INDEPENDENT TECHNICAL REVIEW

HANDBOOK

LOS ALAMOS NATIONAL LABORATORY

SANDIA NATIONAL LABORATORIES/NEW MEXICO

February, 1994

INDEPENDENT TECHNICAL REVIEW

HANDBOOK INDEX

II.7.0. The Team Leader's and Team Coordinator's ITR Process Checklist

II.8.0. **The Subpanel Task Leader's ITR Process Checklist**

II.8.1. Review the ITR Background Information

II.8.2. Select Review Group Members

II.8.3. Prepare the Review Plan

II.8.4. Individual Team Assignments

II.8.5. Background Document Search and Review

II.8.6. Records and Notes

II.8.7. Subpanel/Task Specific Briefings

II.8.8. Selecting and Scheduling Horizontal Interviews

II.8.9. Off-site Subpanel/Task and ITR Team Discussions

II.8.10. Detailed On-site Investigations

II.8.11. Developing an Issues and Assessment Consensus

II.8.12. Report Writing Assignments

II.8.13. Comparing the Report to the Review Plan

- Subpanel/Task Interview Record
- Subpanel/Task Document Record
- Subpanel/Task Interview Notes
- Subpanel/Task Key Observations/Issues Record

III. **Appendices**

APPENDIX A. An ITR Overview

APPENDIX B. The Malcolm Baldrige Quality Criteria

APPENDIX C. Team Skills

APPENDIX D. Facilitator Skills

APPENDIX E. Key Concepts and Terminology

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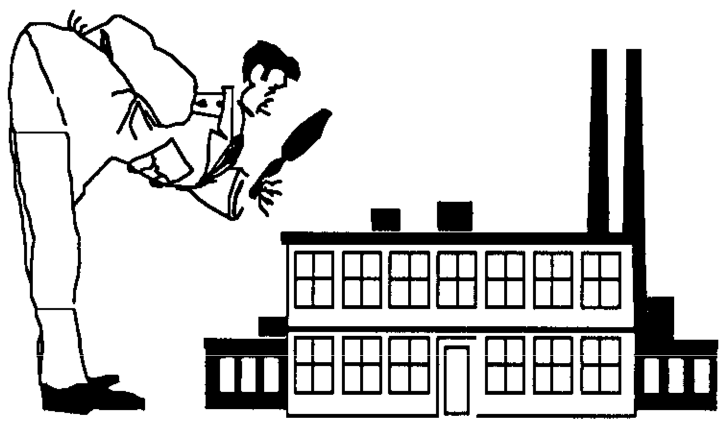
Independent Technical Review

(Red Team)



"For your information, let me ask you a few questions."

-Sam Goldwyn

SECTION I

GENERAL LOGISTICAL INFORMATION

iii. 1 Phone Numbers

Los Alamos Scientific Laboratory	Sandia National Laboratories
M.ail Stop K570	Dept. 6604, Mail Stop 1003
P.O. Box 1663	P. O. Box 5800
Los Alamos, N.M. 87545	Albuquerque, N. M. 87185-5800
Phone: (505) 665-6295	**Phone:** (505) 845-8048
FAX: (505) 665-6318	**FAX:** (505) 844-8791
Modem: (505) 665-6232	**Modem:** (505) 844-8791

Apple System/2400 Baud
8 Bits per Character
No Parity Flow Control
XON/XOFF

E Mail:	**E-Mail:**
Computer Password:	**Computer Password:**
Medical On Site: (505) 667-7890	**Medical On Site:** (505) 845-8692

Name	Work	Home
Phil Thullen	(505) 665-6295	(505) 672-9387
Doug Weaver	(505) 844-7736	(505) 296-0992
Deborah Bennett	(505) 665-6295	(505) 753-5222
Mary Ellen Benavidez	(505) 665-6295	
Nancy Glenn	(505) 845-8048	
Laurie Hixson	(505) 665-6295	

Off Site Medical Facilities

Los Alamos Medical Center:	(505) 662-4201
Lovelace Medical Center:	(505) 262-7000
Presbyterian Hospital:	(505) 841-1234

iii.2. Hotels

iii.2.1. Albuquerque

Fred Harvey Hotel 2910 Yale SE	(505) 843-7000 1-800-227-1117
Best Western Airport Inn 2400 Yale SE	(505) 242-7022 1-800-528-1234
Comfort Inn - Albuquerque Airport 2300 Yale SE	(505) 243-2244 1-800-221-2222
Courtyard by Marriott 1920 Yale SE	(505) 843-6600
Radisson Inn Albuquerque Airport 1901 University SE	(505) 247-0512 1-800-333-3333
Best Western American Motor Inn 12999 Central NE	(505) 298-7426 1-800-366-2252
Howard Johnson East 15 Hotel Circle NE	(505) 296-4852 1-800-887-4852
Ramada Inn East 25 Hotel Circle NE	(505) 296-5472 1-800-RAMADA
Amberley Suite Hotel 7620 Pan American Frwy NE	(505) 823-1300 1-800-333-9806
Hampton Inn, Albuquerque North 743 Pan American Frwy NE	(505) 344-1555
Holiday Inn Pyramid at Journal Center 5151 San Francisco Road NE	(505) 821-3333 1-800-544-0623

Howard Johnson Plaza Hotel 6000 Pan American Frwy	(505) 821-9451 1-800-654-2000
La Quinta Motor Inn 5241 San Antonio Drive NE	(505) 921-9000 1-800-228-5151
Wes Winters Resort Park 500 Tyler Road NE	(505) 345-3716
Albuquerque Marriott Hotel 2101 Louisiana NE	(505) 881-6800 1-800-228-9290
Ramada Hotel Classic 6815 Menaul NE	(505) 881-0000
Winrock Inn 18 Winrock Center NE	(505) 883-5252 1-800-86 6-5252
Doubletree Hotel 201 Marquette NE	(505) 247-3344 1-800-528-0444
Hyatt Regency Albuquerque 330 Tijeras NW	(505) 842-1234 1-800-228-1234
La Posada de Albuquerque 125 Second Street NW	(505) 242-9090 1-800-777-5732
Best Western Rio Grande Old Town 1015 Rio Grande Blvd NW	(505) 843-9500 1-800-528-1234
Sheraton Old Town 800 Rio Grande Blvd NW	(505) 843-6300 1-800-237-2133
Allbuquerque Hilton Hotel 1901 University NE	(505) 884-2500 1-800-821-1901
Clarion Four Seasons Hotel 2500 Carlisle NE	(505) 999-3311

iii.2.2. Los Alamos

Hill Top House Trinity & Central	(505) 662-2441
Los Alamos Inn 2201 Trinity Drive	(505) 662-7211

iii.2.3. White Rock

White Rock Motor Lodge White Rock Shopping Center	(505) 672-3838

iii.3. Restaurants

iii.3.1. Albuquerque

American Andre Fashion Square (San Mateo & Lomas)	 (505) 268-5354
The Artichoke Cafe 424 Central SE	(505) 243-0200
Bella Vista North Highway 14, Ceder Crest	(505) 281-3370 or (505) 281-3914
Cafe del Sol (In Sheraton Old Town) 800 Rio Grande Blvd NW	(505) 843-6300 ext. 1212
The Firehouse Restaurant at the Tram Base of Sandia Peak Tramway	(505) 292-3473
Barbecue The County Line of Albuquerque 9600 Tramway Blvd NE	 (505) 296-8822
Continental/Internation Eulalia's (La Posada de Albuquerque) 125 Second Street NW	 (505) 242-9090

The Gallery Restaurant (Holiday Inn) 5151 San Francisco Road NE	(505) 821-3333
Harvey House Restaurant 2910 Yale SE	(505) 843-7000
High Noon Restaurant and Saloon 425 San Felipe NW	(505) 765-1455
Herbs and Roses (In Marriott) 2101 Louisiana NE	(505) 881-6800
High Finance Restaurant (Sandia Peak) 40 Tramway Road	(505) 243-9742
Lil's (In Fred Harvey Hotel) 2910 Yale SE	(505) 843-7000
Nicole's (In Marriott) 2101 Louisiana NE	(505) 881-6800
Old Tymer's Cafe 7100 Central SE	(505) 266-5564
Prairie Star 1000 Jemez Dam Road, Bernalillo	(505) 867-3327
Ranchers Club of New Mexico (In Albuquerque Hilton) 1901 University NE	(505) 884-2500
66 Diner 1405 Central NE	(505) 247-1421
Stephens Restaurant Central Avnue at 14th Street	(505) 842-1773
The Terrace Restaurant (In Holday Inn Pyramid) 5151 San Francisco Road NE	(505) 821-3333

French

Le Marmiton 5415 Adademy NE	(505) 821-6279

Italian

Ciaol Ristorante e Bar Skyview Center (Tramway & Indian School)	(505) 293-2426
Mama Mia 1439 Carlisle NE	(505) 265-4557
Ristorante Trombino 5415 Academy NE	(505) 821-5974
Scalo, Northern Italian Grill 3500 Central SE (Nob Hill Center & Carlisle)	(505) 255-8781

New Mexican/Native American

Garduno's of Mexico 10551 Montgomery NE	(505) 298-5000
5400 Academy NE	(505) 821-3030
8806 Fourth Street NW	(505) 898-2772
Kachina Kitchen (Old Town) 2129 Central NW	(505) 243-6140
La Cascada Restaurant (In Albuquerque Doubletree) 201 Marquette NW	(505) 247-3344
La Placita Dining Rooms (Old Town) 308 San Felipe NW	(505) 247-2204
Maria Teresa Restaurant & 1840 Bar (Old Town) 618 Rio Grande Blvd NW	(505) 247-2204
Rancho de Corrales Corrales Road, Corrales	(505) 897-3131
The Rio Grande Cantina 1100 Rio Grande Blvd NW	(505) 242-1777

Seafood

Cafe Oceana 1414 Cental SE	(505) 247-2233
Red Lobster 5555 Montgomery NE	(505) 884-4445
Seagull Street Market & Restaurant 5410 Academy Blvd NE	(505) 821-0020

Steak and Seafood

Cooperage Restaurant & Lounge 7220 Lomas NE	(505) 255-1657
Customs House Restaurant (In Sheraton Old Town) 800 Rio Grande Blvd NW	(505) 843-6300 ext. 1266
Maine-ly Lobster & Steak House 6220 San Mateo NE	(505) 822-1200
Pauls Monterey Inn 1000 Juan Tabo	(505) 294-1461
Rio Grande Yacht Club 2500 Yale SE	(505) 243-6111

iii.3.2. Los Alamos

Amberly Restaurant 941 18th Street	(505) 662-5590 or (505) 9753
Ashley's Restaurant & Pub (At Los Alamos Inn) 2201 Trinity Drive	(505) 662-7211
Blue Window 800 Trinity Drive	(505) 662-6305
Boccaccio's 4244 Diamond Drive	(505) 662-7204

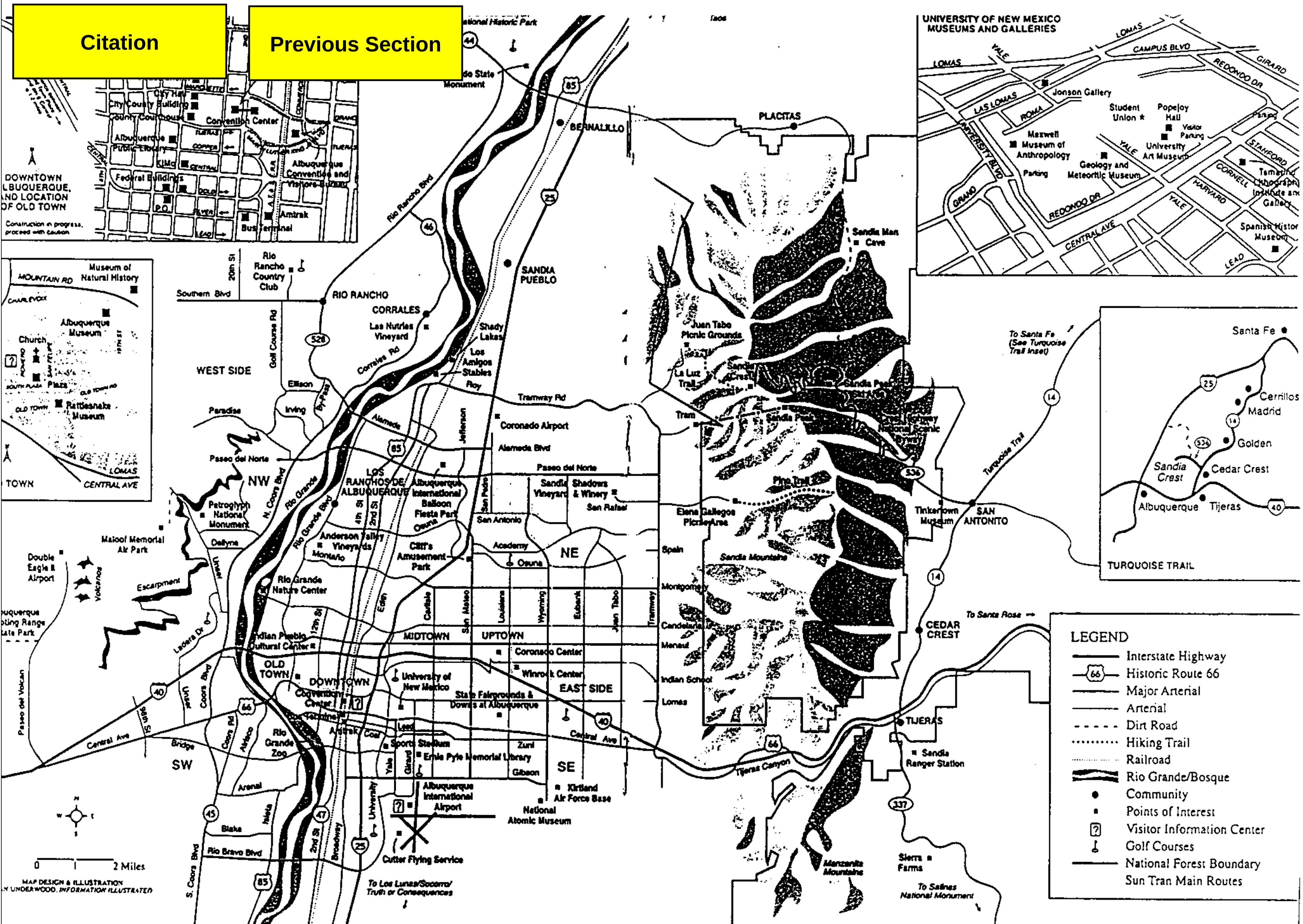
De Colores 820 Trinity Drive	(505) 662-9745
Hill Diner 1315 Trinity Drive	(505) 662-9745
Hot Shots 2581 Trinity Drive	(505) 662-2005
Hunan Garden Chineese 1400 17th Street (In Community Ctr.)	(505) 662-9328
Szechwan 1504 Iris Street	(505) 662-3180
Trinity Sights Corner of Trinity and Central	(505) 662-2552

iii.3.3. White Rock

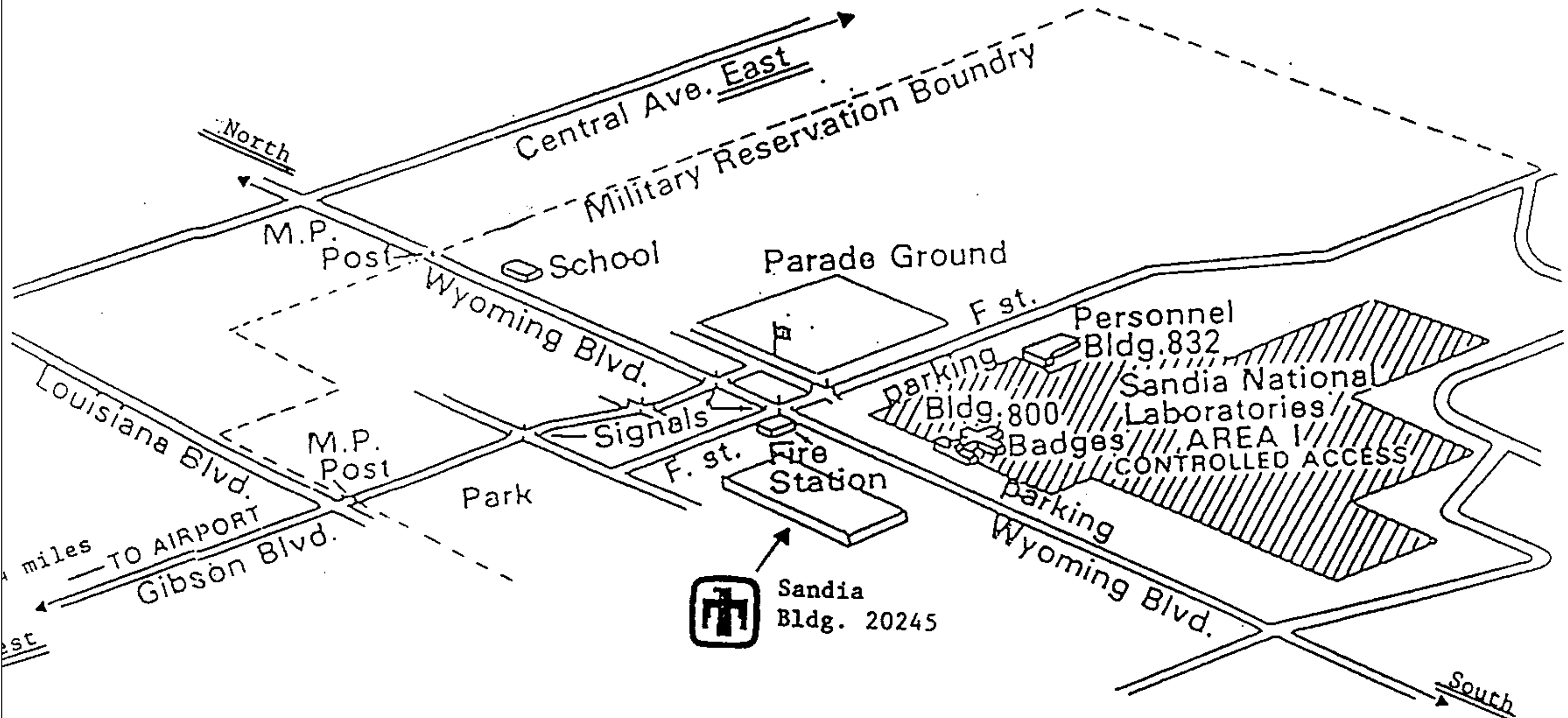
Katherine's (Village Shopping Center) 121 Longview Drive	(505) 672-9661
O Henry's Restaurant 11 Sherwood Drive	(505) 672-9353

iii.4 Maps

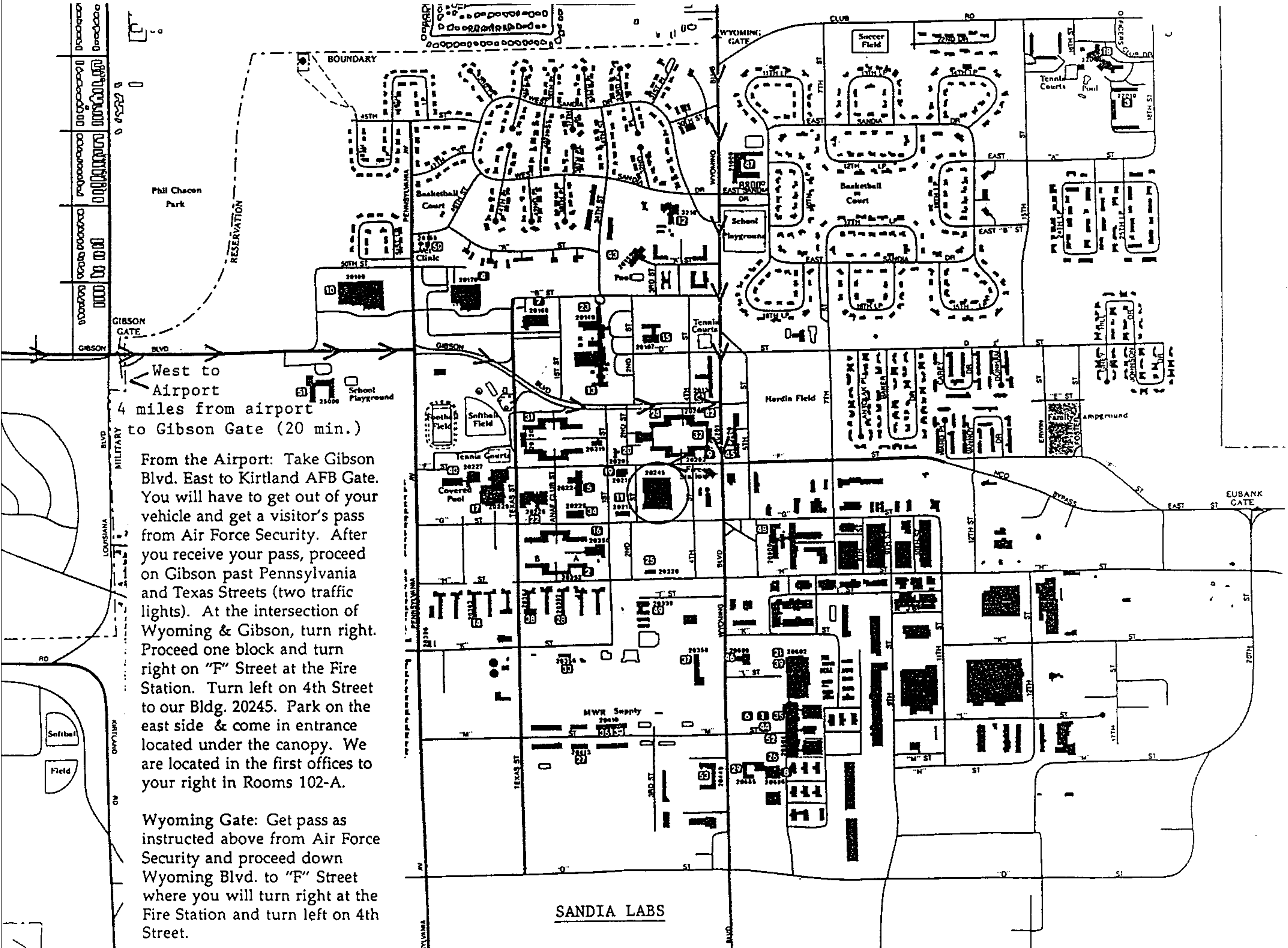
Citation
Previous Section



ALBUQUERQUE



Central Ave. East
North
Military Reservation Boundry
M.P. Post
School
Parade Ground
Wyoming Blvd.
F st.
Personnel Bldg.832
parking
Sandia National Laboratories AREA I CONTROLLED ACCESS
Bldg.800
Badges
Louisiana Blvd.
Signals
M.P. Post
F. st.
Fire Station
Park
TO AIRPORT
miles
Gibson Blvd.
parking
Wyoming Blvd.
Sandia Bldg. 20245
South



