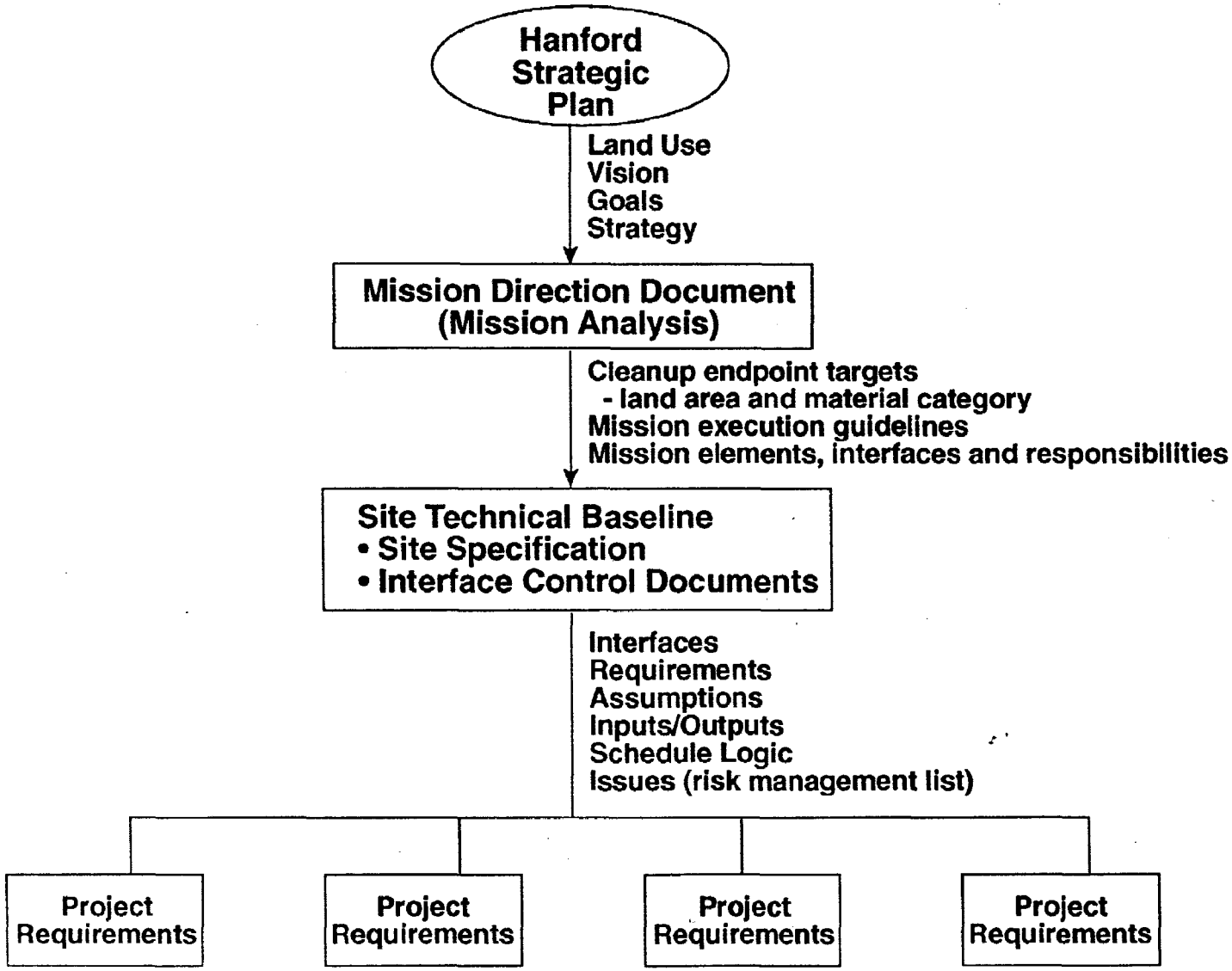
Sitewide Systems Engineering

Technical Document Hierarchy



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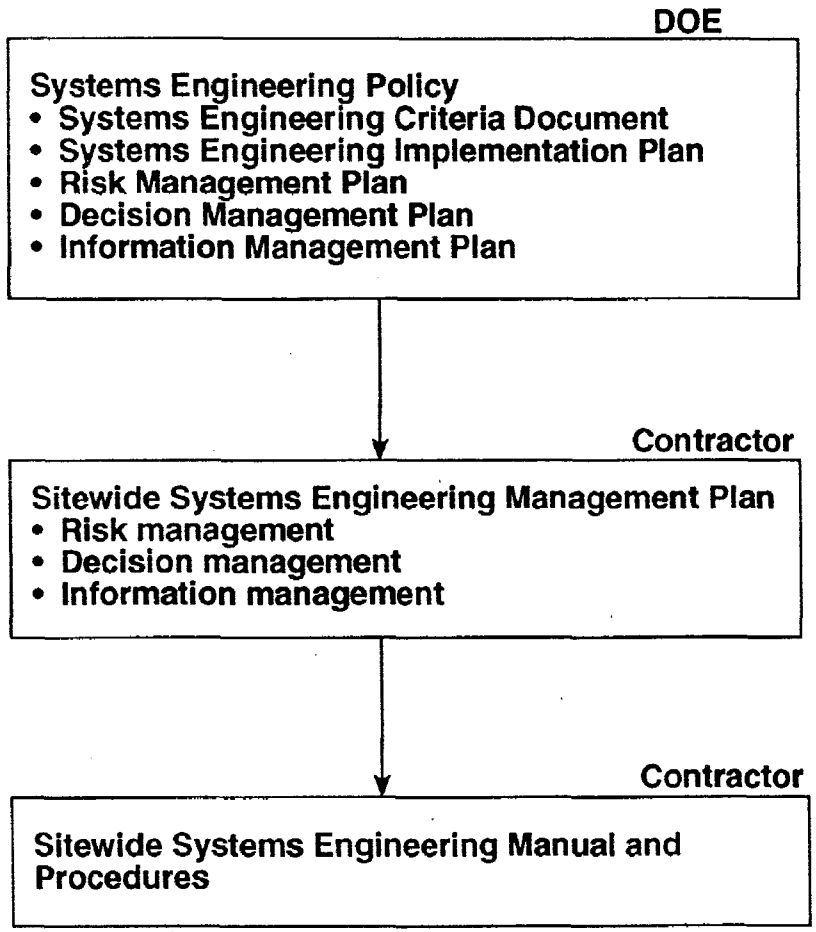
Sitewide Systems Engineering

Process Document Hierarchy



Support needed from Projects/Programs

- Participation in SWSE Integration Group
- Participation in development of necessary and sufficient minimum data requirements for site specification and interface management.
- Provide and update required SWSE data.
- Agreement to assume management and resource responsibility for the resolution of identified SWSE issues.

SWSE Integration Group Roles and Responsibilities

- Program/Project Responsibilities
  - Serve as SWSE point of contact for Project and communicate SWSE information to appropriate project personnel including schedule and budget groups
  - Represent Projects technical position(s)
  - Provide input to Site Technical Baseline database
  - Assist in definition of SWSE interfaces
  - Assist in identification of SWSE issues and determination of projects and systems impacted by resolution
  - Assist in identification of program/project with lead responsibility for issue resolution and resolution requirements