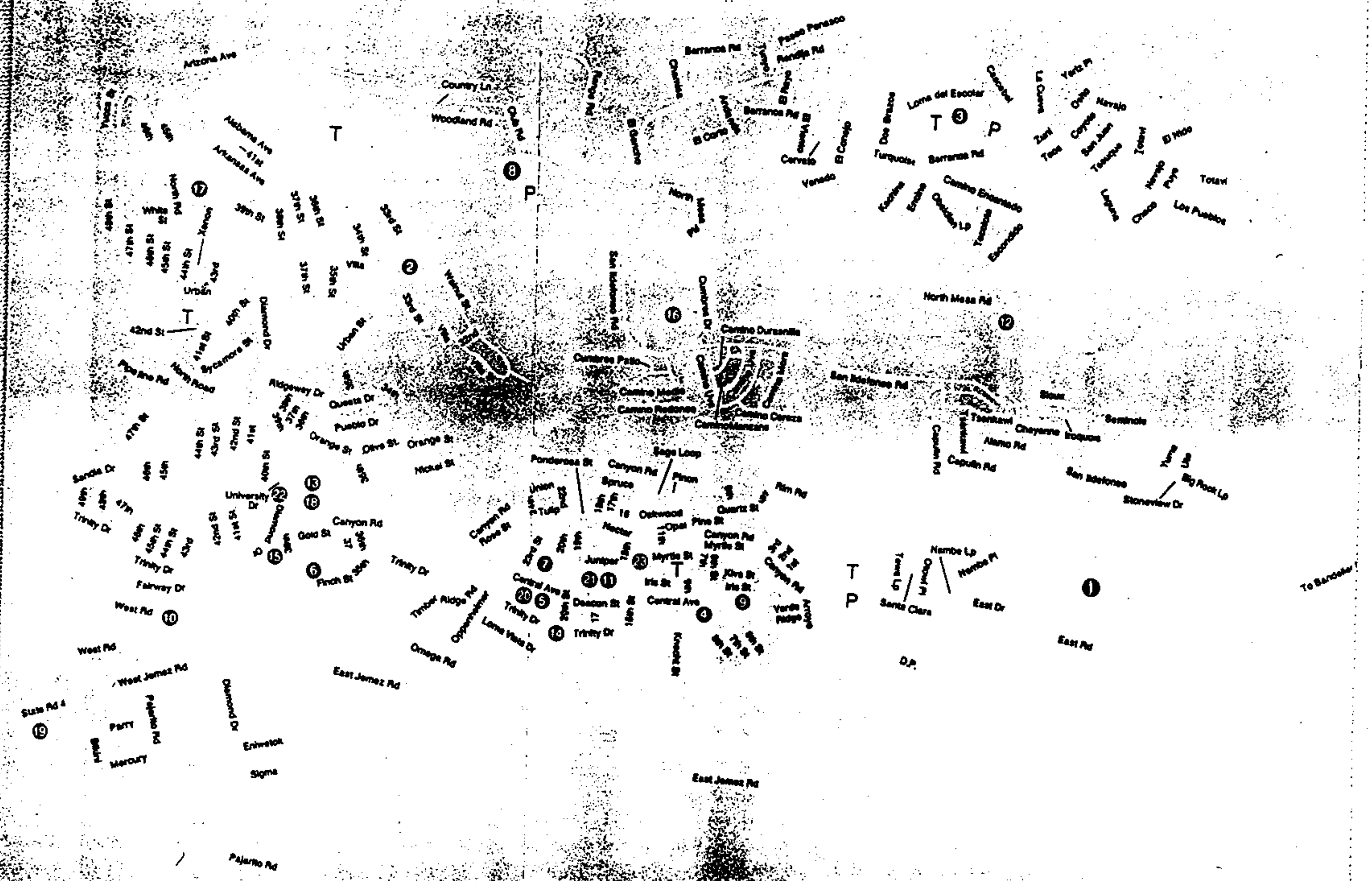
West to Airport

4 miles from airport to Gibson Gate (20 min.)

From the Airport: Take Gibson Blvd. East to Kirtland AFB Gate. You will have to get out of your vehicle and get a visitor's pass from Air Force Security. After you receive your pass, proceed on Gibson past Pennsylvania and Texas Streets (two traffic lights). At the intersection of Wyoming & Gibson, turn right. Proceed one block and turn right on "F" Street at the Fire Station. Turn left on 4th Street to our Bldg. 20245. Park on the east side & come in entrance located under the canopy. We are located in the first offices to your right in Rooms 102-A.

Wyoming Gate: Get pass as instructed above from Air Force Security and proceed down Wyoming Blvd. to "F" Street where you will turn right at the Fire Station and turn left on 4th Street.

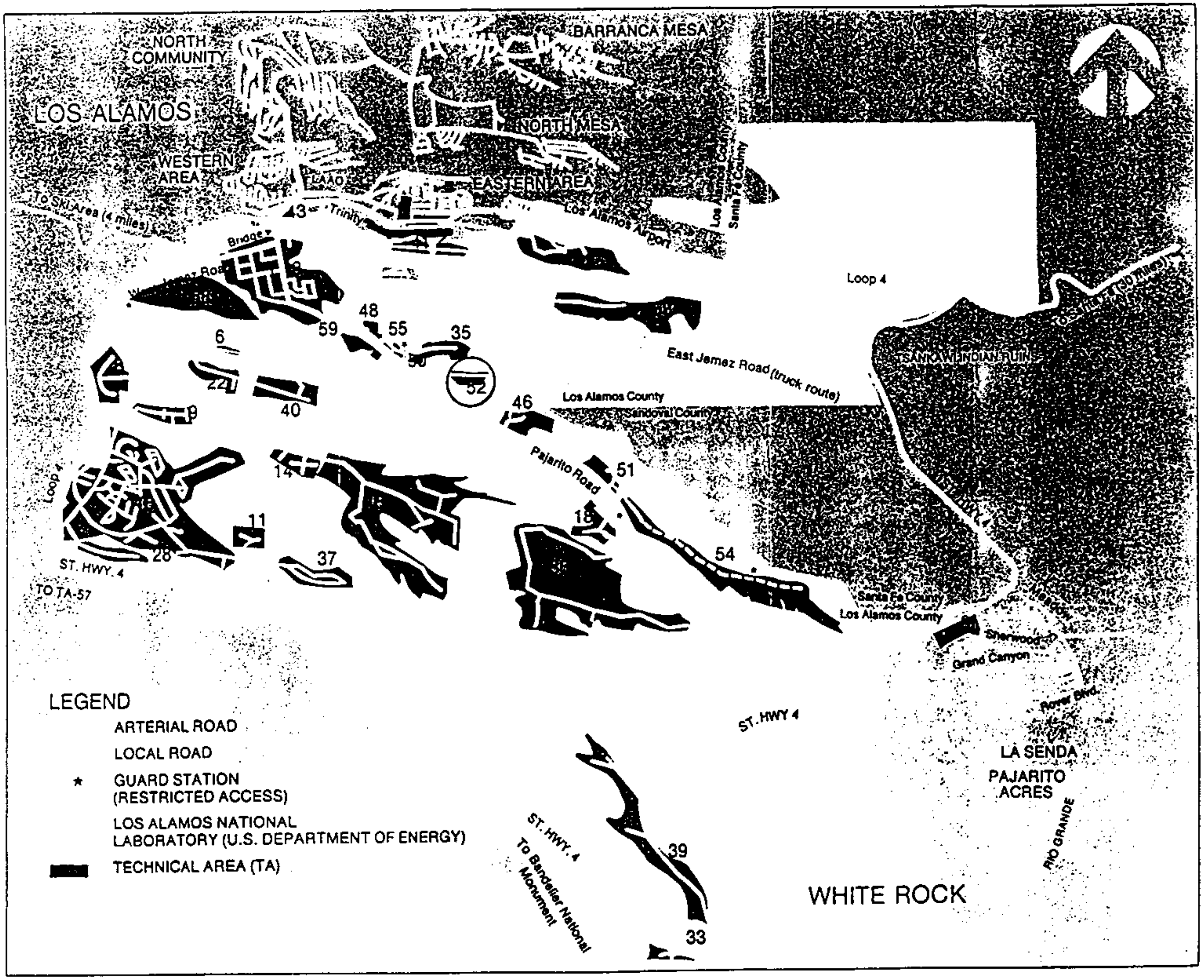
LOS ALAMOS



Points of Interest

1 Airport
2 Aspen Elementary School
3 Barranca Mesa Elementary School
4 Business District
5 County Municipal Building
6 DOE Los Alamos Area Office
7 Fuller Lodge, Chamber of Commerce, Art Center, and Los Alamos County Historical Museum
8 Golf Course
9 Hill Top House
10 Ice Rink
11 Library
12 Los Alamos County Fairgrounds
13 Los Alamos High School
14 Los Alamos Inn
15 Los Alamos Medical Center
16 Los Alamos Middle School
17 Mountain Elementary School
18 Municipal Swimming Pool (public)
19 Pajarito Mountain Ski Area
20 Police Station
22 UNM Branch College and Laboratory Training Office
23 YMCA
T Tennis Courts (public)
P Swimming Pool (private)

TECHNICAL SITES



TA	NOMENCLATURE
0	Unassigned Land Reserve
2	Omega Site
3	South Mesa Site
6	Two-Mile Mesa Site
8	Anchor Site West
9	Anchor Site East
11	K-Site
14	Q-Site
15	R-Site
16	S-Site
18	Pajarito Laboratory
21	DP-Site
22	TD-Site
28	Magazine Area A
33	HP-Site
35	Ten Site
36	Kappa Site
37	Magazine Area C
39	Ancho Canyon Site
40	DF-Site
41	W-Site
43	Health Research Laboratory
46	WA-Site
48	Radiochemistry Site
50	Waste Management Site
51	Radiation Exposure Facility
52	Reactor Development Site
53	Meson Physics Facility
54	Waste Disposal Site
55	PF-Site
57	Fenton Hill Site
58	Two-Mile North Site
59	OH-Site

The Red Team is located in Tech. Site #52/Bldg. RD 1.

SECTION I

INDEPENDENT TECHNICAL REVIEWS FOR MAJOR PROJECTS

I.1. ITR Charter

I.1.1. Purpose

Provide an independent engineering review of the major projects being funded by the Department of Energy, Office of Environmental Restoration and Waste Management. The independent engineering review will address questions of whether the engineering practice is sufficiently developed to a point where a major project can be executed without significant technical problems. The independent review will focus on questions related to:

1. Adequacy of development of the technical base of understanding;

2. Status of development and availability of technology among the various alternatives;

3. Status and availability of the industrial infrastructure to support project design, equipment fabrication, facility construction, and process and program/project operation;

4. Adequacy of the design effort to provide a sound foundation to support execution of project;

5. Ability of the organization to fully integrate the system, and direct, manage, and control the execution of a complex major project.

I.1.2 Objective

To produce a documented, independent, engineering review of major projects funded by DOE-EM and specifically assigned to DOE-Facility Transition. The focus will provide a factual understanding of the actual situation and the nature of the recognized difficulties that will have to be overcome in the successful execution of the project. The output of the review will be a clear articulation of the strengths and deficiencies in the technology and engineering, the major uncertainties that are involved, and suggestions as to courses of action that could be beneficial.

I.2. <u>Integrated System-Level Assessments</u>

DOE Independent Technical Reviews assess programs, projects, and capabilities as elements of larger program/project systems. The ITR team focus is the confidence that the element and the system will meet performance, cost, and schedule predictions. The review perspective is the integration of phenomenology, process, facilities, regulatory, and management and control aspects within the reviewed element as well as integration within the system in which the element functions. The system and its elements produce a product by acting upon one or more inputs (Figure I.2-1). The system is bounded by physical attributes, such as processes, facilities, organizational structures, infrastructure, inputs, and products/outputs. It also is described by documentation, such as program, strategic, or business plans, process flow sheets, and technical roadmaps (Figure I.2-2).

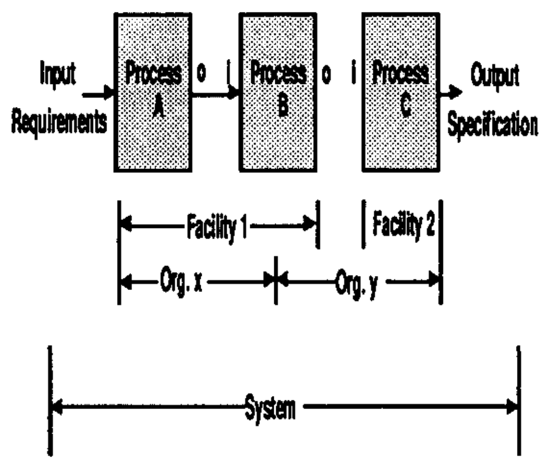


Figure I.2-1

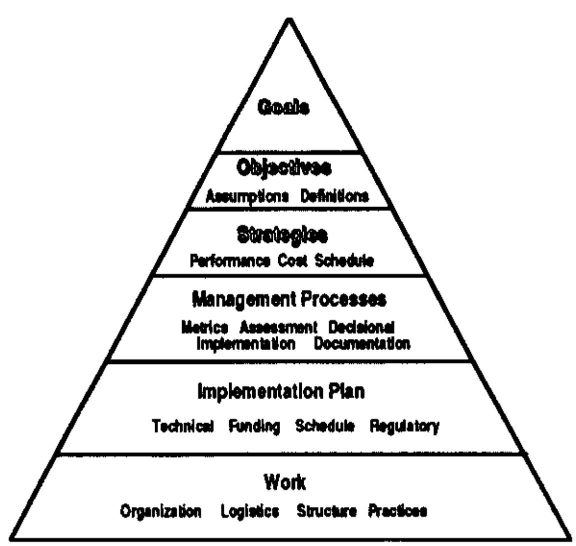


Figure I.2-2

The system basis for a review can be established by several means. The customer's one time review prescription may define the system, the unit/element being reviewed may have previously defined the greater system, or, lacking other definitions, the ITR team may construct a system basis for purposes of the review.

I.3. ITR Structure

The Independent Technical Review team will report to DOE-Facility Management. It is composed of the primary Engineering Review Group and can be supplemented by a Technical Oversight Board. Their functions are as follows.

I.3.1. Engineering Review Group

The Engineering Review Group is established for the purpose of creating a group of technically experienced and qualified individuals who will review the scientific and engineering bases that underlie major projects to be executed by the Department of Energy. Specific areas critical to the success of a project will be identified and independently confirmed.

Individuals with the requisite experience and knowledge will be selected to serve as team members to review specific major projects in the context of systems that must function in the entirety. The Engineering Review Group has often been divided into several subgroups that will address the project with regard to the tasks outlined in the charter, or the following fundamental technical areas:

1. Phenomenology that serves as the primary bases for the project and the secondary phenomena associated with side effects that can interfere with the project to assure that they are fully understood, that the technology proposed is compatible with the phenomenology, and to minimize the potential for major surprises in process or program/project operations;

2. Process Engineering necessary to convert the feedstock into the final product to assure that the configuration and technology of the process will achieve the desired end result;

3. Facility Engineering necessary to assure that the site and buildings selected and designed will provide a safe, environmentally sound, and functionally suitable place for housing the process;

4. Regulatory Requirements to assure that rules and regulations that must be satisfied during the operation of the process have been

identified, have been incorporated into the planning, and will function properly;

5. Management and Control of the project to assure that the necessary discipline, structure, and organization is in place to meet safety, health, and environmental protection prerequisites while simultaneously meeting the production requirements, specifications, and schedules.

I.3.2. Technical Oversight Board

The Technical Oversight Board was historically established to serve as a group of technically experienced and qualified individuals with the responsibility to review and comment on the proposed approach to be taken by the Engineering Review Group in its review of major projects to be executed by the Department of Energy. The Board has functioned as a check to assure that the scope and depth of the science and engineering review of a major project is adequate to assure the proper systematic evaluation of the project. If utilized, the Board can also examine the results of the review to assure its internal technical consistency and to confirm that strengths, deficiencies, and root cause assessments are supported with sufficient information.

I.3.3 Technical Requirements and Support

I.3.3.1 Phenomenology

These team members are experienced and qualified with regard to the fundamental science and technology of the process or activity. The basic areas include physics, chemistry, engineering, hydrology, seismicity, etc. This group must have expertise in the science of the process that will be taking place.

Examples of issues to be addressed include:

- Science of the process
- State of technology to support the process
- Comparative merits of alternative technologies
- Topics that require further development
- Process related problem solving (side effects)

I.3.3.2. Process Engineering Tasks

These team members are experienced and qualified with regard to the configuration, operation, and control of the process necessary to produce a product to meet established requirements. This group must have expertise in the technology and equipment, and the configuration arrangement necessary to have a controllable process.

Examples of issues to be addressed include:

- Definition of product requirements
- Input/feedstock requirements
- Comparative evaluation of alternative processes
- Selection of process technology
- Operation control systems
- Process control systems: Process variable selection, Measurement concepts, Instrumentation, Control/feedback systems
- Electrical requirements and codes
- Maintainability potential
- Reliability potential
- Process equipment/hardware design/specification
- ALARA requirements
- Waste minimization
- Safety/hazard-minimization

I.3.3.3. Facility Engineering

These team members are experienced and qualified with regard to the design and construction of a large industrial processing facility, both in terms of the function and durability of the structures and the overall layout of the plant. This group must have expertise in the concepts for configuring a structure to support processing operations.

Examples of issues to be addressed include:

- Site suitability

- Plant layout
- Structural stability
- Subsystem isolation/containment
- Maintainability
- Reliability
- HVAC Systems
- Environmental release control
- ALARA requirements
- Radiation protection
- Waste minimization
- Safety and health protection
- Security/physical protection
- DOE orders compliance

I.3.3.4 Regulatory Requirements

These team members are experienced and qualified with regard to the regulatory requirements (environmental, safety, and health) that would have to be met in the operation and/or transition of a process and/or facility. This group must have the expertise to recognize the situations or conditions when regulatory requirements could be violated through process design, program/project design, or operational practices.

Examples of issues to be addressed include:

- Radiation protection
- ALARA requirements
- Clean Air Act
- Clean Water Act
- Resource Conservation and Recovery Act
- Comprehensive Environmental Response Compensation and Liability Act

- Occupational Safety and Health Act
- Toxic Substance Control Act

I.3.3.5 Management and Control

These team members are experienced and qualified with regard to the management and control requirements necessary to manage the design, construction, and operation of a process and facility that will be complex in structure and potentially hazardous in character. This group must have expertise in the technique and system for directing and controlling a large, complex, and expensive operation.

Examples of issues to be addressed include:

- Project management
- Configuration control/management
- Systems integration
- Production requirements
- Operational procedures
- Schedule control
- Cost control
- Quality assurance
- Safeguards and security

I.4 Technical Oversight Board

I.4.1 Purpose

Historically, the Technical Oversight Board (TOB) has critiqued the methods and activities of the Independent Technical Review support group and ITR teams to continuously improve the quality of the review processes and products. The Board, is requested by DOE, is composed of permanent and ad hoc members recognized as seasoned executives and/or technical experts in their respective fields. The TOB can meet with the ITR team and task leaders to critique individual ITR plans and draft assessment reports. Members of the board can also participate in reviews as observers.

The TOB can carry out the following duties:

- Nominate permanent replacement members to maintain the organizational skills defined below.
- Critique and endorse review methods and processes developed by the support group.
- Select ad hoc members as appropriate for critique of individual reviews.
- Critique and endorse the activities of the individual ITR teams, including: ITR plans; on-site ITR activities; ITR reports.
- Provide a preface for each ITR report which endorses the assessment results or describes TOB assessment concerns.

I.4.2 Organization

The Technical Oversight Board permanent members have been current or retired executives or senior technical experts. The Board membership can encompass, at minimum, the following expertise:

- Nuclear Industry
- Systems Engineering
- Research and Development
- Manufacturing
- Commercial Industry
- Environmental Regulations

The DOE Team Director can request that a TOB be utilized with any given ITR Team. Members are nominated by the TOB chairperson and approved by the DOE Team Director.

I.4.3 Implementation

The DOE Team Director, and the TOB Chairperson establish meetings, schedules, and agenda to carry out the TOB purpose. If feasible, TOB meetings are held in conjunction with and at review sites to efficiently use resources.

I.5. ITR Activities

I.5.1 Past Review Activities

Hanford Waste Vitrification System	October, 1991	DOE/EM-0056P

Hanford Tank Waste Disposal Strategy	January, 1992	Pending
Hanford Tank Farm Operations Review	July, 1992	DOE/EM-0095P
SR Defense Waste Processing Facility Review	July, 1992	DOE/EM-0080T
Hanford PUREX Plant Safe Store Review	October, 1992	Pending
SR In Tank Precipitation	June, 1993	DOE/EM-0104
Rocky Flats Plant	September, 1993	Pending
WIPP Bin and Alcove Test Programs	December, 1993	Pending
Oak Ridge Isotope Facilities Shutdown Program		In Preparation

I.5.2 Past Support Activities

Hanford Tank Waste Goals and Objectives Strategy Workshop	December, 1991
Hanford High Level Waste Management Workshop	March, 1992
Hanford Tank Waste Management Workshop	August, 1992
DOE/KAO Strategic Planning and MSA Comment	On-going
Commercial Practices	November, 1992
Hanford TWRS New Technical Strategy	January, 1993
PUREX Implementation Planning	On-going

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SECTION II

INDEPENDENT TECHNICAL REVIEW PROGRAM

II.1. Introduction

In 1991, the Under Secretary directed that capability be established to conduct independent technical reviews (i.e., "Red Teams") of DOE projects in support of the Acquisition Executives and the Energy System Acquisition Advisory Board (ESAAB) process. Since that time, Independent Technical Review (ITR) teams have assessed technical understanding, processes and facilities at many of the major sites across the DOE complex.

II.1.1. Purpose

To provide an Independent Technical Review (ITR) of the scientific and engineering basis of major programs and projects being managed by the Department of Energy (DOE). ITRs may be requested on an ad-hoc basis, in support of a Key Decision, or in support of the project validation process, as outlined in DOE Order 4700.1.

The ITRs generally focus on questions related to such topics as:

- The adequacy of the scientific/technical basis for project formulation.
- Transitioning facilities from production capability to states suitable for deactivation and decontamination.
- Status of development and availability of technology to support the project.
- Risk-based decision methodologies
- Status and availability of the industrial and DOE infrastructure to support project design, equipment fabrication, facility construction, and process and facility operation.
- Adequacy of the engineering design effort to provide a sound systems engineering foundation to support execution of the project.
- Evidence of adequate consideration by the project team of

alternatives to the chosen approach.

- Assessment of the integration of the project into related processes and systems, as well as the overall program.
- Implementation of sound technical, cost, schedule program/project management practices, and compliance with the quality, safety, and environmental regulations and directives.

II.1.2. Objective

The ITR objective is to produce a documented, objective, technical and management review. The review focuses on a factual understanding of the actual situation, and the nature of the recognized difficulties that will have to be overcome in the successful execution of the project. The output of the ITR will be a clear articulation of the strengths and deficiencies in management, technology, and engineering; the major uncertainties that are involved; and suggestions as to courses of action that could be beneficial.

II.1.3. Organization

An ITR Team Director will be designated from within DOE. Individual ITR teams will be formed, as required, to accomplish the reviews. Membership on the ITR teams will generally be on an ad-hoc basis, drawing heavily from within DOE, the national laboratories, other Government organizations, contractors, consultants, and organizations such as the National Academy of Science and the National Science Foundation.

The composition of individual teams will vary depending on the project's specific needs and requirements. The designation of a Team Director and team membership will be coordinated with the appropriate Program Secretarial Offices. Individual teams will be comprised of task areas which focus on specific areas such as phenomenology, process engineering, system engineering, program/project engineering, regulatory requirement, safety, and management and control.

II.1.4. Responsibilities

1. The Acquisition Executive (AE) will determine and direct the conduct of an ITR team.

2. The Director, Office of Procurement, Assistance, and Program Management, through the Associate Director, Office of Program/Project Management and Control, will:

    a) Establish and obtain funding for a dedicated core group;

    b) On behalf of the AE, facilitate the activities of the ITR;

c) Recommend candidates for ITR Director to the AE for this selection; and

d) Identify and designate a core group to support the process.

3. The Program Secretarial Officers will plan for the conduct of, schedule, and fund ITRs as part of the Pre-title I activities, or as directed by the AE.

4. The Director, Independent Technical Review Team, in coordination with the Office of Procurement, Assistance and Program Management, will:

   a) Manage all ITR activities;

   b) Work with the Core Group to mobilize ITRs;

   c) Brief the AE on the ITR assessment;

   d) Issue a formal DOE report of the ITR assessment; and

   e) Participate in the ESAAB meetings at the discretion of the AE.

5. The Core Group will:

   a) Develop and maintain contacts and contracts with technical experts and consultants from universities, industries, and laboratories;

   b) With the ITR Director recruit and organize the team;

   c) Maintain a core support organization and facilities to assure quick response and flexibility to meet short-term and long-term needs of the AE; and

   d) Provide facility, clerical, administrative, logistic, and other support to the ITR.

II.1.5. Methods

Once a decision to form an ITR team has been reached, a DOE team leader will be designated. The organization, specific objectives, milestone schedule, composition of the ITR team, and funding for the effort will then be established. A team charter will be developed and approved by the AE. Each charter will include the scope, cost, and schedule for the review effort. Emphasis will be placed on meeting the specific needs of the AE in a timely manner. The ITR assessment will be documented in a formal DOE report. The Operations Office and project/program management being evaluated will be provided the opportunity to comment on the ITR assessment.

II.1.6. Assessment Report Deliverable

The ITR assessment and associated recommendations will be documented in a formal report and provided to DOE for further disposition. The ITR report will contain individual program/project deficiencies, strengths, root causes, and requisite supporting documentation. Alternate paths forward and broad recommendations should be included as appropriate. However, the ITR report normally does not contain specific recommendations because the Program Office, rather than the ITR, is in the best position to develop program/project specific recommendations for corrective actions.

II.2. The ITR Guidance Handbook

II.2.1. Purpose

The primary purpose of this Handbook is to provide guidance to Independent Technical Review Teams of DOE programs and projects. The guidance included in this Handbook is intended to be sufficient to ensure a high degree of consistency in the conduct and products of the reviews. However, processes and formats suggested may be modified, as appropriate to address specific review prescriptions and/or program/project conditions. Modifications to the processes and formats contained in the guidance Handbook are documented in the individual ITR plans.

This Handbook is also intended to aid DOE Program Offices, DOE Operations Offices and the program/project managers in understanding and preparing for an ITR, as well as conducting self-reviews. In addition, the Handbook will be used to inform other interested agencies and parties of DOE's plans for conducting ITRs.

II.2.2. Handbook Organization and Content

This Handbook contains sections and appendices providing general guidance for planning, conducting, and documenting the ITR. Checklists provide a suggested step-by-step process to be employed. The appendices contain supplementary material to aid the user in performing the assessment, including: national benchmark standards, example formats for information request letters, sample review plans, and technical documentation lists. Periodic modifications and additions to the Handbook will be made by the Core Group. Additional copies of the Handbook and supporting materials will be made available by the Core Group.

II.3. ITR Overview

This section outlines the overall methodology and the fundamental criteria to be used in performing an Independent Technical Review.

II.3.1. General Review Methodology

The general review scheduling is shown in Figure II.3 - 1. The organizational structure and the responsibilities of key team personnel are described in Section 4.0. The ITR teams generally focus on five topical areas: Phenomenology, Process, Facilities, Regulatory, and Management and Control.

II.3.2. Information Collection

On-site review activities will include formal briefings, document review, observation of program/project operations, interviews with DOE and program/project personnel, evaluation of program/project procedures and protocols, and review of previous briefings, reports, studies, audits and assessments.

The scope and depth of the information collection process is not intended to be so exhaustive as to identify every program/project issue, but rather to compile a representative sampling of information in order to develop a broad understanding and awareness of the key technical issues and problems and the associated root causes.

II.3.3. Development of the Assessment

II.3.3.1. Methodology.

The information obtained by the ITR team will be used to develop strengths and deficiencies assessment statements. Deficiencies are activities, practices, or conditions which, in the judgment of the team, may not satisfy the prescriptive review criteria. Strengths are activities, practices, or conditions which, in the judgment of the team, are noteworthy with regard to the review criteria, or will have general application to other DOE programs/projects.

In general, the first step in the development of a strength/deficiency assessment statement is the identification of an activity, condition, and/or practice which does not appear to meet the review criteria. "Identification" may be provided directly by program/project personnel, written documents, or observations made by a team member. Either case requires that several types of information be obtained by the review team member, including:

1. The specific nature of the problem, issue, condition or practice.

2. A location, if appropriate.

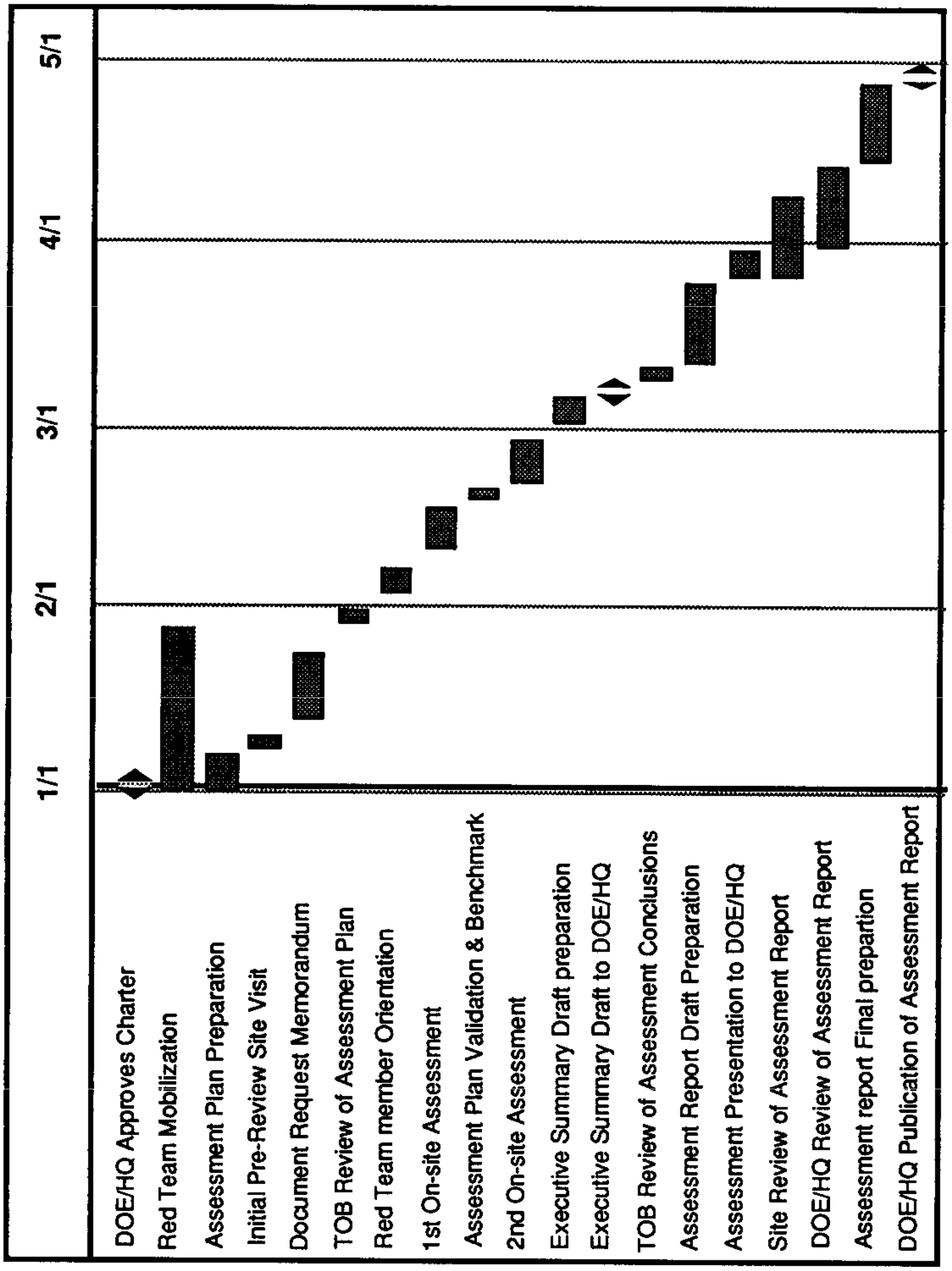

Figure II.3 - 1. General Review Schedule

3. The framework or perspective within which the problem or practice exists.

4. Supporting information describing the problem or practice,

or events leading to the problem.

5. Information on current/planned program/project management actions with respect to the problem or practice.

6. Information regarding how the review team member learned of the problem or practice.

With such information the individual team member should discuss the matter with the cognizant task leader and other team members (e.g., during daily team briefings). It is the review task leader's responsibility to determine whether or not the information constitutes a strength and/or whether additional information should be obtained. At this point, the strength or deficiency should be documented as tentative, and require further development and validation. Development and validation of a strength or deficiency is an interactive process which should result in a well-documented, defensible assessment statement.

The existence of a program/project corrective action (either planned or in progress) for a problem does not eliminate the basis for an assessment, but should be fully described in the supporting assessment documentation. After determining that a tentative statement is warranted, the review task leader will assign an appropriate title and identifying number to the assessment in accordance with procedures established by the overall team. A suggested format for an assessment statement is provided in Appendix R. Examples of strengths and deficiencies assessment statements from previous ITR reports are also provided in Appendix R.

While assessment statements are not negotiable (final authority to make an assessment statement rests with the ITR team leader), it is essential to ensure the factual accuracy of the statement prior to its inclusion in the draft report. Generally, tentative assessment statements are reviewed by program/project representatives and a meeting is held to discuss them. After the ITR team makes appropriate revisions, the validated assessment statements are ready for incorporation into the draft ITR assessment report.

II.3.3.2. Development of Root Causes.

It is the intent of the ITR to go beyond the strengths and deficiencies assessment statements, and to identify the associated root causes.

Root causes can be defined as the factors contributing to the observed deficiencies, as traceable to how the operations are managed by the program/project management and overseen by DOE. The individual review teams are in the best position to ask questions to evaluate the circumstances leading to each assessment.

Root causes can generally be identified using a two-stage process. The first stage in developing root causes is essentially an identification, where possible, of causal factors behind each deficiency. If one or more factors can be identified as contributing to a specific assessment, it should be included with the documentation of the assessment.

The second stage of root cause development is an analysis, conducted by the ITR team management (team leader, coordinator and task leaders), of the deficiencies and causal factors developed by the team. Using information on management practices and conditions obtained through its own observations and discussions with program/project personnel, the ITR team management will: group and categorize similar assessments; identify and further trace causal factors which appear to be commonly occurring and possibly related among several assessment statements; and broadly define the root causes for the deficiencies.

II.4. The ITR Process

This chapter outlines the basic processes of the review. These processes are divided into three categories: planning, on-site activities, and post-assessment activities. Key planning steps to be taken, time frames, and responsible individuals are cited where possible. Detailed process checklists are provided in the Section 7.0. Use of the review processes and the example formats provided in the Appendices will help to ensure effective and consistent ITRs.

II.4.1. Planning

II.4.1.1. Team Organization and Components.

Each team will consist, at a minimum, of a ITR team leader and task leaders for each of the appropriate component assessments, a team coordinator, and a core membership of technical specialists. Figure II.4 - 1 presents a model organization of an ITR team, which should be modified to meet specific review prescriptions.

II.4.1.1.1. Team Member Selections

Conducting an ITR assessment may require up to 30 highly skilled and experienced professionals. Candidates for these assignments should be knowledgeable of contemporary issues, techniques, matters pertinent to their technical or management disciplines, DOE orders, and regulations for environment, safety and health.

It is also important to avoid organizational conflicts-of-interest (OCOI) in assigning personnel to specific ITR teams. In general, an OCOI may exist if a prospective team member has a real or perceived interest in the outcome of the ITR team to which he or she would be assigned. One type of OCOI, for example is the existence of a business or prior direct relationship between the proposed team member and the field office, contractor, or program/project.

The team coordinator will manage the ITR team staffing process and, in cooperation with the designated team leader and task team leaders, will ensure that the skill/experience of potential team members match their assignments, and that an OCOI situation does not exist. This will help to ensure that the ITR teams are able to produce a high quality review. To assist in mobilizing a new team, the Core Group maintains a personnel data base and contracts for individuals with the relevant skills. Individuals interested in participating in ITRs should contact the Core Group office.