  - Communicate and coordinate needed Project response for issue resolution

- SWSE Responsibilities
  - Maintain Site Technical Baseline data base (STBLDB)
  - Integrate Project input to STBLDB
  - Track resolution of issues
  - Coordinate SWSE Integration Group activities

SWSE Integration Group

	RL	WHC/BCSR/ICF KH	PNL	BHI
Sitewide Systems Engineering	*Wisness/Colburn	**Smith/Baynes/Grygiel		
Tank Waste Remediation System	Kinzer/Sanders	Umek/Thomson	Seaver/Hesser	
Transition	Wisness/Angulo	Cartmell/Borisch		
Spent Nuclear Fuels	Knollmeyer/Augustenborg	Gerber/Womack		
Solid Waste	Knollmeyer/Augustenborg	Hamilton/Hladek		
Liquid Effluent	Knollmeyer/Augustenborg	Green/Lowe		
Environmental Restoration	Clendenon			Romine/Foelber
Infrastructure	Rutherford/Guillen	Seiler/Dieterle		
Program Integration	Higgins/Daily	Waite		
Science & Technology	Trader/Christensen	TBD	Triplett	
Reg Analysis	Kruger/Rasmussen	Dixon/Toebe		
Analytical Services		Gaylord		
Safety	Clark	TBD		

* Chairman
** Contractor Lead

___ Working Team

Recommendations

1. Approve the systems engineering plan and approach presented in SMB material.

2. Authorize Lloyd Piper and Steve Wisness to issue RL SWSE policy documentation consistent with SMB material in a final form without additional concurrence.