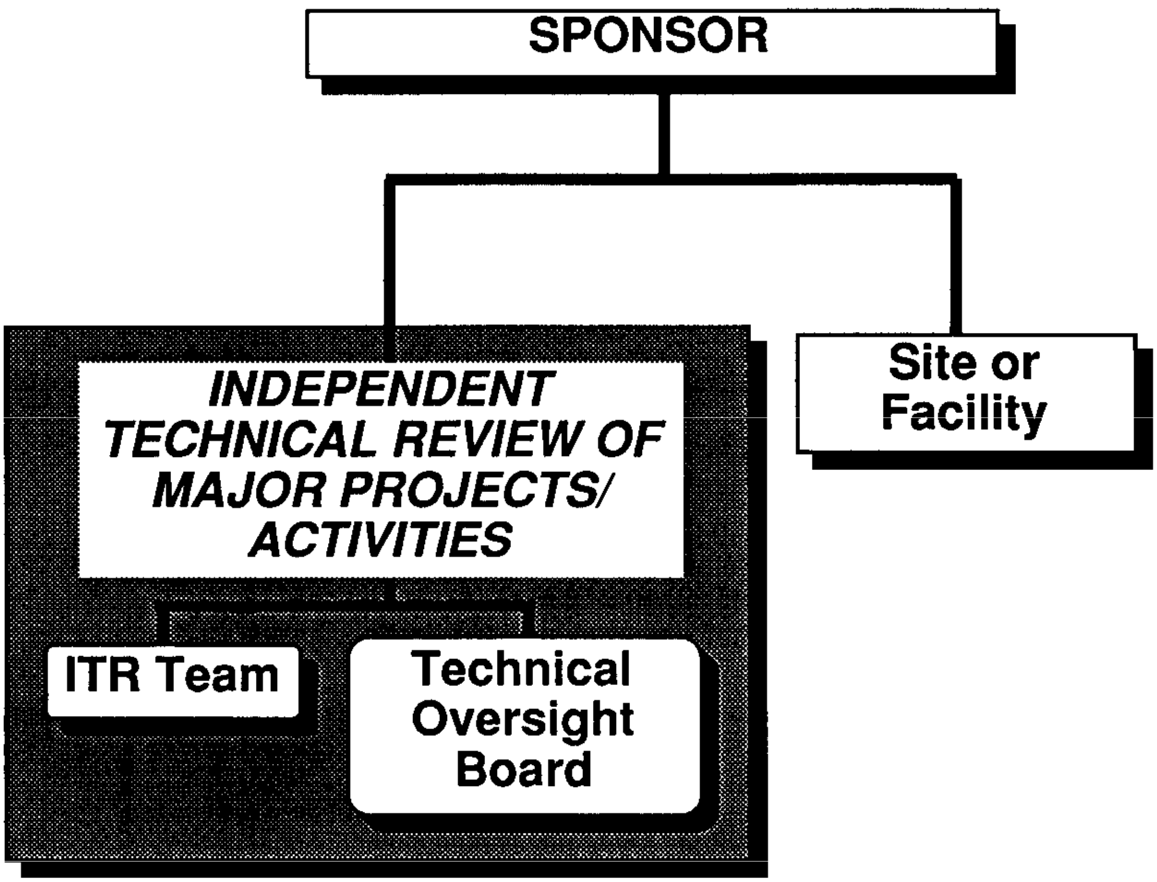

Figure II.4 - 1. ITR Organizational Structure

II.4.1.1.2. Team Leader Responsibilities

The ITR team leader will manage the team and serve as the primary contact point with the PSO, Operations Office, and the ITR Director. The principal responsibilities of the team leader are to ensure that the ITR team is organized, staffed and supported as necessary to meet the review objectives and criteria; to ensure that the review sub-teams interact effectively and that their respective assessment statements are functionally integrated; and to ensure that the ITR report is accurate, objective and thorough. The team leader provides overall management and policy guidance to the review teams. The task leaders are primarily responsible for the detailed technical conduct and results of their respective review areas.

II.4.1.1.3. ITR Team Coordinator

The ITR coordinator, designated for each team by the Core Group Office, will have primary oversight of the review process and schedules. The coordinator works directly with the team leader and task leaders throughout the assessment. Major responsibilities include:

1. Assistance in the mobilizing the review team, including the identification and recruiting of qualified personnel, training, and processing of clearances and contracts.

2. Providing training to team leaders, task leaders, and members concerning the overall review process, documentation requirements, report formats, protocols for interaction with program/project personnel, and team meetings and schedules formats.

3. Schedules, attends, and facilitates team meetings.

4. Provides assistance in the resolution of day-to-day team issues and problems.

5. Serves as the point of contact for information requests from the team and regarding team activities and reports. Maintains records and files containing copies of documents and reports resulting from review activities.

6. Establishes on-site logistics and administrative support for the team. The ITR coordinator will establish contacts with appropriate program/project personnel to ensure that the needs of the ITR team are met.

7. Assists the team and sub-group leaders in the review and concurrence processes for draft and final ITR reports.

II.4.1.1.4. Conduct of ITR Team Members

All personnel selected to participate in a ITR are highly skilled and experienced professionals, and should be well aware of ethical practices and issues which may arise as part of the review team activities. It is expected that each team, individually and collectively, will conduct ITR activities in a careful, accurate and objective manner. The relationship of an ITR team to the program/project personnel should be neither antagonistic nor subservient, but rather a concerted attempt by a group of professionals to identify issues to permit progress toward their solution. As such, it is recommended that ITR members endeavor to establish cordial, yet "arms-length" relationships with the program/project personnel. It is further recommended that any difficulties encountered in this regard be brought to the attention of the team leader or to the coordinator for prompt resolution.

II.4.1.2. Schedule Coordination with Operations Office and Program/Project Management

The team leader will contact the appropriate operations office and program/project office representative in advance of the review to discuss specific dates for the pre-review program/project visit. The pre-assessment visit should be scheduled for, at minimum, one full day. Notification to the program/project management should be coordinated through the operations office.

II.4.1.3. Letter of Notification and Request for Information

After the schedule has been agreed upon, a formal ITR notification letter will be sent by the ITR Director. It will identify the dates for the pre-review program/project visit and ITR on-site activities, as well as the names of the team, team leaders, and potential team members.

In addition, the notification letter may outline expectations for the pre-review program/project visit (e.g., program/project overview briefings, program/project tour, preliminary drafting of a review agenda) and will identify documents that should be made available for the review. Appendix I reflects the types of documents that may be useful. The actual request will vary depending on the review prescription and the nature of the program/project. The letter will also request that the Operations Office identify a representative for the ITR, as well as the names and telephone numbers of the program/project technical and administrative contacts.

An example Letter of Notification and Request for Information, is provided in Appendix F.

II.4.1.4. Clearances

The team coordinator will prepare and submit FORM F 5631.20 (Request for Visitor Access Approval; formerly Form 277) before the pre-review program/project visit. The coordinator will also prepare and submit Form F 5631.20. The team coordinator should ensure that all team members have appropriate security clearances.

II.4.1.5. Interaction with Federal, State, and Local Regulatory Agencies

For each review, the ITR Director will determine the appropriate contacts and participation of observers during the on-program/project activities.

II.4.1.6. Pre-Review Program/Project Visit

The team leader, task leaders, and the team coordinator participate in the pre-review program/project visit, which normally takes place two to four weeks before the review. The visit may include a tour of the program/project facilities.

The team leader will review requested information, as necessary, for the planning of team on-site activities. The team leader will also obtain copies of all available documents deemed useful to the team and will request that the program/project management or Operations Office representatives supply the team any important material that is unavailable at the time of the pre-review visit.

The team management, program/project management, and Operations Office representative will begin development of a detailed review agenda. A list of topics to be covered and areas to be visited during the review will be developed by the team leader following the review of background information, the program/project tour, and conversations with the operations office and program/project representatives. Appropriate times for specific on-site activities can be determined by the Operations Office representative and the program/project management. The final agenda will be completed following the visit and will be a part of the review plan.

The team coordinator will contact the assigned site and/or program/project personnel to begin coordination of logistical arrangements, such as team work space, phones, etc. Typical review field requirements are listed in Appendix H.

The team and task leaders will brief their respective team members on the pre-assessment program/project visit. Through this briefing, the team will become familiar with the program/project and its operations and with the draft agenda for on-site activities.

II.4.1.7. Document Review

An intensive review of past studies, briefings, presentations, assessments, reports, data, and other pertinent documents will be conducted by the team to gain understanding of program/project activities and status, existing and potential problem areas, and to direct on-site review inquiries to relevant areas.

The document review will take place prior to the first on-site review. The team management may contact the Operations Office representatives or designated program/project personnel for assistance in interpreting the documents.

II.4.1.8. Review Plan

Following the pre-review program/project visit and review of information, the team leader, coordinator, and team members will prepare a review plan which outlines the key issues, general review approach, and specific lines of inquiry. The plan should include the items discussed below. Any modifications to the processes and formats contained in this guidance Handbook which may be necessary to comply with specific review requirements should be documented in the review plan. An example review plan is included as Appendix M.

II.4.1.8.1. Criteria Identification

On the basis of the PSO review prescription, discussions with the Operations Office and program/project representatives, pre-review program/project visit, and document review, the team management will develop a summary of key criteria and task lines of inquiry.

II.4.1.8.2. Agenda

The team leader and program/project representative will continue to refine the agenda developed during the pre-review program/project visit. To ensure that program/project management and key personnel are adequately informed and prepared for the review, the agenda will be as detailed as possible. The agenda may identify the following: program/project briefings for the ITR team, breakout briefings by task, task working sessions with corresponding program/project personnel, individual interviews with program/project personnel, visits to observe activities and facilities, reviews of documents, records and files, the names of team members and involved program/project personnel; and, the day and time of each activity. An example agenda is included in Appendices P and Q.

II.4.1.8.3. Required Documents

The review plan will include a list of the reports, files, and other documents that team members intend to review on the program/project. Copies of all documents should be obtained and retained in the ITR records library. A list of typical review documents is provided in Appendix I.

II.4.1.8.4. Classified Projects

The ITR will need to evaluate classified, as well as non-classified programs/projects. The review plan should consider the presence of classified information, materials, and records. In general, the criteria and line of inquiry for classified vs. non-classified projects will not differ, although questions addressing the presence of classified information/material may be necessary.

For planning purposes the team leader should ensure that appropriate information regarding classified projects is requested in the pre-review information request, and should ensure that team members have the necessary security clearance prior to the program/project visit. The team leader should coordinate these activities with the appropriate program/project classification officer who will be able to provide advice on the nature of the classified programs.

II.4.1.9. <u>External Contacts</u>

II.4.1.9.1. Media

The ITR Director will coordinate all media contacts through the Headquarter's Office of Procurement, Assistance, and Program Management, Operations office/sites, and Office of Public Affairs. The DOE team leader may be designated as principal media contact for the team. A representative of the DOE Office of Public Affairs may be designated as a contact for the ITR team.

II.4.1.9.2. General Public and Elected Officials

It is DOE's policy to keep the public fully informed of ITR team activities. Accordingly, state and local governmental officials may be notified prior to the review. Congressmen and senators with an interest in a particular program, project, or site may also be informed. All contact with groups external to DOE will be coordinated through DOE Headquarters.

II.4.1.9.3. DOE Office of the General Counsel

The ITR team leader may be provided with a contact person within the DOE Office of the General Counsel and should contact that person to ascertain whether there are any litigation-sensitive issues related to the site and/or program/project.

II.4.1.9.4. Office of Environmental Compliance

The team leader may consult with the Office of Environmental Compliance (OEC) prior to the program/project visits to identify significant or relevant compliance issues associated with the site and/or program/project.

II.4.1.10. Process Checklist

A process checklist primarily for use by the team leader, task leaders, and the team coordinator is provided in Section 7.0. It includes advance on-site activities, and closeout activities. Responsibility for accomplishing these tasks should be coordinated among the team management group.

To the extent possible, all logistical arrangements should be made with the program/project contacts prior to the arrival of the ITR team. During on-site activities, the ITR team coordinator will act as liaison with program/project-appointed contacts in regard to administrative activities. including coordination of meetings with program/project management. The team coordinator will prepare periodic status reports for DOE review, revise the working agenda, supervise word processing staff, maintain all records, supervise production of the ITR report, distribute information as necessary, and complete closeout activities for the assessment.

II.4.2. On-Site Procedures

II.4.2.1. Introductory Briefing

The team leader will begin the review with an introductory briefing to present the ITR structure, the objectives and criteria for the specific ITR, the review process, and the team members. Site or program/project management will have the opportunity at the kick-off briefing to present an overview of their activities and the environment, safety and health, and management and organizational programs.

The introductory briefing should be attended by all team members, the Operations and Program office representatives, site environment staff, site safety and health staff, and representatives of site and program/project management. Representatives of relevant federal and state regulatory agencies should be invited to attend and to participate in the review process, at the discretion of the ITR Director. An example format for the introductory briefing material is provided in Appendix A.

II.4.2.2. Orientation Briefing

Following the introductory briefing, the program/project management should present a detailed overall orientation briefing and tour. In-depth ITR investigations and discussions of specific lines of inquiry are not to be conducted at this briefing. Team members should focus on questions of clarification.

II.4.2.3. Document Review, Interviews, Working Sessions and Observations

Team members will proceed with their review according to the established agenda. They will receive briefings, review documents and files, interview program/project personnel, observe activities, and visit facilities as part of their information-gathering process.

II.4.2.4. Meetings

Informal notes should be taken at all working sessions and meetings and the attendees should be documented. The team leader and task leaders will conduct a ITR debriefing to review observations, identify problems, share information, resolve any data discrepancies, and make adjustments to the agenda. Daily debriefing will help ensure the progress of the review plan and will permit modification and redirection of the plan. This debriefing is not normally open to program/project participants and observers.

The team leader may choose to conduct interim meetings with the program/project management and operations office before the final closeout meeting to present and discuss deficiencies assessment standards and to obtain clarification on points of issue. Validation of the ITR statements with on-site personnel will both ensure the accuracy of the, and minimize comments during the subsequent assessment process of the ITR report.

II.4.2.5. Maintenance of Working Papers and Records

Team members will develop comprehensive, organized, and coherent working papers to describe information gathered and the means of gathering it (e.g., observation, recorded reviews) and identify the sources of information.

During the daily debriefing the following records will generally be developed:

1. Updates to the daily agenda

2. Lists of tentative deficiencies and strengths assessment statements

3. Lists of interviews and working sessions

4. Lists of documents on file and additional documents to be requested

5. Lists of documents reviewed

6. Daily Activities Report for each task (optional)

All working papers will be neat and legible.

II.4.2.6. Draft Report Preparation

An example format for the ITR Report is included as Appendix R and S. The first draft of the report executive summary should be completed during the detailed site visit.

II.4.2.7. Classification/Clearance

The team leader will coordinate a classification review for records and the program/project assessment report with the appropriate program/project classification officer. The site classification officer may need to interact with the team early in the review to avoid unnecessary taking of classified notes, and to review draft and final written products of team members to ensure that classified information is not compromised.

II.4.2.8. Closeout Meeting

The team leader will conduct a closeout meeting at the conclusion of on-site activities. This meeting will be attended by ITR task leaders, team members (as determined by the team leader), program/project management, Federal, state and local regulators, and program/project staff involved in the review. Responsible Operations and Office of Procurement, Assistance, and Program Management personnel will be notified and may attend at their discretion. The team leader should present a verbal summary of concerns and strengths identified by the team, with the caveat that the final conclusions will be developed at a subsequent off-site team meeting.

II.4.3. Post Review Processes

II.4.3.1. Program/Project Response to Draft Assessment Report

The Program Office, Operation Office, program/project management, and regulatory agencies will have no more than two (2) weeks following the issue of a draft ITR assessment report to review the report and submit comments regarding technical accuracy to the team coordinator. At this time, the report will also be reviewed and commented upon by other components of DOE (EM-l, EH-l, GC-l). Comments from the program/project and DOE may be included in the final report at the team leader's discretion. The team leader and coordinator will prepare a final ITR report within two (2) weeks of receiving comments from the PSO.

Recipients of the final ITR report may include the Site, Operations Office, Congress, regulatory agencies, Program Office, EH-l, and the PSO.

II.4.3.2. Dispute Resolution

Resolution of disputes that may arise during and after the program/project review and general issues, shall be resolved, where possible, by the team leader and program/project level counterpart. In the event agreement cannot be reached at this level, disputes should be elevated, though the Independent Technical Review Director, to succeeding levels of DOE management.

II.4.3.3. Document and Records Management

Copies of the drafts and final report, correspondence, and all documents requested for the review and the preparation of the ITR report will be maintained by the Core Group. The Core Group will also maintain the team records compiled during the preparation of the assessment report, such as field notebooks, etc.

II.4.3.4. Potential Instances of Waste, Fraud and Abuse

A potential exists for ITR team members to be provided with information regarding possible criminal violations of waste, fraud, and environmental, safety or health laws. Such information could be uncovered in several ways including:

1. through discussions with contractor or DOE employees; and

2. as a result of direct observations made by the team.

Any such information, whether direct allegations of criminal violations made by program/project personnel or information developed by a team member, must be reported immediately to the Inspector's General's (IG) office at DOE-HQ. It is important that the original receipt of information be fully and clearly documented and maintained in the ITR team files. It is the responsibility of any team member who receives such information to immediately notify the team management. The team leader will notify the ITR Director who will arrange for IG staff to discuss the information with the team leader by phone or to conduct an on-site meeting. The team coordinator is responsible for documenting the receipt of such information and its transmittal to the IG. All further follow-up actions and documentation are the responsibility of the IG.

Additional information on policies and procedures for reporting fraud, waste and abuse to the Office of Inspector General is provided in DOE Order 2030.4.

II.5. Health and Safety of Team Members

II.5.1. Introduction

This chapter provides guidance concerning the health and safety protection program for the ITR team members. The health and safety of team members will be ensured through an integrated program of training, adherence to standard operating procedures, and careful program/project planning and activities. Members of teams must be familiar with the types of hazards that may be present, the ways in which these hazards can be mitigated, and safe practices applicable to the conduct of their activities. Information concerning hazards at each site and/or program/project will be made available to teams, in advance, to facilitate planning. Protective clothing and equipment, personnel monitoring devices, and portable instruments will be made available to the team for their use, as appropriate.

It is DOE policy that ITR team members should not be subjected to unreasonable risk during the conduct of the review. This chapter outlines programmatic steps which will be implemented to protect team members during the review. While it is the intention that these steps and those in place at the individual sites will minimize exposure to risk, team members may encounter instances in which they feel their health and/or safety may be threatened. Team members are encouraged to decline participation in activities which, based upon their professional judgment and experience, present an unreasonable risk to health and/or safety. These instances should be identified to the team leader and corrective action taken, where appropriate, to ensure protection of health and safety. Team members will not suffer any repercussions or be otherwise discriminated against for declining participation in such hazardous activities.

II.5.2. Basis for Health and Safety Considerations

The basis for safe practices and conditions during the ITR review are DOE Orders, applicable standard operating procedures, and accepted work practices.

II.5.2.1. Applicable DOE Orders

Applicable DOE Orders will be observed by ITR teams, which include the following:

1. DOE Order 3790.1A., Federal Employee Occupational Safety and Health Program, which is directed at safety for U.S. Government personnel. As Federal employees, DOE personnel are included in the scope of this standard.

2. DOE Order 5480.10., Contractor Industrial Hygiene Program, which contains the applicable guidelines for the contractor on establishing industrial hygiene program elements to protect the health and safety of at-risk.

3. DOE Order 548.4., Mandatory Environmental Safety and Health Standards (Policy Requirements), which includes mandatory requirements for DOE operations and personnel.

4. DOE Order 5483.1A., Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities, which provides occupational safety and health protection which is consistent with the protection afforded private industry employees under the Occupational Safety and Health Act of 1970 (OSHA), Public Law 91-596.

II.5.2.2. Standard Operating Procedures

Standard operating procedures (SOPs) will also be observed by ITR teams, when applicable. The program/project-specific SOPs address the following subject areas:

1. Monitoring Equipment: Identifies the proper use, calibration, and maintenance procedures of field monitoring devices.

2. Health and Safety: Presents requirements for health and safety plans, program/project audits, incident reports, emergency response teams, dosimetry (TLD) badges, first aid, principles of decontamination, and medical program operating procedures.

3. Respiratory Protection: Includes equipment selection and use; personal requirements; training requirements; equipment inspection, maintenance, and cleaning; and documentation requirements.

DOE contractor facility Health and Safety Plans and SOPs will apply to team members during all on-site ITR activities.

Additional reference documents applicable to work of this nature include the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities developed by the National Institute of Occupational Safety and Health, OSHA, the United States Coast Guard, and the EPA; and Standard Operating Safety Guides manuals specifying proper techniques and procedures for work involving hazardous materials.

II.5.3. General Safety Practices

The following requirements are generally applicable to team members throughout activities at a program/project:

1. Eating, drinking, chewing gum or tobacco, smoking, or any

practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any designated contaminated area.

2. Hands and face must be thoroughly washed upon leaving the work area or engaging in any other activities.

3. Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

4. No excessive facial hair (e.g., beard, sideburns) that interferes with a satisfactory fit of the mask-to-face seal is allowed on personnel required to wear respiratory protection equipment.