3. Provide Program/Project staff and contractor support for SWSE as outlined to minimize the costs for SWSE and provide quality useful products.

ATTACHMENT 2

Rev. 12/5/95

SITEWIDE SYSTEMS ENGINEERING

1. Systems Engineering Requirements: *While there are several general references to the use of system engineering in the planning and execution of the Hanford Mission, there is no specific definition of the processes to be adopted. The major sources of this guidance are:*

DOE-HQ	-	DOE Order 430.1, Life Cycle Asset Management Project Management Guide -10 (not a requirement)
DOE-RL	-	No specific requirements.
DNFSB 92-4	-	RL response included generic requirements to use systems engineering with specific deliverables e.g. Management Plan and Implementation Plan.
TPA	-	General integration requirement without specificity.
OMB A-109	-	Recommends use of systems engineering without specificity on MSA's.

2. Sitewide Systems Engineering (SWSE) Goals

Establish an iterative process to achieve a consistent top down set of management documents

Produce usable results and products that support sitewide integration

Define and manage
- Requirements
- Issues and assumptions
- Interface control between projects, infrastructure
- Waste management data tracked to intra-project level

Provide high level technical and schedule baseline with consistent traceability from strategic plan to projects

Projects continue systems engineering to level needed

3. Hanford Systems Engineering Philosophy

* Systems engineering principles *are* not a substitute for good project management.

* Sitewide Systems Engineering *(SWSE) will define and manage requirements, issues, assumptions, and interfaces* for sitewide *activities* requiring physical facilities and the boundary inputs/outputs requirements for projects. It is a framework for the program/project systems engineering (see Figure 1 - Framework).

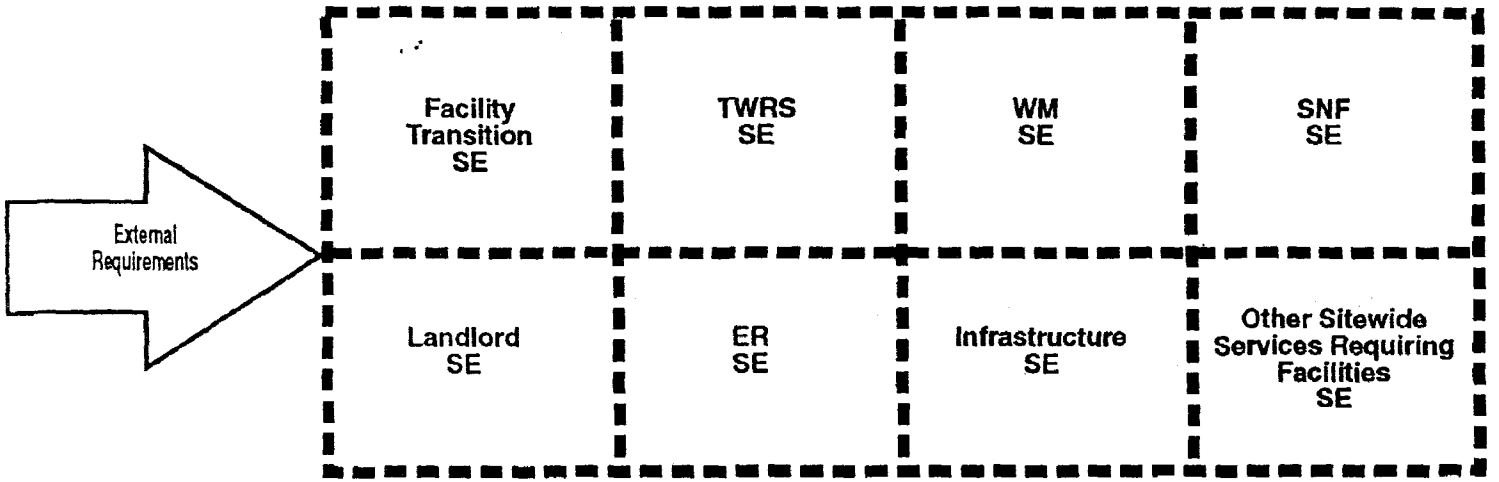
* Program/Project Systems Engineering is done by the programs and projects at the level of detail appropriate for the dollar value of the project, complexity, sensitivity to changes, and impact on other programs/projects. Detailed analysis, all trade studies,

Figure 1

Sitewide Systems Engineering

Framework

Sitewide Systems Engineering



- Sitewide Systems Engineering is a framework focused on capturing and managing the boundary requirements for sitewide services requiring physical facilities and the boundary inputs/outputs requirements for projects.
- Project Systems Engineering is done by the projects at the level of detail appropriate for the dollar value of the project, complexity, sensitivity to changes, and impact on other projects. Detailed analysis, all trade studies, and initial change management is done at the project level.