5. Contact with contaminated surfaces or with surfaces suspected of being contaminated should be avoided. Whenever possible, one should not walk through puddles or mud or on other discolored surfaces; kneel on the ground; or lean, sit, or place equipment on drums, containers, vehicles, or the ground.

6. Because medicine and alcohol can exaggerate the effects of exposure to toxic chemicals, prescribed drugs should be carefully administered.

7. Personnel and equipment in the contaminated area should be limited to the numbers consistent with effective operations.

8. Procedures for leaving a contaminated area must be explained before going to the program/project. Work areas and decontamination procedures must be observed on the basis of prevailing program/project conditions.

II.5.4. Protocol for On-Site Review Activities

The planning and implementation of health and safety considerations will be based on the following considerations:

1. The ES&H organization at each site will be officially responsible for the health and safety of the visiting ITR team. Any team-related injuries, illness, or possible exposures to hazardous or toxic substance or environments will be reported to the site ES&H program.

2. Planning for health and safety will be fully coordinated with

the ES&H organization at each site.

3. Protective clothing (e.g. Tyvek coveralls and rubber overshoes/booties) and equipment will be made available to the assessment teams by program/project personnel. Individual team members are encouraged to bring their own steel-toed work shoes, protective eye wear, and hearing protection if finding suitably fitting gear may be difficult on site.

4. All members of the team will be formally trained in appropriate health and safety considerations.

5. Copies of the sites Health and Safety requirements will be provided to the team and a safety representative may be appointed for the team.

II.5.4.1. Training

The first step in addressing health and safety considerations for a team visit is a determination that all members of the team have been adequately trained. For some members, a formal course conducted by the DOE support contractor may be necessary. Team members should communicate with their task leaders prior to the site visit to make sure they have received the training necessary to carry out their ITR responsibilities.

Team members who will have access to, or work within, hazardous waste areas must meet the training requirements recently promulgated by the Occupational Safety and Health Administration. This requirement is described briefly below, and in more detail in OSHA's Final Rule on Hazardous Waste Operations and Emergency Response (29 CFR 1910.120). The requirements of this rule are effective as of March 6, 1990. Training is required for all DOE and DOE contractor employees having access to, or working in a hazardous materials area, wherein they might be exposed to a hazardous substance, a health hazard, or to safety hazards. This includes DOE Headquarters personnel who visit these areas.

Many DOE facilities have areas for the treatment, storage or disposal of hazardous materials or waste and thus fall under this rule. The minimum training required for personnel needing access to any of these areas is 24 hours. Training must cover the specific elements set forth in 29 CFR 1910.120(e). Some facilities may have hazardous waste clean-up sites and are therefore subject to more stringent requirements.

The rule provides that certification be issued to personnel completing the training. Once an employee has received the training and has been certified, this certification is valid at all sites subject to the rule.

All personnel needing access to these specific areas must have the required training or entry should be denied. Each task leader should confirm in advance that team members have received the appropriate training.

II.5.4.2. Field Coordination

To facilitate planning for safety and health consideration, the following information on the site will be requested from the site Operations Office:

1. Hazards to which the team may be exposed and requirements or recommendations of the site ES&H organization for controlling these hazards during the program/project visit.

2. Any unusual occurrences or unplanned incidents relevant to planned team activities.

3. All relevant site ES&H standard operating procedures and guidance, including emergency procedures and information on hazard-warning labels and signs.

4. Names and phone numbers of health and safety contacts at the site through whom team matters may be coordinated.

5. Any program/project restrictions, hazard or contamination zones, or other special administrative precautions of which the team should be aware.

6. Protective clothing or equipment that may be necessary but will not be provided at the program/project.

7. First aid and medical services available on the site and in the vicinity of the program/project.

II.5.4.3. Pre-assessment Site Visit

During the pre-review site visit, the team leader will be responsible for meeting with the site ES&H director or his representative to discuss and confirm safety and health arrangements for team. These arrangements should be tentatively resolved before this pre-review meeting and documented by correspondence to the site and the Operations Office.

The pre-review meeting provides a final opportunity for first-hand discussion and modification of arrangements, such as applicable team procedures, provisions for protective equipment, and escort procedures. The team leader or his designee will act as the team Safety Representative for purposes of program/project coordination.

II.5.4.4. Review Team Site Visits

The review team will conduct its operations under the purview of the site ES&H program in accordance with arrangements made with the site in advance. The team will be briefed by the site ES&H staff on health and safety considerations.

II.5.5. Health and Safety Requirements

Compliance with the existing site Health and Safety requirements is required for every activity (such as a program/project visit) during which there is a potential for exposure of personnel to harmful chemical or physical agents. These requirements should be understood by the team members prior to the program/project visit.

The essential health and safety elements of interest at a program/project include:

1. The risks associated with the program/project.
2. Key personnel and alternates responsible for program/project safety and response operations.
3. The levels of protective equipment to be worn by personnel during various program/project operations.
4. The work area boundaries, size of work zones, distances between zones, and access control points for each zone designated in the plan.
5. Decontamination procedures for personnel and equipment.
6. The number of personnel and equipment needed and allowed in the work zones during initial entry and subsequent operations.
7. Established program/project emergency procedures—for example, escape routes, signals for evacuating work parties, emergency communications (internal and external), and procedures for response to fires and explosions.
8. Arrangements with the nearest medical facility (and medical life squad unit) for emergency medical care for routine injuries and toxicological problems.
9. Weather and other conditions that may affect the health and safety of personnel during program/project operations.

10. Control procedures to prevent access to the program/project by unauthorized personnel.

II.5.6. Physcials

It is expected that members of the review teams will be in compliance with their respective employers' requirements for periodic physicals. In the event that a prospective team member has not had a recent or annual physical, and may be participating in an on-site activity in which for example, a respirator is required, it would be prudent to undergo a physical examination in advance. Additional or routine physicals may be required for participation in some team field activities.

II.6. ITR Quality Assurance

II.6.1. Policy and Objectives

It is essential that the techniques and results of all ITRs be consistent, technically valid, and of high quality. The guidance provided in this section is intended to assist the team leaders and members to achieve those objectives. The nature of the ITR program precludes the use of a formal quality assurance (QA) program, as would be applied to the design of a nuclear facility or the conduct of an environmental site characterization project. However, several QA principles and techniques have been adapted to the needs of the ITR. These are described as five basic elements of implementation in the section to follow: guidance, selection of personnel, training, evaluation, and corrective action. These elements constitute a feedback loop process under the overall direction of ITR Director, in which corrective action may involve modification of existing guidance. It should be emphasized that the quality of the ITR results must be inherent in the on-site activities of the teams; quality cannot be added or improved subsequently. The continual application of the principles and techniques described herein will assure that the quality objectives of the ITR program will be met.

It should also be recognized that both DOE and contractor personnel will participate as team members, and that the guidance provided in this section broadly applies to both. Contractor personnel may have additional specific QA requirements, either via their corporate QA program or specific contractual requirements. Discussion of those requirements is beyond the scope of this Handbook.

II.6.2. Implementation

II.6.2.1. Guidance

The fundamental source of guidance for all aspects of the ITRs will continue to be contained in the Independent Technical Review Handbook.

This Handbook will be used to provide detailed guidance on all elements of the review program and include sections on the purpose, scope, and method of ITR processes and protocols; process checklists; health and safety considerations for participants; and the format and content of reports.

The Independent Technical Review Handbook is intended to be a "living document" which will be periodically updated and revised to reflect the suggestions and comments offered by its users. In addition, users of the Handbook are encouraged to contact the Core Group Office with regard to specific issues of concern, or recommendations for additional guidance.

The guidance provided may be updated by management direction memoranda developed by the ITR Director and issued by the Office of Procurement, Assistance, and Program Management. These memoranda address issues of interpretation of policy promulgated; details not explicitly covered in the Handbook; and modifications to the program as it evolves and matures. ITR team personnel will be provided with copies of these memoranda as a reference source for policy guidance on review activities.

II.6.2.2. Training

In addition to reviewing the ITR Guidance Handbook, information regarding the conduct of the reviews can be obtained by an individual team member prior to his or her assignment by attending one of the training sessions periodically conducted. These training sessions are designed to provide a practical "lessons learned" exchange among team members, and to provide more detailed guidance on topics such as the identification of root causes.

Another objective of the training sessions is to provide the same level of awareness and understanding of the principles of the reviews to all team members and thus promote more consistent application of these principles to the variety of sites to be investigated. This consistency is important in assuring that all assessment deficiencies are similarly identified, evaluated, and described.

In the course of the ITRs, team members receive valuable on-the-job training on DOE operations and issues. The daily orientation to issues through the review of reports, files, and other documents, as well as by observation of operations, is guided and refined by the team leader, individual task leaders, and program/project contractor coordinator. Periodic meetings with team members serve to ensure a multi-disciplined approach to each review . These meetings, conducted daily while on the site, allow for the coordination and review of problems from all technical disciplines. Team members learn to identify and define problems from the perspective of all the technical disciplines, thereby improving the quality not only of the ITRs, but also, of ongoing practices of environment, safety and health, and management activities at DOE facilities, in general.

II.6.2.3. Evaluation

This element is composed of two facets: observation of field activities and document review. Observation of field activities includes team work completed in preparation for on-site activity (e.g., team meetings), planning, site visits, on-site review activity itself, and any other work done on the site to coordinate or track work. Document review involves review of all formal documentation of results and cursory review of the informal input to working drafts of documents.

II.6.2.3.1. Observation of Review Activity

PR personnel may visit each site during on-site activity to observe, first-hand, the implementation of the ITR guidance and policy. The purposes for observing this activity are multiple. The primary objective is to review both the personnel conducting the ITR and the management of the review. The aim is consistency and quality in the way in which the ITR is conducted and in the assessments that come out of it. Where particularly good review techniques are observed, they are passed along to the other teams. Constructive criticism is provided when on-site activity can be more thorough, more efficient, or more consistent with the purpose and scope of the overall effort. Suggestions for improvement are also solicited from team members while they are thoroughly involved in the process. Finally, the PR representative has an opportunity to clarify policy and guidance during this observation phase of the ITR program.

II.6.2.3.2. Document Review

Document review involves numerous participants and formal, as well as informal products of the ITR. Several levels of document review are incorporated into the program. Review of documentation before it is released for distribution serves several purposes. First, it uncovers technical errors or omissions. Second, it ensures consistency among review teams in expressing the philosophy and approach to the review program. Finally, it allows for conformance to standard formats, checking of outlines, and detection of typographical errors can be detected.

The Office of Procurement, Assistance, and Program Management receives copies of all ITR correspondence and reports. In most cases, the PR receives an information copy of all documentation and provides a review to ensure consistency across the broad array of activities. PR is the focal point for ITR team efforts and thus has staff with the broad knowledge necessary to provide consistent guidance on both policy and implementation. This review provides PR with the latest information on all reviews, allows corrective actions to be made retroactively, and does not impede or delay the delivery of routine documentation.

PR will review major and sensitive documents before they are released. Examples of major documents include all draft ITR assessment reports. Sensitive documents include reports and correspondence released to outside organizations, including Congress, regulatory agencies, and the general public.

ITR reports are reviewed at three levels before they are finalized and released. The draft report is reviewed by the operations office, with the assistance of program/project contractor(s). This is the formal mechanism for the validation of the assessment. A security check is also performed by the field office to be sure that classified or UCNI material is not inadvertently included in the report or that any such material that is included is properly marked and controlled. The draft assessment report is also reviewed by the ITR team leader before it is transmitted to the PSO and PR for formal review and concurrence. After revision of the draft assessment report in accordance with the comments received, a similar review process is performed for the final assessment reports.

II.6.3. Corrective Action

This element can be directed at any one of a number of targets. Individual ITR program personnel, ITR teams, and all entities involved in ITR may be provided additional training or guidance as a corrective action measure. Corrective action may involve an informal conversation between PR management and one or more ITR program personnel. It may also be in the form of informal written communication and constitute an ITR program modification to policy or procedures.

The management guidance and direction memoranda signed by the PR Director represent a formal mechanism for corrective action when inefficiencies, inconsistencies, or confusion regarding program philosophy are detected in evaluations of the quality of ITR .

II.7. ITR PROCESS CHECKLISTS

II.7.1. Defining the Review Scope and Charter

_______ Ascertain the customer's objective for the review.

_______ Ascertain if the customer has specific review criteria and/or expected lines of inquiry.

_______ Establish the customer's expected review schedule.

_______ Determine if the customer has key assumptions related to the program/project being reviewed.

_______ Determine if standard review task groups are not appropriate for this review.

_______ Ascertain if the customer has specific review team personnel or skills requirements.

_______ Ascertain the financial resources available for the review.

_______ Obtain appropriate program/project/site background information and documents from the customer. See Appendix I.

_______ Obtain the name, phone, and FAX number of the appropriate Operations or Field Office and program/project contact.

_______ Obtain organizational charts for the customer, Operations Office, and program/project organizations.

_______ Identify review and program/project stakeholders.

_______ Develop a draft review charter, including the scope, criteria, schedule, resources, and assumptions for customer review, modification, and approval.

II.7.2. Mobilizing the Review Team

_______ Meet with the Core Group Coordinator assigned to this review to discuss the review charter and support needs.

_______ Prepare a review notification letter to the appropriate Operations Office. The notification letter should contain the date and expectations for the pre-review site visit. (Note: See Appendix F for examples.) Forward the letter to DOE-HQs for review and approval.

_______ Ascertain the specific technical expertise and skills required for the review.

_______ Review the Core Group personnel data base for appropriate task leaders and participants.

_______ Identify potential Task Leaders.

_______ Assess participant qualifications, availability, and organizational conflicts of interest.

_______ Notify team coordinator of task leaders and selected participants. The team coordinator will begin to mobilize the team.

_______ Schedule a review management (team leader/coordinator/task leaders) kick-off meeting.

_______ Provide the team coordinator with site-specific review details for preparation of ITR Handbooks.

_______ Meet with the key review personnel to outline the ITR structure, the charter for this review, and any background information on the customer's expectations and the program/project.

_______ Provide task leaders with the maximum allowable panel size and with potential team member lists.

_______ Establish a milestone date for the task leaders to finalize and document a panel participant roster.

_______ With the key review personnel select a date for a review team kick-off/training meeting.

II.7.3. Training

With the team coordinator, arrange for training in the following areas:

_______ The Malcolm Baldrige National Quality Award Benchmark.

_______ Review skills and techniques.

_______ Team building skills.

_______ Interviewing skills.

_______ Facilitator skills.

_______ Ship an ITR Handbook to each member.

II.7.4. Requesting Background Documents

With the Team Coordinator:

_______ Review the list of typical review documents in Appendix I and develop a request list to be included in the ITR notification letter.

_______ The support office will assign a review control number to each document as it is received. (Note: See Appendix J for the Std. document control methodology.)

_______ The support office will develop and publish an index of the reference documents.

_______ Add the reference index to Section III of the ITR Handbook.

II.7.5. The Pre-Review Site Visit

_______ Schedule the pre-review site visit with the Operations or Field Office, if this was not done in the notification letter.

_______ Review the documents supplied by the program/project management as a result of the notification letter request to determine if other documents should be requested during the pre-review visit.

_______ Prepare a pre-review site visit presentation, which includes at minimum:

-	ITR structure	Appendix A
-	The charter for this review	
-	Team organization and personnel	Appendix A
-	Documentation requests	Appendix I
-	Team field requirements	Appendix I
-	Anticipated schedule	

_______ Request that the Operations or Field Office and the program/ project management provide appropriate overview briefings and facility tours as a part of the pre-review visit.

_______ Request the names of site personnel who will serve as the review coordinators and/or counterparts for each task group.

_______ With the Operations or Field Office and the program/project management, develop an agenda and schedule for the review.

_______ Document any preliminary program/project strengths and deficiencies identified from the overview presentations included in the ITR Handbook, Section III.

_______ Provide the material obtained from the pre-review site visit to the team coordinator. The material will be added to Section III of the ITR Handbook.

II.7.6. <u>The Review Team Kick-Off Meeting</u>

The team coordinator/trainer will:

_______ Review team facilities, accommodations, computers, and software. Introduce support personnel. Other areas which may need to be addressed include:

- Contract considerations
- Local accommodations
- Housekeeping issues and requirements
- Travel planning and reimbursement

_______ Conduct standard review process training. (See ITR Training Handbook.)

The team leader, coordinator, or trainer should:

_______ Present the customer's charter and objectives.

_______ Present the review schedule and participant time and schedule requirements.

_______ Present an overview of the program/project to be assessed, using materials from the pre-review site visit.

_______ Present any preliminary strengths and deficiencies identified during the preliminary site visit.

_______ Provide a list of ITR library reference documents.

_______ Provide a list of task group counterpart names.

_______ Provide a list of accepted definitions and acronyms.

_______ Provide participants with the standard format for a resume. Each person is to provide a resume prior to the end of the review team kick-off week.

II.7.7. Preparing the Review Plan

_______ Each task group should review the ITR Handbook standard review plan and examples.

_______ Each task group should review the charter, reference documents, and pre-review site information for this specific review.

____ Task members should conduct a literature search for applicable benchmarking work in this area/field.

_______ Each task group is to prepare a draft review plan and line of inquiry.

_______ Each task group is to develop a set of review questions. The task leader assigns each member responsibility for a category of questions.

_______ The task leaders should formally present the review plan and line of inquiry to the team leader and coordinator.

The team management harmonizes the task group review plans and lines of inquiry and documents the result as the draft review plan.

II.7.8. Review Plan Validation and Benchmarking

_______ Determine if other DOE sites and facilities would be appropriate site for benchmarking the review plan.

_______ Determine if applicable research and development efforts are being carried out by the National Laboratories.

_______ Determine if similar activities are being carried out at industrial sites and facilities.

_______ Determine if National Codes and Standards should be used as a part of the review process.

_______ Evaluate the status of foreign technology, sites, and facilities.

_______ Establish a review plan validation and benchmarking strategy (See Appendix N):

- Select one or two of the best comparable sites
- Schedule visits to the key sites
- Communicate the types of presentations and tours desired; the size of the team that will be visiting
- Define the validation/benchmarking expectations

_______ Visit the appropriate site(s) and validate the plan. (See Appendix N.)

_______ Evaluate and document key benchmarking performance variables:

- Quantitative and qualitative measures
- Practices
- Techniques
- Organizational structures
- Cultural norms
- Education and experience levels
- Key technical and management processes

_______ Modify the review plan as appropriate.

II.7.9. TOB Critique of the Review Plan

_____ Schedule a one day TOB critique meeting through the team coordinator.

_______ Prepare a draft critique agenda and a review overview; FAX to the Chairperson of the TOB for review, modification, and approval. (See Appendix O for example formats.)

_______ Provide the TOB with copies of the review plan, the meeting agenda, and the review overview **one week** before the review meeting.

_______ The Team leader should lead the review plan critique session.

_______ Task leaders present their respective review plans and line of inquiry to the TOB.

_______ The TOB accepts the review plan or recommends modifications.

_______ The team and task leaders consider modifications to the review plan per the TOB recommendations.

II.7.10. Presenting the Review Plan to the Team

(This step can be implemented the first day of the on- site review.)

_______ Present the Review Overview and review plan to the team members.

_______ Present the TOB recommended changes.

II.7.11. THE OVERVIEW ON-SITE REVIEW VISIT

_______ The team leader kicks off the review by presenting the following information:

- ITR Basis and Structure
- Integrated System Perspective
- Process
- Charter and Objectives
- Review Plan Lines of Inquiry
- Team Members

_______ Program/project management provide overview technical briefings of interest to all task groups.

_______ Task leaders and their counterpart meet to discuss and modify, if appropriate, the detailed agenda and schedules.

_______ On-site personnel provide task specific briefings.

_______ The task groups conduct interviews, working sessions with program/project personnel, and tours, as appropriate.

_______ The team leader sits in on sub-group sessions with on- site personnel to assure the review plan is followed, the review is addressing issues in depth, and that proper conduct of ITR participants is being followed.

_______ Task groups take notes of qualitative and quantitative measures of the program/project, based on the review criteria and line of inquiry.

_______ Task groups meet daily in private debriefing sessions to assess and analyze the data they have collected. The task group formulates a trial set of strengths and deficiencies assessment statements, as the first review week progresses.