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and initial change management *of SWSE data* is done at the program/project level.

* Systems engineering principles are a support system for the development of MYPPs/SSPPs and budget submittals.

* Systems engineering *scope* will be limited to real physical project work and overhead/services requiring physical facilities and infrastructure.

* Systems engineering *scope* will be limited to the EM mission and the infrastructure/landlord services necessary to support PNL.

* Systems engineering applications are NOT:
  - A project management system for costs and schedule.
  - A budget system: budget issues/priorities/schedules are a separate area for the programs/projects and the RL Budget Division.

* A detailed composite total site systems engineering network is not required. *A sitewide systems engineering data base will be developed for the site level system description and maintained by SWSE. The principle vehicle for coordination of this information will be the SiteWide Systems Engineering Integration Group (SWSEIG).* Key physical interfaces between programs and projects will be identified through SWSE.

* Programs/projects are not required to use the same software or level of detail. Programs/projects can implement the systems engineering principles criteria as needed to get the results desired for the program/project and the information required for site level systems engineering.

* The sitewide systems engineering data will be updated continuously through the MYPP/SSPP, ADS, budget changes, program/project evaluations, and change notice processes. Hard copies, if required, will be published periodically.

* Programs/projects will perform trade studies, analysis of cost savings, contingency analysis, vulnerability analysis, and issue resolution as required.

4. Hanford Systems Engineering Process

See attached flowchart.

The Hanford Systems Engineering Process is a combined effort where sitewide support and line organizations function as a team to achieve the site objectives. The sitewide systems engineering (SWSE) function managed by AMF/PMD and the PID group provide analysis of the sitewide data and are service organizations to the line customers. The SWSE and

PID efforts will not assume line authority or responsibility for the application of systems engineering principles at the program/project level. SWSE and PID will provide the "4-Cs" coordination, consolidation, consistency, and consultation.

A summary of the Hanford Systems Engineering Process is: (Figure 2)

* The minimum practical data elements and definition for the SWSE effort is determined and revised as needed.

* Specific physical performance requirements are noted at the sitewide and the program/project level. Each program/project defines its additional requirements in an S/RIDs or equivalent process.

* The program/projects, in performing their planning process which includes systems engineering principles, develop the raw data required for SWSE.

* SWSE consolidates the data and includes appropriate site level physical performance requirements and interface data and sends information back to the projects and to PID for analysis.

* The information is analyzed by the projects to verify the planning basis and by PID for consistency and inclusion of requirements, consistency of assumptions and baseline information. Cost saving opportunities and technical issues are identified.

* In an iterative process, the programs/projects resolve the issues and revise the SWSE data as needed. In any cycle when the issues are resolved through analysis or adoption of an acceptable set of assumptions, sitewide integration has been achieved.

* As the programs/projects continue with baseline change control, evaluations, and preparation of budget and ADSs, any changes to the SWSE outputs will be provided to SWSE.

* SWSE will continuously update the data base and make it available for review electronically.

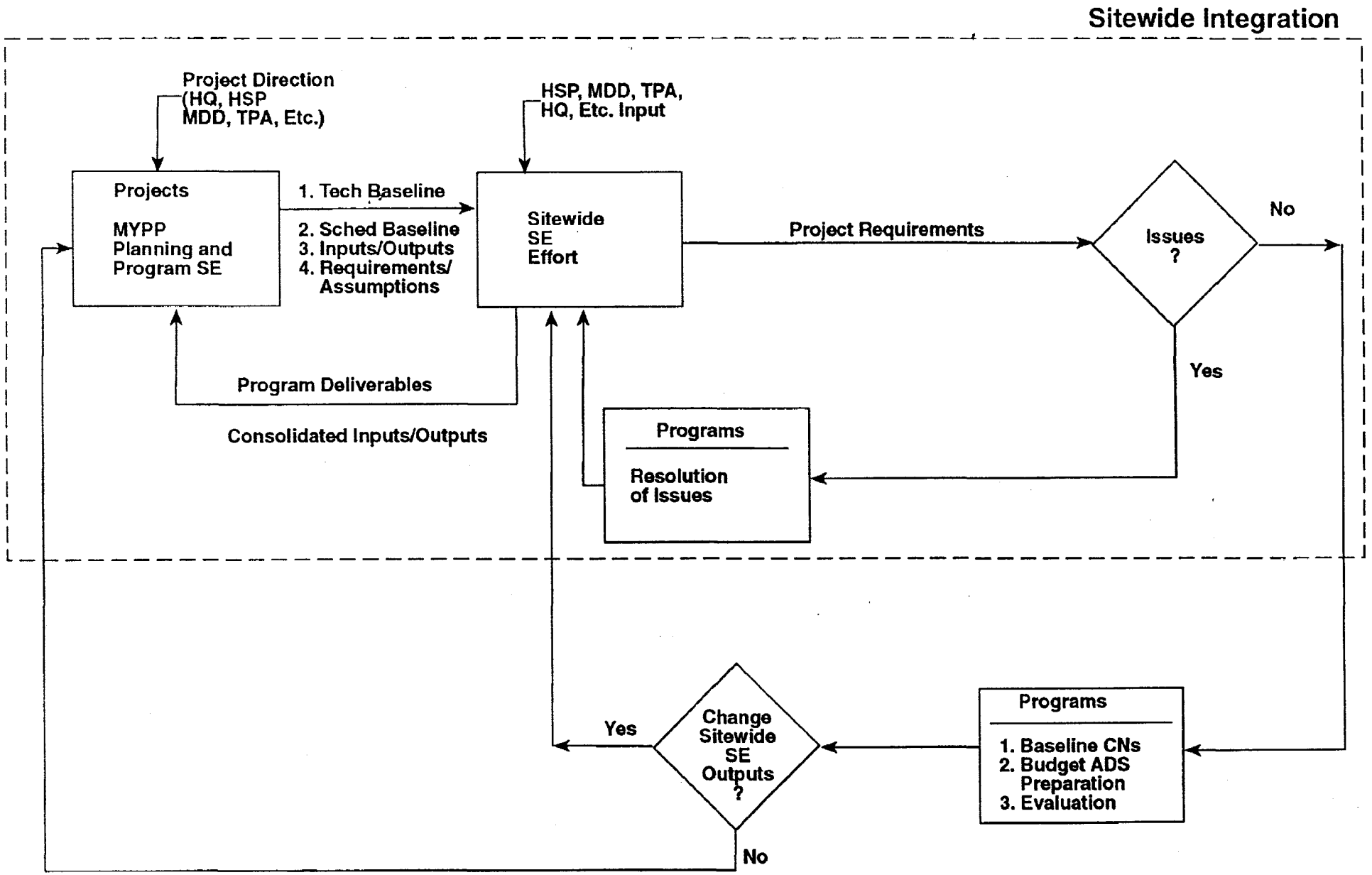
5. Sitewide Systems Engineering Process Documents

System engineering process documentation at the site level is shown in Figure 3.

6. Sitewide Systems Engineering Products

(A) Site Specification
Consolidated Programmatic/Project Physical Performance Requirements/Assumptions
* By project.