_______ Daily team management debriefing meeting are held to discuss review progress. Review team members also attend but generally do not participate.

_______ Based on its analysis, each task group requests, from its counterpart, additional detailed documents, interviews, and presentations, to be provided during the second visit. The team management is informed of all such requests. Focus on "need to know" information--not nice to know. The team coordinator assigns a document control number to each additional document.

_______ At the end of the first week prior leaving the site, the task groups prepare and submit to the team coordinator an interim strengths and deficiencies assessment report. This interim report is for DOE eyes only.

_______ The team leader and team coordinator draft a preliminary assessment notification memo and FAX it to the customer or his representative.

II.7.12. The Mid-Review Off-Site Analysis Meeting

_______ To kick off the meeting, each task leader presents his/her group's interim report.

_______ The team brainstorms and drafts a trial set of assessment statements and root causes.

_______ Task groups review and modify, if appropriate, their review plan.

_______ Task groups review the additional documents provided during the first on-site visit.

II.7.13. The Detailed On-Site Review Visit

_______ Task groups conduct vertical and horizontal cross-cut interviews.

_______ Task groups request and receive additional specific briefings to validate its trial review.

_______ Task groups hold detailed discussions with subject specific teams of program/project personnel.

_______ The task groups focus their review activities on validation, clarification, and additions to the trial set of strengths and deficiencies assessment statements.

_______ At the end of the second review, prior to leaving the site, task groups brainstorm additional/final strengths and deficiencies assessment statements, based on quantitative and qualitative notes and data. The briefing, document, interview, working session basis for each assessment statement is established and documented. Assessment statements are used to formulate a sub- panel root cause review. All brainstorm information is entered in a word processing file for use in preparing the task group assessment report.

_______ Each task group drafts an assessment report executive summary during the second on-site visit. The summary contains the review root cause, strengths, and deficiencies assessment.

_______ At an internal ITR closeout session, the task leader presents the group's assessment to the team leader and other task leaders.

_______ The team leader evaluates the assessments of the task groups to insure they are consistent with the framework of the review.

_______ Task leaders provide their counterpart with an informal discussion of root cause, strengths, and deficiencies assessment before departing the site.

_______ The team leader and key team members may elect to hold an informal closeout meeting with site representatives. Verbal presentation of preliminary concerns is appropriate.

II.7.14. Preparing Task Group Draft Assessment Reports

_______ The team leader establishes the date for submission of the first and final task group draft reports.

_______ Task groups meet to discuss their assessment summary and the qualitative and quantitative notes and data. Quantitative data should be tabulated.

_______ Each task group collectively writes a draft report and submits it to the team leader. The task group decides on the best method of preparing the draft. One member may elect to write a strawman. The draft assessment report must be documented in the standard format and software.

_______ Task members review their draft assessment report and validate it against their notes and the review documents.

_______ Task groups review drafts of the other Task groups reports to look for root cause, strengths, and deficiencies assessment interrelationships.

_______ Task groups document interviews and key documents in an appendix of their report.

_______ Each task group issues a final draft assessment report to the team leader by the agreed on date.

II.7.15. Preparing the Draft Assessment Report

_______ Team leader and task leaders arrive at a consensus as to the key assessment statements and draft an executive summary.

_______ The team management reviews and finalize the Executive summary.

_______ The general technical assessment section is drafted from task group summaries, checking for consistency with the executive summary.

_______ The team leader assigns responsibility for and a schedule for drafts of associated report appendices.

_______ The team leader and coordinator assemble the assessment report and issues a first draft to the task leaders and the TOB.

II.7.16. The TOB Critique of the Draft Assessment Report

_______ The team leader schedules a TOB assessment report critique meeting.

_______ A copy of the draft report is sent to each TOB member one week before the review meeting.

_______ TOB members read the draft report before the review.

_______ The TOB meets in private to review and discuss the report the first day of the review.

_______ The review team leader and task leaders meet with the TOB to receive its recommendations and proposed revisions or clarifications the second day of the review.

_______ The team management revises the draft assessment report, as appropriate, prior to the customer review.

II.7.17. Customer Review of the Draft Assessment Report

_______ The customer should define the method he/she will use to review the assessment report.

_______ The team leader should produce a concise presentation of the assessment. The total number of viewgraphs should be less than 12.

II.7.18. Preparing the Second Draft Assessment Report

_______ The team leader modifies report as appropriate.

II.7.19. Reviewing the Second Draft with the Site Management

_______ The team leader presents the review assessment to the program/project management. If the customer agrees, the site management is provided a copy of the second draft.

_______ The site management reviews the document for technical accuracy. The site management is not permitted to question the assessment report Challenges to these must be raised directly with the customer.

_______ Issues of technical accuracy are addressed by the appropriate task leader. Changes are made to the second draft as appropriate.

II.7.20. Issuing the Final Report

_______ The team leader provides a final review of the assessment report, making any final modifications as required.

_______ The customer should define the method for issuing the final report.

II.7.21. Follow-On Review Activities

It may be appropriate to propose a "GOLD" team to either the on-site management or the customer. The Gold team assists the customer in addressing the assessment and concerns by making a team of experienced personnel available for a short period of time. The Gold team may also return at some time interval to assist the site management in reviewing their progress.

II.7.22. Archiving the Review Document

II.8. The Task Leader's ITR Process Checklist

II.8.1. Review the ITR Background Information

_______ Read the customer's ITR objective, criteria, expected lines of inquiry, and key assumptions.

_______ Read the program/project/site background information and documents in ITR Handbook Section III.

_______ Review the organizational charts for the customer, Operations/Area Office, and program/project organizations.

_______ Review historical assessment plans and reports with particular attention to the sections which apply to your subgroup or task. Consider the historical success in assessing the lines of inquiry and questions.

_______ Determine what additional information, documents, reference sources, etc. will be required or useful in carrying out your task review. Provide a list to the Team Leader and the Team Coordinator.

II.8.2. Select Review Team Members

(NOTE: This step may have been completed during charter negotiations with Headquarters, the site, and the Team Leader. If so, skip to Section II.8.3.)

_______ Identify the specific technical expertise and skills required for the review.

_______ Meet with the Core Group Coordinator assigned to this ITR team to discuss the specific skills needed for your task area.

_______ Review the Core Group personnel data base for appropriate team members.

_______ Assess participant qualifications, availability, and organizational conflicts of interest.

_______ Notify team coordinator of the team members you would like to use. The team coordinator will make the contractual arrangements.

II.8.3. Prepare the Review Plan

_______ After the ITR training has been completed, you will meet with your group to develop a task Review Plan.

_______ Before Review Plan discussions begin, ask each member to read all introductory and background documents you believe are important.

_______ Conduct a group discussion of the charter and background information to insure everyone is comfortable with the material.

_______ Brainstorm (see Appendix C) a list of potential issues or questions which one might ask with regard to your subgroup/task. Historical review plans and the Malcolm Baldrige Criteria (Appendix B) are also a good source of questions.

_______ Group the questions into theme categories. As each theme develops, assign a number to it, and place that number by the appropriate questions.

_______ Using consensus building techniques (Appendix C), eliminate the themes and/or questions which the group does not feel are important or applicable to the Charter. Three to six themes are typical.

_______ Rework the wording of the remaining themes to insure cogent unambiguous statements. State the themes in the form of a "line of inquiry," per Appendix M.

_______ Review the wording of the questions to insure their meaning is clear.

_______ Using the information of Appendix M, prepare a draft task review plan and give it to the Team Leader or Team Coordinator for review.

_______ Obtain copies of the other task leaders lines of inquiry and review for voids, conflicts, and overlaps. Meet with the individual task leaders to harmonize the lines of inquiry. **Do not discredit the ITR "systems" perspective and waste the site personnel's time by addressing overlapping issues.**

II.8.4. Individual Team Assignments

_______ Based on the skills of you and your group members assign specific lines of inquiry and/or questions to each team member.

_______ Each member with an assignment is responsible for developing background and reference material as a basis for the review.

_______ Each member with an assignment is to coordinate all review activities with regard to that line of inquiry/question, including appropriate briefings, interviews, and inspections.

_______ In addition to responding to lines of inquiry and questions which emerge during the review, each member with an assignment is expected to develop a post-review assessment response to their assigned line of inquiry or question.

II.8.5. Background Document Search and Review

_______ Determine if the DOE National Laboratories, DOE production sites, universities, or private industry have appropriate programs or projects in this area.

_______ With the help of your group and the team coordinator, obtain the names and phone numbers of contacts.

_______ Based on their assignments, ask group members to contact the locations to determine if appropriate reference or background documents are available.

_______ If feasible, use the LANL or SNL library facilities to access and review journal and trade magazine articles.

_______ Have team members identify, review, and evaluate foreign technology papers.

_______ The team members should review/read appropriate site documents in the ITR library prior to the first site visit. **Do not waste site personnel's time by arriving with your team members unprepared.**

II.8.6. Records and Notes

Four review record forms are provided at the end of Section 8 for keeping records of:

_______ Specific documents used in the review assessment process.

_______ Interview information, including name, organization, and responsibility.

_______ Interview notes.

_______ Observations developed during private discussion sessions.

II.8.7. Task Specific Briefings

_______ After the site completes overview presentations, you will need to begin task specific briefings.

_______ Review task specific briefing agendas prepared by the site to determine if the presentations are appropriate to your line of inquiry and questions.

_______ If you believe a presentation is inappropriate, discuss it with your counterpart or the team coordinator. Do not waste personnel's time by briefings which are not in the scope of the review. However, in the first informational week at the site, you should be allowed any briefing which the site feels is important information for your line of inquiry.

_______ If the site has not prepared a draft briefing agenda, you will be required to list the specific briefings of importance to your line of inquiry. Prepare a draft list based on your review of the site documents, the overview presentations, your team's experience in this field. Provide the list to your counterpart or the team coordinator to schedule.

_______ **If you believe a briefing is important but the site is hesitant, reluctant, or slow to provide it, be insistent.**

_______ Obtain a copy of all presentations for the review library.

_______ During week one at the site, your task team should ask questions of clarification. Refrain from detailed questions and investigations until the second week or until the site has put all information and data they feel is important on the table.

_______ Ask for the source of viewgraphs/foils. Remember—with access to a personal computer, viewgraphs can be prepared in an hour which claim anything. In the first on-site week, be sure to determine the source and basis for presentation statements and claims.

_______ Ask for copies of important briefing reference or source documents. If the site states that the document is too large, they only have one copy, the document is issue controlled, or it has not been released for external distribution, request a loan copy to read at the site. **Remember—be persistent. Keep records of the documents you have requested and review them daily with your counterpart.**

II.8.8. Selecting and Scheduling Horizontal Reviews

_______ Prepare a draft horizontal interview list based on your review of the site documents, the overview presentations, the detailed briefings, and your team's experience in this field. Provide the list to your counterpart or the team coordinator to schedule.

_______ **If you believe an interview is important but the site is hesitant, reluctant, or slow to schedule it, be insistent.**

_______ Prepare a list of key questions to be addressed in each interview. The horizontal interviews should focus on the way the site does its work—plans, strategies, processes, organization, documentation structures, systems, records, procedures, etc. used to carry out work at this site.

_______ Following this approach you should be able to identify the key staff and documents necessary for detailed investigations.

_______ Be open in the horizontal interviews to new lines of inquiry. If the interview is conducted according to ITR recommendations, the interviewee will frequently identify additional areas which concern him/her.

_______ The task group should meet privately several times during the week to discuss observation and issues. In addition, additional avenues of questioning and investigation should be identified and documented.

_______ Keep track of interviews, documents, and key observations on the forms provided at the end of this section.

II.8.9. Off-Site Task and ITR Team Discussions

_______ Off-site ITR team discussions are held to identify areas of preliminary issues and assessments. The issues and assessments will be investigated during the second on-site week.

_______ The team members should read/review all documents obtained during the first on-site week according to their lines of inquiry assignments.

_______ The task group should meet and review the issues documented during the first week in private meetings. The group should then brainstorm and subsequently discuss other issues which have surfaced since leaving the site. All consensus issues should be documented on the issues provided.

_______ The group should then discuss the root causes of the issues identified. These root causes and supporting issues should be the focus of the second on-site investigative week.

_______ The entire ITR team should meet to discuss the issues and root causes identified by each task group. This session should identify common issues, additional issues, as well as conflicts in opinion between task groups.

_______ The task group should then identify the key interviews, tours, questions, etc. to validate the issues and root causes during the second on-site week. Requirements for interviews and tours should be sent to the site through the team coordinator.

II.8.10. Detailed On-Site Investigations

II.8.11. Developing an Issues and Assessment Consensus

II.8.12. Report Writing Assignments

II.8.13. Comparing the Report to the Review Plan

INTERVIEW RECORD

ITR NAME ______________________ TASK GROUP ______________________

Date	Interviewee's Name	Organization	Responsibility

DOCUMENT RECORD

ITR NAME

TASK GROUP

Title	Author	Site ID #

INTERVIEW NOTES

ITR NAME	TASK GROUP
INTERVIEWEE'S NAME	DATE

Signature:________________________________

KEY OBSERVATIONS/ISSUES RECORD

ITR NAME ____________________ TASK GROUP ____________________

Date	Observations/Issues

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APPENDIX A

AN ITR OVERVIEW

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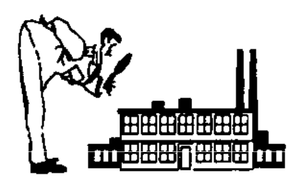
OUTLINE

- Basis
- Structure
- Integrated Systems Perspective
- ITR Team Structure
- Process
- Activities



BASIS FOR REVIEWS

Initiated by EM-1 in the Spring of 1991 to Provide —

- DOE-HQs with an Independent *Technical* Assessment for Use in
  - Key Decisions
  - Identification of Emergent Issues
  - Continuous Program Improvement

- A Systems Level Assessment of Program or Project
  - Science Basis
  - Engineering Practice
    - Process
    - Regulatory
    - Facilities
    - Management and Control

REVIEW STRUCTURE

- **Individual Review Charters and DOE Team Leaders Approved by EM-1**

- **Ad-Hoc Team Members are:**

Drawn From	Based on
National Labs	*Specific Technical Expertise*
Consultants	*Broad Technical Experience*
DOE Contractors	*Significant Practical Experience*
Private Industry	*Absence of Organization Conflict of Interest*
Universities	
DOE	

- **A Core Support Group Provides**

  The Review Process

  Training

  Facilities and Equipment

  Review Memory

- **A Technical Oversight Board Critiques Review Activities**

  Nationally Recognized Credentials

Independent Technical Reviews

Definitions

Assessment: Based on a one time prescription, to analyze critically and judge definitively the nature, significance, status, or merit of a situation or condition.

Audit: A compliance examination and evaluation of a program or program element based on prescribed standards and requirements.

Study: A careful examination or analysis, based on detailed scientific methods, of a phenomenon, development, or question within a limited area of investigation.

Validation: To grant formal approval based on evidence of a system which meets specific criteria.

Purpose

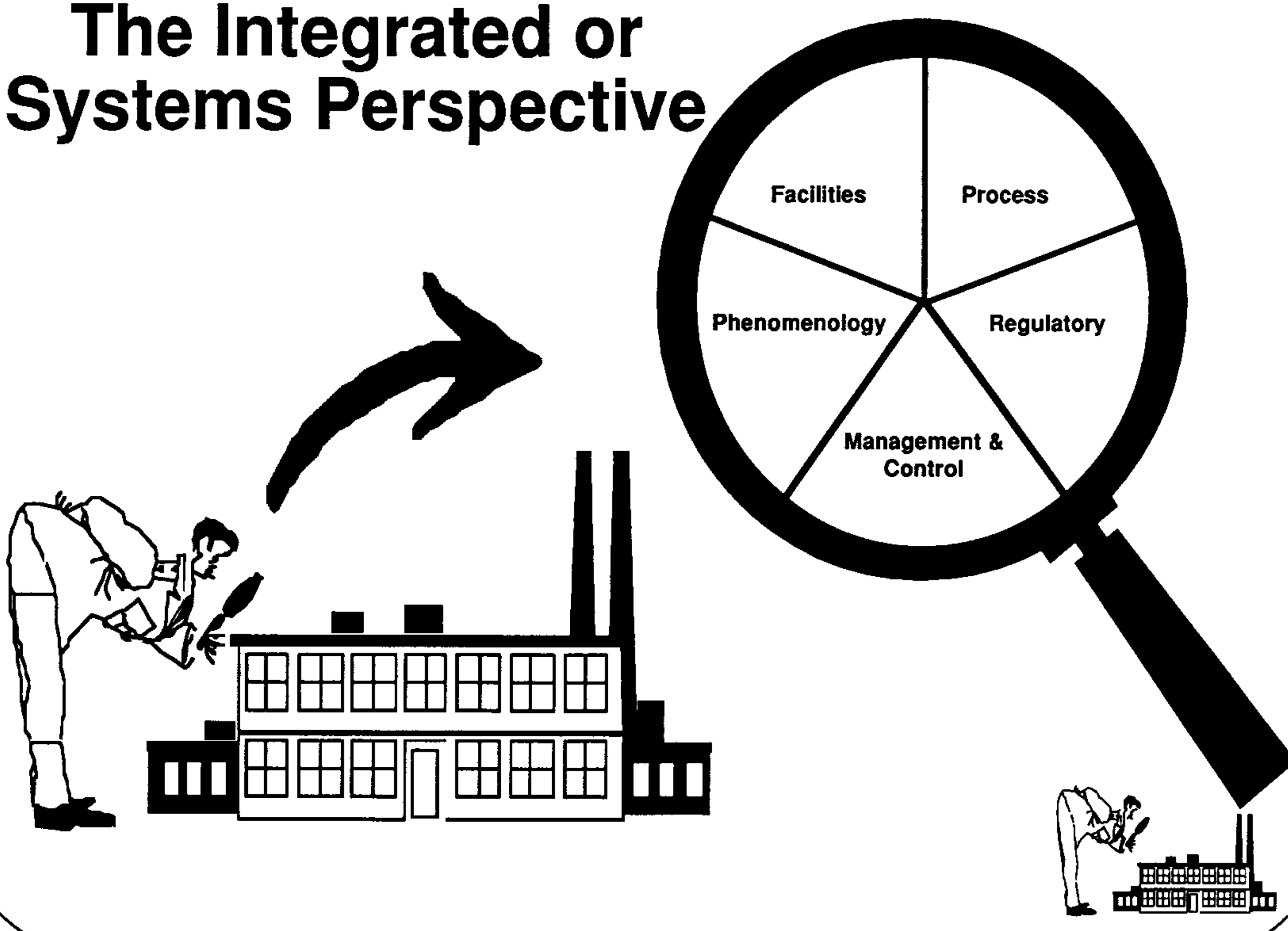
Assess

To analyze critically and judge definitively the nature, significance, status, or merit of

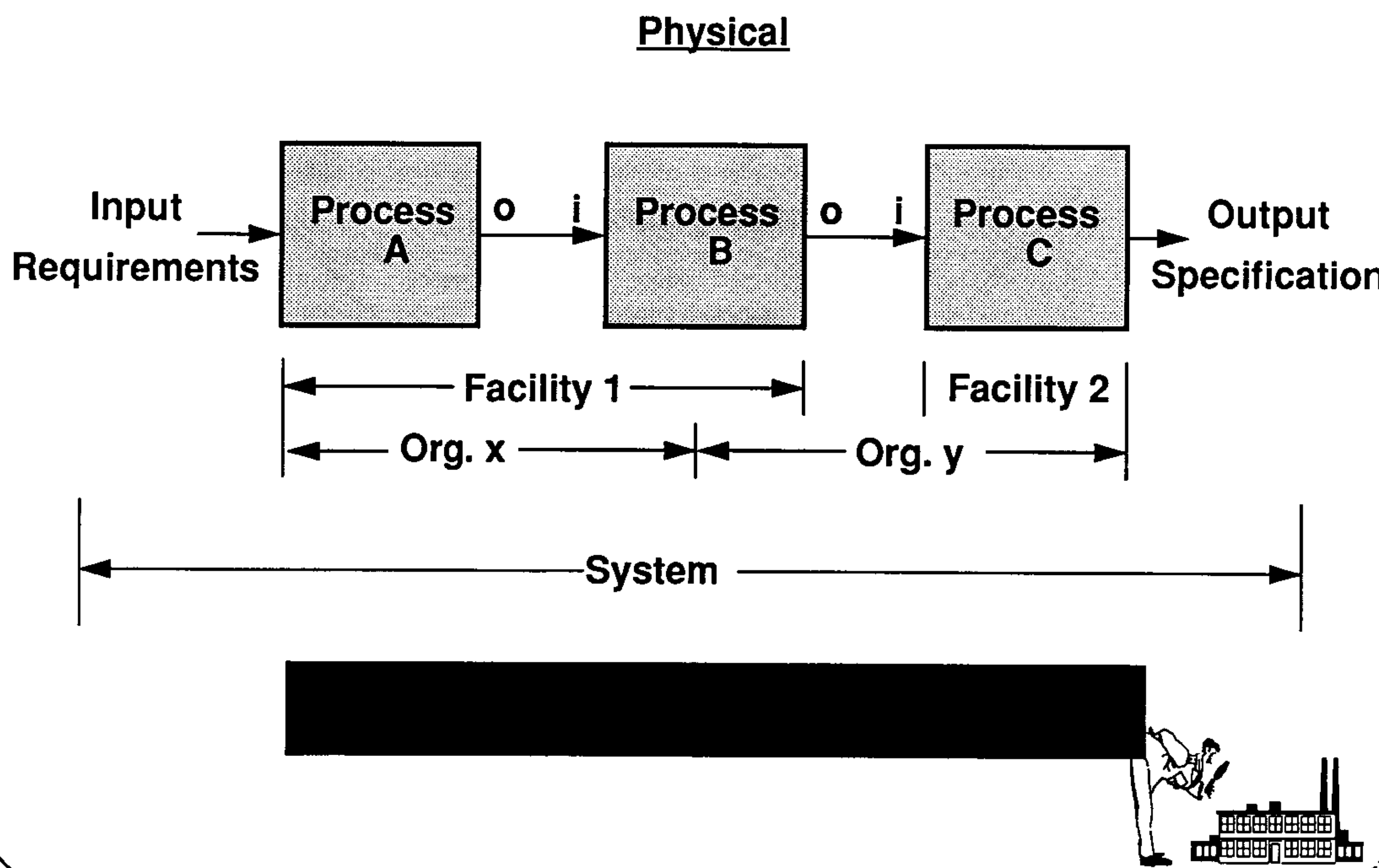
~~Assess~~

- Develop and Propose Solutions
- Propose Customer Actions
- Infer Information
- Reach Findings or Observations Without Supporting Documentation or Notes
- Use as a Forum to Promote Your Biases

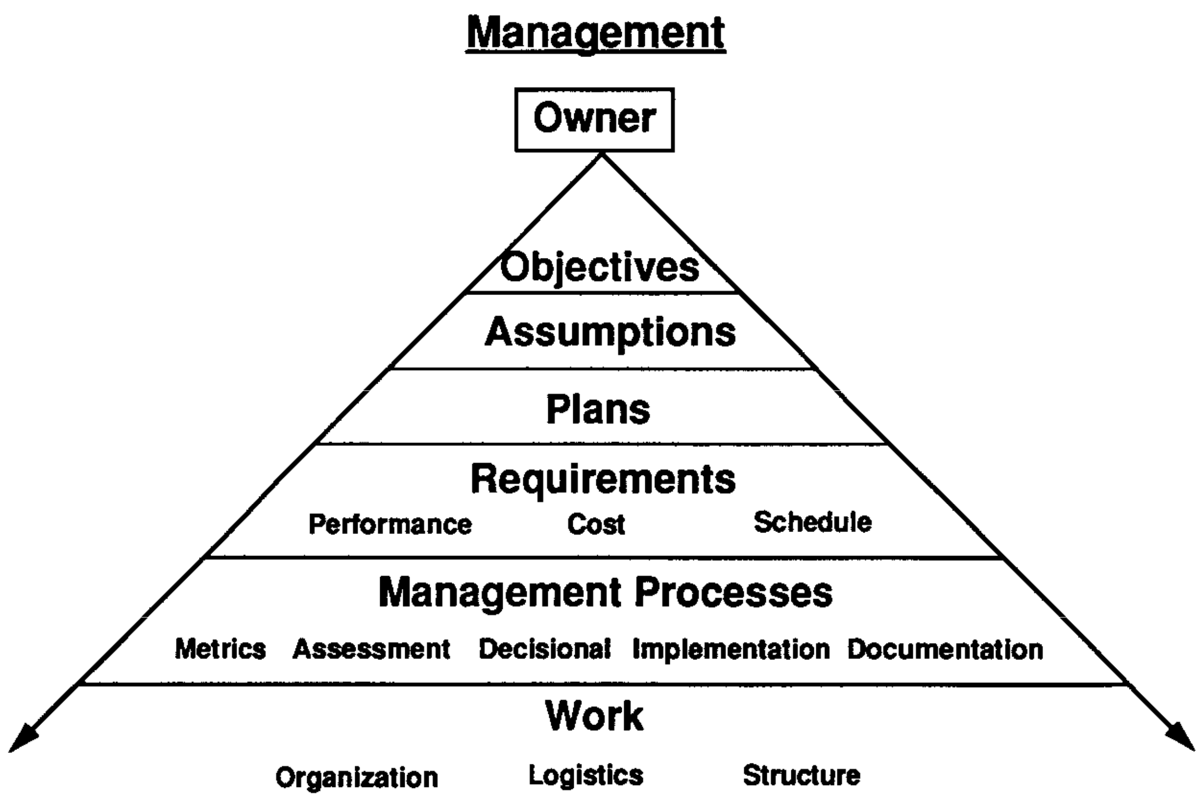
The Integrated or Systems Perspective



Systems Perspective



Integrated Perspective



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TEAM STRUCTURE

DOE ITR Director

- **Core Group**
  - Process
  - Facilities
  - Systems
- **Assessment Team**
  - Phenomenology
  - Process
  - Facilities
  - Regulatory
  - Mgt & Control
- **Technical Oversight Board**

TEAM STRUCTURE

PHENOMENOLOGY

Assesses the understanding of the relevant science

- Science basis
- Status of support technologies
- Merits of emerging technologies
- Issues requiring further research

TEAM STRUCTURE

PROCESS

Assesses the processes used to convert the input to the output, including the state of development, control, and production infrastructure

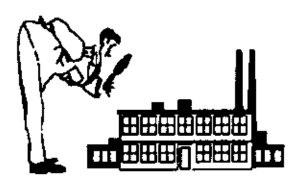
- Input/output specifications
- Process definition
- Alternative processes evaluation
- Control systems and methodologies
- Maintainability/reliability evaluations
- Equipment/hardware designs/specifications
- Waste and hazard minimization

TEAM STRUCTURE

FACILITIES

Assesses the suitability of the site and buildings to support the activity

- Site suitability
- Building and subsystem design and layout
- Structural stability
- Subsystem isolation and containment
- Reliability and maintainability
- Environmental release control
- Security and physical protection
- Waste and hazard minimization



TEAM STRUCTURE

REGULATORY

Ensure that relevant regulations and orders have been identified and incorporated into the activity plan and the operation

- NEPA
- Clean Air Act
- Clean Water Act
- RCRA
- TSCA
- CERCLA
- OSHA
- DOE orders
- State and local regulations
- ALARA
- Radiation protection

TEAM STRUCTURE

MANAGEMENT & CONTROL

Assesses if management has the structure, processes, and discipline to meet ES&H protection prerequisites while simultaneously meeting technical, cost, and schedule objectives

- System and project management
- Configuration control and management
- Systems integration
- Quality requirements
- Procedures and documentation
- Management processes
- Safeguards and security

TEAM STRUCTURE

Technical Oversight Board

Critiques the methods and activities of the Independent Technical Review support group and review teams to continuously improve the quality of the review processes and products. The Board is composed of permanent and ad-hoc members recognized in their respective fields as seasoned executives and/or technical experts.

THE REVIEW PROCESS

Input → LANL/SNL Independent Technical Review **Process** → Output

Review Issue or Question

Report
- Show Stoppers
- Concerns
- Strengths

THE REVIEW PROCESS

- Charter Negotiated and Approved
- Initial Site Visit
- Staff and Train Team
- Prepare Review Plan; TOB Critique
- Information Site Visit — Presentations, Tours, and Document Collection
- Off-Site Analysis; Benchmark Other Sites/Activities
- Detailed Site Visit — Interviews, Inspections
- Develop Consensus Assessment; TOB Critique
- Brief EM; Site
- Finalize Report

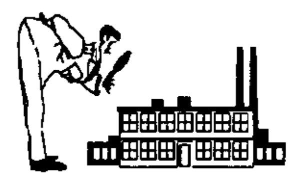
REVIEW ACTIVITIES

Hanford Waste Vitrification System	October, 1991	DOE/EM-0056P
Hanford Tank Waste Disposal Strategy	January, 1992	Pending
Hanford Tank Farm Operations Review	July, 1992	DOE/EM-0095P
SR Defense Waste Processing	July, 1992	DOE/EM-0080T
Hanford PUREX Plant Safe Store Review Facility Review	October, 1992	Pending
SR In Tank Precipitation	June, 1993	DOE/EM-0104
Rocky Flats Plant	September, 1993	Pending
WIPP Bin and Alcove Test Programs	December, 1993	Pending
Oak Ridge Isotope Facilities Shutdown Program		In Preparation

THE BASIC ITR PROCESS FLOW

PREP | OVERVIEW ON-SITE | OFF-SITE DISCUSSIONS | DETAILED ON-SITE | ASSESS | REPORT

Time ⟶ (6 - 12 weeks)



THE ITR PROCESS

PREP | OVERVIEW ON-SITE | OFF-SITE DISCUSSIONS | DETAILED ON-SITE | ASSESS | REPORT

Time →

1 - 4 WKS

1. ITR Training
2. Read/Review ITR Manual
4. Review Specific ITR Information
   - Charter
   - Prelim. Information
5. Review Prior Assessment Documents
   - Review Plans
   - Reports
   - Briefing Packages
6. Read Appropriate Library Documents
7. Review Requirements Documents
8. Prepare Subpanel/Task Review Plan
9. TOB Plan Critique
10. Finalize Review Plan

THE ITR PROCESS

PREP	OVERVIEW ON-SITE	OFF-SITE DISCUSSIONS	DETAILED ON-SITE	ASSESS	REPORT

3 - 5 Days

Time →

1. ITR Charter and Process Presentation
2. Program/Project Overview Briefings
3. Site and Facility Tours
3. Subpanel/Task Specific Briefings
3. Horizontal Interviews - Establish Basis
4. Team/Subpanel Discussions
5. Document Request
6. Close-out Mtg

THE ITR PROCESS

PREP | OVERVIEW ON-SITE | OFF-SITE DISCUSSIONS | DETAILED ON-SITE | ASSESS | REPORT

1 - 2 WKS

1. Read Documents
2. Benchmark Similar Programs/Projects
3. Team/Subpanel Discussions
4. Draft Preliminary Set of Assessment Issues
5. Identify Detailed Lines of Inquiry For Second Site Visit
   - Vertical Interview/Inspection

THE ITR PROCESS

PREP | OVERVIEW ON-SITE | OFF-SITE DISCUSSIONS | DETAILED ON-SITE | ASSESS | REPORT

Time →

1 Week

1. Clarification/Detailed Briefings to Address Issues
2. Vertical Interviews
3. Specific Inspections and Tours
4. Team/Subpanel Issue Discussions
5. Preliminary Assessment
6. Preliminary Assessment Briefing With Site Mgt.

THE ITR PROCESS

PREP | OVERVIEW ON-SITE | OFF-SITE DISCUSSIONS | DETAILED ON-SITE | ASSESS | REPORT

Time →

1 - 2 WKS

1. Team/Subpanel Discussion of Assessment Conclusions
2. Develop Consensus Assessment Conclusions
3. Develop "Elevator " Conclusions
4. Write Task/Subpanel Assessment Reports
5. Prepare Draft Assessment Report
6. Prepare Assessment Briefing Package
7. TOB Assessment Critique

Independent Technical Reviews

THE ITR PROCESS

PREP | OVERVIEW ON-SITE | OFF-SITE DISCUSSIONS | DETAILED ON-SITE | ASSESS | REPORT

Time →

1 - 2 WKS

1. Brief EM
2. Brief Site
3. Issue Draft Report for Comment
4. Correct Factual Errors
5. Provide Final Draft to DOE - EM

APPENDIX B

THE MALCOLM BALDRIGE NATIONAL QUALITY AWARD CRITERIA

(AN ASSESSMENT BENCHMARK)

B.1. Introduction

When asked to define quality, most people think of goodness, excellence, handcrafted, valuable, exclusive, or involving customer satisfaction. They also relate quality to a separate organization, such as QC or QA, which performs a watch dog function for the quality of the companies' products and services.

A leading quality expert, Phil Crosby, states that all work we perform can be viewed as a process with defined attributes, suppliers and customers. We do our work based on some definition, or **requirements,** provided by our customer. Our work is most always additive to the process/work of others--our suppliers. If our suppliers don't understand our expectations and requirements for the input to our process and as a result provide us with a faulty input, it will be difficult for us to provide our customer with the desired output.

Crosby defines quality as **conformance to requirements--** specifications/technical, cost and schedule. Quality is improved by a system designed to prevent and eliminate problems--not by after-the-fact appraisal. You and your customers and suppliers need to communicate on the performance standards (specifications, cost, and schedule) to which the quality of products and services from processes can be compared. Finally, quality is best measured in terms of the cost of doing things wrong--rather than right the first time.

The Crosby definitions of work processes, quality, prevention, performance standards, and measurement are useful in developing a full appreciation of the Malcolm Baldrige National Quality assessment criteria. If you would like additional reading material on Crosby's view of quality, please see the ITR implementation personnel.

(Note: The authors have rephrased certain parts of the original Baldrige text to make the review criteria applicable to government/DOE applications. If you wish to review the original criteria text, please see the ITR implementation personnel.)

B.2. Evaluation Criteria

The Baldrige Award uses a three-way review in evaluating a company approach, deployment, and results are assessed for each criteria.

Approach: refers to the methods the company uses to achieve the purposes addressed in the criteria. The review is based on:

- The degree to which the approach is prevention based.
- The appropriateness of the tools, techniques, and methods to the requirement.
- The effectiveness with which the tools, techniques, and methods are used.
- The degree to which the approach embodies effective evaluation and improvement cycles.
- The degree to which the approach is based upon quantitative information that is objective and reliable.
- The indicators of unique and innovative approaches, including significant and effective new adaptations of tools and techniques used in other applications or types of business.

Deployment: refers to the extent to which the approaches are applied to all relevant areas and activities addressed and implied by the criteria. The assessment is based on:

- The appropriateness and effective application to all internal processes, activities, facilities, and employees.
- The appropriate and effective application to all interactions with customers, suppliers, and the public.

Results: refers to outcomes and effects in achieving the purposes addressed and implied by the criteria. The assessment is based on:

- The quality/performance levels demonstrated.
- The contributions of the outcomes and the effects to quality/performance improvement.
- The rate and breadth of performance improvement.
- The demonstration of sustained performance improvement.

- The significance of the improvements to the customer.
- The comparison of results to those of other companies or industries.
- The ability to show that improvements derive from quality practices and actions.

Evaluation Guidelines: The following terms are used to describe the results of the evaluation:

Low	Anecdotal, some positive trends.
Mid	Some integration; positive trends in most areas, some evidence that results are caused by the approach.
High	Sound prevention through improvement cycles; excellent integration; excellent results in major areas; results clearly caused by approach.

B.3. Assessment Criteria

B.3.1. Leadership

The leadership category examines how senior executives create and sustain clear and visible values along with a management system to guide all activities of the company toward excellence. Also examined are the senior executives' and the company's leadership in the external community and how the company integrates its public responsibilities with its values and practices.

B.3.1.1. Senior Executive Leadership: Describe the senior executives' leadership, personal involvement, and visibility in developing and maintaining an environment for quality excellence.

a. Senior executives' leadership, personal involvement, and visibility in quality-related activities of the company; (1) goal setting; (2) planning; (3) reviewing company performance; (4) communicating with employees; and (5) recognizing employee contributions. Other activities may include participating in teams, learning about the domestic and international competitors, and meeting with customers and suppliers.

b. Senior executives' approach to building values into the leadership process of the company.

c. Senior executives' leadership and communication of excellence to groups outside the company. Groups may include national, state, community, trade, business, professional, education, health care, standards, and government organizations.

Notes:

(1) The term "senior executives" refers to the highest-ranking official of the organization applying for the Award and those reporting directly to that official.

(2) The type and extent of the activities of senior executives within and outside the company could depend upon company size, resources and other business factors.

B.3.1.2. Values: Describe the company's quality values, how they are projected in a consistent manner, and how adoption of the values throughout the company is determined and reinforced.

a. Brief summary of the content of policy, mission, or guidelines that demonstrate the company's values.

b. Company's communications activities to project the values throughout the company. Briefly describe what is communicated and the means and frequency of communications.

c. How the company determines and evaluates how well the values have been adopted throughout the company, such as through surveys, interviews, or other means, and how employee adoption is reinforced.

B.3.1.3. Management: Describe how the values are integrated into day-to-day leadership, management, and supervision of all company units.

a. Key approaches for involving, and encouraging leadership in, all levels of management and supervision, principal roles and responsibilities at each level.

b. Key approaches for promoting cooperation among managers and supervisors across different levels and different functions of the company.

c. Types, frequency, and content of reviews of company and of unit performance; types of actions taken to assist units not performing according to plans or goals.

d. Key indicators the company uses to evaluate the effectiveness of its approaches to integrating values into day-to-day management and how the evaluation is used to improve its approaches.

Note: Key indicators refer to principal measures of some characteristics of quality and effectiveness.

B.3.1.4. Public Responsibility: Describe how the company extends its quality leadership to the external community and includes its responsibilities to the public for health, safety, environmental protection, and ethical business practice in its policies and improvement activities.

a. How the company promotes awareness and sharing with external groups. Groups may include national, state, community, trade, business, professional, education, health care, standards, and government organizations.

b. How the company encourages employee leadership and involvement in activities of organizations mentioned above.

c. How the company includes its public responsibilities such as business ethics, public health and safety, environmental protection, and waste management into its policies and practices. For each area relevant and important to the company's business, briefly summarize: (1) principal improvement goals and how they are set; (2) principal improvement methods; (3) principal indicators used to monitor quality; and (4) how and how often progress is reviewed.

Note: Health and safety of employees are not covered in this item. These are addressed in Item 4.5.

B.3.2. Information and Analysis

The information and analysis category examines the scope, validity, use, and management of data and information that underlie the company's overall management system. Also examined is the adequacy of the data, information, and analysis to support a responsive, prevention-based approach to customer satisfaction built upon "management by fact."

B.3.2.1. Scope of Management of Data and Information: Describe the company's base of data and information used for planning day-to-day management, and evaluation of quality, and how data and information reliability, timeliness, and access are assured.

a. (1) Criteria for selecting data to be included in the data and information base; and (2) scope and types of data; customer-related; internal operations and processes; employee-related; safety, health, and regulatory; performance; supplier quality; and other.

b. Processes and techniques the company uses to ensure reliability, consistency, standardization, review, timely update, and rapid access throughout the company. If applicable, describe approach to ensuring software quality.

c. How the company evaluates and improves the scope of its data and information and how it shortens the cycle from data gathering to access.

Notes:

(1) The purpose of this item is to permit the applicant to demonstrate the breadth and depth of the data assembled as part of its total management system. Applicants should give brief descriptions of the types of data under major headings such as "employees" and subheadings such as "education and training," "teams," and "recognition." Under each subheading, give a brief description of the data and information. Actual data should not be reported in this item. Such data are requested in other examinations items.

(2) Information on the scope and management of competitive and benchmark data is requested in Item 2.2

B.3.2.2. Competitive Comparisons and Benchmarks: Describe the company's approach to selecting competitive comparisons and world-class benchmarks to support planning, evaluation, and improvement.

a. Criteria and rationale the company uses for seeking competitive comparisons and benchmarks: (1) relationship to company goals and priorities for improvement of product and service and/or company operations; (2) with whom to compare--within and outside the company's industry.

b. Current scope of competitive and benchmark data: (1) product and service quality; (2) customer satisfaction and other customer data; (3) supplier performance; (4) employee data; (5) internal operations, business processes, and support services; and (6) other. For each type: (a) list sources of comparisons and benchmarks, including company and independent testing or evaluation; and (b) how each type of data is used.

c. How the company evaluates and improves the scope, sources, and uses of competitive and benchmark data.