Figure 2



Hanford Systems Engineering (SE) Process

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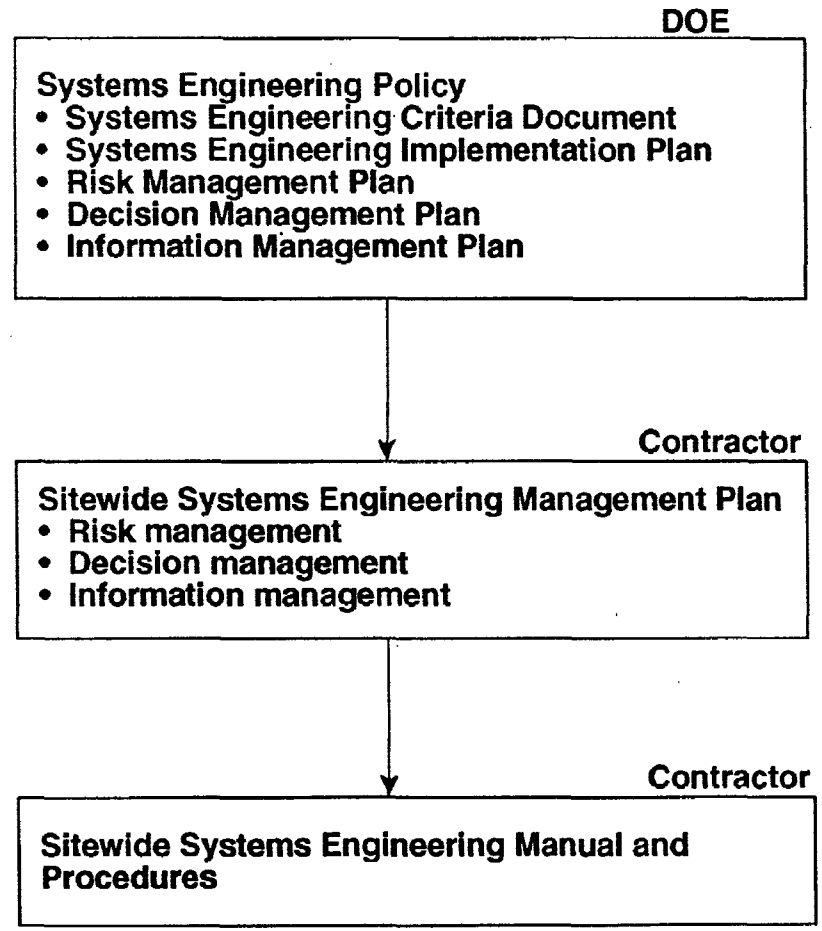
Figure 3

Sitewide Systems Engineering

Process Document Hierarchy



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* Specific physical performance requirements of program/project/site composite.

Technical Baseline Elements
* High level less than 500 activities by WBS.

Schedule Baseline
* High level less than 500 activities by WBS.

Consolidated Interface (Input/Output) Requirements
* By WBS to major sub-project level shown on Project Hanford consolidated project chart.
* Include points of contact for contractor and DOE for each sub-project and data element.
* Define data elements of input/output information to be gathered.
* Define Program/Project "manager" for each data element.
* Define characteristics of each data element required at the minimum practical level for the user of the data.
  - Could be yes/no without quantification.
  - Could be only projected change from existing levels.
  - Could be actual quantities and future quantities.
  - Could be categories such as type of waste, type of analytical test.
  - Waste management data elements should include disposition path even if internal to the sub-project.
* Define appropriate future projection planning estimate periods matched to economic life of asset/data element.
  - Current need.
  - 5 year and 20 year projections for infrastructure.
  - Known future large needs like tank waste vitrification.
* Define quality of information for data element at source of need input.
  - Actual real data.
  - Design estimate.
  - Knowledgeable guesstimate (SWAG).
* Report providing consolidated sitewide totals for needed data elements with sub-reports by data element showing needs by sub-project.

(B) SWSE Interface Control Documents
- Defines SWSE interfaces
- Defines Program/Project "manager" of interface
- Defines current status of interface

(C) Sitewide Issue Resolution Status Report
- Defines SWSE issues to be resolved
- Defines Program/Project with lead role to manage resolution of the issue

- Defines schedule for resolution

7. SWSE Integration Group

(A) Charter

Assist in identifying SWSE data set and attributes, identification of issues and impacts, and interface management between major site projects.

(B) Program/Project Responsibilities

Program/Project Responsibilities

- Serve as SWSE point of contact for Project and communicate SWSE information to appropriate project personnel including schedule and budget groups
- Represent Projects technical position(s)
- Provide input to Site Technical Baseline database
- Assist in definition of SWSE interfaces
- Assist in identification of SWSE issues and determination of projects and systems impacted by resolution
- Assist in identification of program/project with lead responsibility for issue resolution and resolution requirements
- Communicate and coordinate needed Project response for issue resolution

(C) SWSE Responsibilities

- Maintain Site Technical Baseline data base (STBLDB)
- Integrate Project input to STBLDB
- Track resolution of issues
- Coordinate SWSE Integration Group activities

8. Support Needed from Programs/Projects

(A) Participation in SWSE Integration Group

(B) Participation in development of necessary and sufficient minimum data requirements for site specification and interface management.

(C) Provide and update required SWSE data.

(D) Agreement to assume management and resource responsibility for the resolution of identified SWSE issues.