B.3.2.3. Analysis of Data and Information: Describe how data and information are analyzed to support the company's overall objectives.

a. How data described in 2.1 and 2.2, separately and in combination, are analyzed to support: (1) company planning and priorities; (2) company-level review of performance; (3) improvement of internal operations, business processes, and support services; (4) determination of product and service features and levels of performance that best predict improvement in customer satisfaction; and (5) improvement projections based upon potential use of alternative strategies or technologies.

b. How the company evaluates and improves its analytical capabilities and shortens the cycle of analysis and access to analytical results.

Note: This item focuses primarily on analysis for company-level evaluation and decision making. Some other items request information based on analysis of specific sets of data for special purposes such as human resource practices and complaint management.

B.3.3. Strategic Planning

The strategic planning category examines the company's planning process for achieving or retaining leadership and how the company integrates improvement planning into overall business planning. Also examined are the company's short-term and longer-term plans to achieve and/or sustain a leadership position.

B.3.3.1 Strategic Planning Process: Describe the company's strategic planning process for short-term (1-2 years) and longer-term (3 years or more) leadership and customer satisfaction.

a. How goals for leadership are set using: (1) current and future requirements for leadership in the company's target markets; and (2) company's current levels and trends versus competitors' in these markets.

b. Principal types of data, information, and analysis used in developing plans and evaluating feasibility based upon goals: (1) customer requirements; (2) process capabilities; (3) competitive and benchmark data; and (4) supplier capabilities; outline how these data are used in developing plans.

c. How strategic plans and goals are implemented and reviewed: (1) how specific plans, goals, and performance indicators are deployed to all work units and suppliers; and (2) how resources are committed for key requirements such as capital expenditures and training; and (3) how performance relative to plans and goals is reviewed and acted upon.

d. How the goal-setting and strategic planning processes are evaluated and improved.

Notes:

(1) Strategic plans address in detail how the company will pursue market leadership through providing superior products and services and through improving the effectiveness of all operations of the company.

(2) Item 3.1 focuses on the processes of goal setting and strategic planning. Item 3.2 focuses on actual goals and plans.

B.3.3.2. Goals and Plans: Summarize the company's goals and strategies. Outline principal plans for the short term (1-2 years) and longer term (3 years or more).

a. Major goals and principal strategies for achieving these goals.

b. Principal short-term plans: (1) summary of key requirements and performance indicators deployed to work units and suppliers; and (2) resources committed to accomplish the key requirements.

c. Principal longer-term plans: brief summary of major requirements, and how they will be met.

d. Two- to five-year projection of significant changes in the company's most important levels. Describe how these levels may be expected to compare with those of key competitors over this time period.

   Note: The company's most important levels are those for the key product and service features. Projections are estimates of future levels based upon implementation of the plans described in Item 3.2.

B.3.4. Human Resource Utilization

The human resource utilization category examines the effectiveness of the company's efforts to develop and realize the full potential of the work force, including management, and to maintain an environment conducive to full participation, leadership, and personal and organization growth.

B.3.4.1. Human Resource Management: Describe how the company's overall human resource management effort supports its objectives.

a. How human resource plans are derived from the goals, strategies, and plans outlined in 3.2: (1) short term (1-2 years); and (2) longer term (3 years or more). Address major specific requirements such as training, development, hiring, involvement, empowerment, and recognition.

b. Key goals and improvement methods for human resource management practices such as hiring and career development.

c. How the company analyzes and uses its overall employee-related data to evaluate and improve the effectiveness of all categories and all types of employees.

   Notes:

   (1) Human resource plans and improvement activities might include one or more of the following: mechanisms for promoting cooperation such as internal customer/supplier techniques or other internal partnerships; initiatives to promote labor-management cooperation such as partnerships with unions; creation or modifications in recognition systems; mechanisms for increasing or broadening employee responsibilities; and education and training initiatives. They might also include developing partnerships with educational institutions to develop

employees and to help ensure the future supply of well-prepared employees.

(2) "Types of employees" takes into account factors such as employment status, bargaining unit membership, and demographic makeup.

B.3.4.2. Employee Involvement: Describe the means available for all employees to contribute effectively to meeting the company's objectives; summarize trends and current levels of involvement.

a. Management practices and specific mechanisms, such as teams or suggestion systems, the company uses to promote employee contributions to quality objectives, individually and in groups. Summarize how and when the company gives feedback.

b. Company actions to increase employee authority to act (empowerment), responsibility, and innovation. Summarize principal goals for all categories of employees.

c. Key indicators the company uses to evaluate the extent and effectiveness of involvement by all categories and types of employees and how the indicators are used to improve employee involvement.

d. Trends and current levels of involvement by all categories of employees. Use the most important indicator(s) of effective employee involvement for each category of employee.

Note: Different involvement goals and indicators may be set for different categories of employees, depending upon company needs and upon the types of responsibilities of each employee category.

B.3.4.3. Education and Training: Describe how the company decides what education and training is needed by employees and how it utilizes the knowledge and skills acquired; summarize the types of education and training received by employees in all employee categories.

a. (1) How the company assesses needs for the types and amounts of education and training received by all categories of employees (Describe how the needs review addresses work unit requirements to include or have access to skills in problem analysis and problem solving to meet their objectives.); (2) methods for the delivery of education and training; and (3) how the company ensures on-the-job reinforcement of knowledge and skills.

b. Summary and trends in education and training received by employees. The summary and trends should address: (1) orientation of new employees; (2) percent of employees receiving education and training in each employee category annually; (3) average hours of education and training annually per employee; (4) percent of employees who have received education and training; and (5) percent of employees who have received education and training in statistical and other quantitative problem-solving methods.

c. Key methods and indicators the company uses to evaluate and improve the effectiveness of its quality education and training. Describe how the indicators are use to improve the education and training of all categories and types of employees.

   Note: Education and training addresses the knowledge and skills employees need to meet the objectives associated with their responsibilities. This may include basic awareness, problem solving, meeting customer requirements, and other related aspects of skills.

B.3.4.4. Employee Recognition and Performance Measurement: Describe how the company's recognition and performance measurement processes support objectives; summarize trends in recognition.

a. How recognition, reward, and performance measurement for individuals and groups, including managers, supports the company's objectives; (1) how quality relative to other business considerations such as schedules and financial results is reinforced; and (2) how employees are involved in the development and improvement of performance measurements.

b. Trends in recognition and reward of individuals and groups, by employee category, for contributions.

c. Key indicators the company uses to evaluate and improve its recognition, reward, and performance measurement processes.

B.3.4.5. Employee Well-Being and Morale: Describe how the company maintains a work environment conducive to the well-being and growth of all employees; summarize trends and levels in key indicators of well-being and morale.

a. How well-being and morale factors such as health, safety, satisfaction, and ergonomics are included in improvement activities. Summarize principal improvement goals and methods for each factor relevant and important to the company's work environment. For accidents and work-related health problems, describe how underlying causes are determined and how adverse conditions are prevented.

b. Mobility, flexibility, and retraining in job assignments to support employee development and/or to accommodate changes in technology, improved productivity, or changes in work processes.

c. Special services, facilities and opportunities the company makes available to employees. These might include one or more of the following: counseling, assistance, recreational or cultural, and non-work-related education.

d. How employee satisfaction is determined and interpreted for use in quality improvement.

e. Trends and levels in key indicators of well-being and morale such as safety, absenteeism, turnover, attrition rate for customer-contact personnel, satisfaction, grievances, strikes, and worker compensation. Explain important adverse results, if any, and how problems were resolved or current status. Compare the current levels of the most significant indicators with those of industry averages and industry leaders.

B.3.5. <u>Assurance of Products and Services</u>

The assurance of products and services category examines the systematic approaches used by the company for assuring goods and services based primarily upon process design and control, including control of procured materials, parts, and services. Also examined is the integration of process control with continuous improvement.

B.3.5.1. <u>Design and Introduction of Products and Services</u>: Describe how new and/or improved products and services are designed and introduced and how processes are designed to meet key product and service requirements.

a. How designs of products, services, and processes are developed so that: (1) customer requirements are translated into design requirements; (2) all requirements are addressed early in the overall design process by all appropriate company units; (3) designs are coordinated and integrated to include all phases of production and delivery; and (4) a process control plan is developed that involves selecting and setting key process characteristics for production and delivery of products and services and how these characteristics are to be measured and controlled.

b. How designs are reviewed and validated taking into account key factors: (1) product and service performance; (2) process capability and future requirements; and (3) supplier capability and future requirements.

c. How the company evaluates and improves the effectiveness of its designs and design processes and how it shortens the design-to-introduction cycle.

Notes:

(1) Design and introduction may include modification and variants of existing products and services and/or new products and services emerging from research and development.

(2) Service and manufacturing businesses should interpret product and service requirements to include all product- and service-related requirements at all stages of production, delivery, and use. See also Item 7.1, Note (3).

(3) Depending on their type of business, applicants need to consider many factors in product and service design such as health, safety, long-term performance, measurement capability, process capability, maintainability, and supplier capability. Applicant responses should reflect the key requirements of the products and services they deliver.

B.3.5.2. Process Control: Describe how the processes used to produce the company's products and services are controlled.

a. How the company assures that processes are controlled within limits set in process design. Include information on: (1) types and frequencies of measurements; and (2) what is measured, such as process, product, and service characteristics.

b. For out-of-control occurrences, describe: (1) how root causes are determined; (2) how corrections are made so that future occurrences are prevented; and (3) how corrections are verified.

c. How the company evaluates the measurements used in process control and assures measurement control.

Notes:

(1) For manufacturing and service companies with measurement requirements, it is necessary to demonstrate that measurement accuracy and precision meet process, service, and product requirements (measurement assurance). For physical, chemical, and engineering measurements, indicate approaches for ensuring that measurements are traceable to national standards through calibrations, reference materials, or other means.

(2) Verification of corrections and verification of improvements in 5.2b, 5.3c, and 5.4b should include comparison with expected or predicted results.

B.3.5.3. Continuous Improvement of Processes: Describe how processes used to produce products and services are continuously improved.

a. Principal types of data and information the company uses to determine needs and opportunities for improvement in processes: (1) data from day-to-day process control; (2) field data such as customer data, data on product and service performance, and data on competitors' performance; (3) evaluation of all process steps; (4) process benchmark data; and (5) data of other types such as from process research and development and evaluation of new technology or alternative processes.

b. How the company evaluates potential changes in processes to select from among alternatives.

c. How the company integrates press improvement with day-to-day process control: (1) resetting process characteristics; (2) verification of improvements; and (3) ensuring effective use by all appropriate company units.

Note: The focus of this item is on improvement of the primary processes used to produce the company's products and services, not on maintaining them or on correcting out-of-control occurrences, which is the focus of Item 5.2.

B.3.5.4. Assessment: Describe how the company assesses its systems, processes, practices, products, and services.

a. Approaches the company uses to assess its systems, processes, practices, products, and services such as process reviews or audits. Include the types and frequencies of reviews, what is assessed, who conducts the reviews, and how the validity of review tools is assured.

b. How assessment findings are used to improve systems, processes, practices, training, or supplier requirements. Include how the company verifies that improvements are effective.

B.3.5.5. Documentation: Describe documentation and other modes of knowledge preservation and knowledge transfer to support assurance, assessment, and improvement.

a. (1) Principal purposes of documents such as for recording procedures and practices and for retaining key records; and (2) uses of documents such as standardization, orientation of new employees, training, maintaining records for legal purposes, or for tracking of products, processes, and services.

b. How the company improves its documentation system: (1) to simplify and harmonize documents; (2) to keep pace with changes in practice, technology, and systems; (3) to ensure rapid access wherever needed; and (4) to dispose of obsolete documents.

Note: Documents may be written or computerized.

B.3.5.6. Business Process and Support Service: Summarize process, assessment, and improvement activities for business processes and support services.

a. Summary of process control and review activities for key business processes and support services: (1) how principal process requirements are set using customer requirements or the requirements of other company units served ("internal customers"); (2) how and how often process is measured; and (3) types and frequencies of reviews and who conducts them.

b. Summary of improvement activities for key business processes and support services: (1) principal improvement goals and how they are set; (2) principal process evaluation and improvement activities, including how processes are simplified and response time shortened; (3) principal indicators used to measure quality; and (4) how and how often progress is reviewed.

Notes:

(1) Business processes and support services might include activities and operations involving finance and accounting, software services, sales, marketing, information services, purchasing, personnel, legal services, plant and facilities management, research and development, and secretarial and other administrative services.

(2) The purpose of this item is to permit applicants to highlight separately the assurance, assessment, and improvement activities for functions that support the primary processes through which products and services are produced and delivered. Together, Items 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, and 5.7 should cover all operations, processes, and activities of all work units. However, the selection of support services and business processes for inclusion in Item 5.6 depends on the type of business and system and should be made by the applicant.

B.3.5.7. Supplier Quality: Describe how the quality of materials components, and services furnished by other businesses is assured, assessed, and improved.

a. Approaches used to define and communicate the company's specific requirements to suppliers. Include: (1) the principal quality requirements for the company's most important suppliers; and (2) the principal quality indicators the company uses to communicate and monitor supplier quality.

b. Methods used to assure that the company's requirements are met by suppliers. Methods may include audits, process reviews, receiving inspection, certification, and testing.

c. Strategy and current actions to improve the quality and responsiveness of suppliers. These may include partnerships, training, incentives and recognition, and supplier selection.

Note: The term "supplier" as used here refers to other company providers of goods and services. The use of these goods and services may occur at any stage in the production, delivery, and use of the company's products and services. Thus, suppliers include businesses such as distributors, dealers, and franchises as well as those that provide materials and components.

B.3.6. Results

The results category examines levels and improvement based upon objective measures derived from analysis of customer requirements and expectations and from analysis of business operations. Also examined are current levels in relation to those of competing firms.

B.3.6.1. Product and Service Results: Summarize trends in improvement and current levels for key product and service features; compare the company's current levels with those of competitors and world leaders.

a. Trends and current levels for all key measures of product and service.

b. Current level comparisons with principal competitors in the company's key markets, industry averages, industry leaders, and world leaders. Briefly explain bases for comparison such as: (1) independent surveys, studies, or laboratory testing; (2) benchmarks; and (3) company evaluations and testing. Describe how objectivity and validity of comparisons are assured.

Notes:

(1) Key product and service measures are measures relative to the set of all important features of the company's products and services. These measures, taken together, best represent the most important factors that predict customer satisfaction. Examples include measures of accuracy, reliability, timeliness, performance, behavior, delivery, after-sales services, documentation, and appearance. These measures are "internal" measures. Customer satisfaction or other customer data should not be included in responses to this item.

(2) Results reported in Item 6.1 should reflect the key product and service features determined in Item 7.1,

and be fully consistent with the key requirements for products and services.

B.3.6.2. Business Process, Operational, and Support Service Results: Summarize trends in improvement and current levels for business processes, operations, and support services.

Notes:

(1) Key measures for business processes, operations, and support services are the set of principal measurable characteristics that represent effectiveness in company operations in meeting requirements of customers and of other company units. Examples include measures of accuracy, timeliness, and effectiveness. Measures include error rates, defect rates, lead times, cycle times, and use of manpower, materials, energy, and capital as reflected in indicators such as repeat services, utilization rates, and waste.

(2) The results reported in Item 6.2 derive from improvement activities described in Category 5 and Item 1.4, if appropriate. Responses should reflect relevance to the company's principal objectives and should also demonstrate the breadth of improvement results throughout all operations and work units.

B.3.6.3. Supplier Results: Summarize trends and levels of suppliers and services furnished by other companies; compare the company's supplier quality with that of competitors and with key benchmarks.

a. Trends and current levels for the most important indicators of supplier quality.

b. Comparison of the company's supplier quality with that of competitors and/or with benchmarks. Such comparisons could include industry averages, industry leaders, world leaders, principal competitors in the company's key markets, and appropriate benchmarks. Describe the basis for comparisons.

Note: The results reported in Item 6.3 derive from improvement activities described in Item 5.7. Results should be broken down by major groupings of suppliers and reported using the principal indicators described in Item 5.7.

B.3.7. <u>Customer Satisfaction</u>

The customer satisfaction category examines the company's knowledge of the customer, overall customer service systems, responsiveness, and its ability to meet requirements and expectations. Also examined are current levels and trends in customer satisfaction.

B.3.7.1. <u>Determining Customer Requirements and Expectations:</u> Describe how the company determines current and future customer requirements and expectations.

a. How the company determines current and future requirements and expectations of customers. Include information on: (1) how market segments and customer groups are determined and how customers of competitors and other potential customers are considered; (2) the process for collecting information and data. This should include what information is sought, frequencies of surveys, interviews or other contacts, and how objectivity is assured; and (3) how other information and data are cross-compared to support determination of customer requirements and expectations. Such information and data might include performance information on the company's products and services, complaints, gains and losses of customers, customer satisfaction, and competitors' performance.

b. Process for determining product and service features and the relative importance of these features to customers and/or customer groups.

c. How the company evaluates and improves its processes for determining customer requirements and expectations as well as the key product and service features.

<u>Notes</u>:

(1) Products and services may be sold to end users by intermediaries such as retail stores or dealers. Thus determining customer groups should take into account both the end users and the intermediaries.

(2) Product and service features refer to all important characteristics of products and services experienced by the customers throughout the overall purchase and ownership experiences. This includes any factors that bear upon customer preference or customer view of

quality--for example, those features that enhance them or differentiate them from competing offerings.

(3) An applicant may choose to describe its offerings, part of its offerings, or certain of its activities as products or services irrespective of the SIC classification of the company. Such descriptions should then be consistent throughout the Application Report.

B.3.7.2. Customer Relationship Management: Describe how the company provides effective management of its relationships with its customers and uses information gained from customers to improve products and services as well as its customer relationship management practices.

a. Means for ensuring easy access for customers to seek assistance and to comment. Describe types of contact, such as telephone, personal, and written, and how the company maintains easy access for each type of contact.

b. Follow-up with customers on products and services to determine satisfaction with recent transactions and to seek data and information for improvement.

c. How the following are addressed for customer-contact personnel: (1) selection factors for customer-contact jobs: (2) career path; (3) special training to include: knowledge of products and services, listening to customers, soliciting comment from customers, how to anticipate and handle special problems or failures, and skills in customer retention; (4) empowerment and decision making; (5) attitude and morale determination; (6) recognition and reward; and (7) attrition.

d. How the company provides technology and logistics support for customer-contact personnel to enable them to provide reliable and responsive services.

e. How the company analyzes key customer-related data and information to assess costs and market consequences for policy development, planning, and resource allocation.

f. Principal factors the company uses to evaluate its customer relationship management, such response accuracy, timeliness, and customer satisfaction with contacts. Describe how the factors or indicators are used to improve training, technology, or customer-oriented management practices.

Notes:

(1) Other key aspects of customer relationship management are addressed in Items 7.3, 7.4, and 7.5.

(2) Item 7.2c addresses important human resource management requirements specifically for customer-contact personnel. This is included in Item 7.2 for special emphasis and coherence.

B.3.7.3. Customer Service Standards: Describe the company's standards governing the direct contact between its employees and customers and how these standards are set and modified.

a. How well-defined service standards to meet customer requirements are set. List and briefly describe the company's most important customer service standards.

b. How standards requirements and key standards information are deployed to company units that support customer-contact personnel. Briefly describe how the company ensures that the support provided by these company units is effective and timely.

c. How service standards are tracked, evaluated, and improved. Describe the role of customer-contact personnel in evaluating and improving standards.

Note: Service standards are objectively measurable levels of performance that define the overall service or for a part of a service. Examples include measures of response time, problem resolution time, accuracy, and completeness.

B.3.7.4. Commitment to Customers: Describe the company's commitments to customers on its explicit and implicit promises underlying its products and services.

a. Types of commitments the company makes to promote trust and confidence in its products, services, and relationships. Include how the company ensures that these commitments: (1) address the principal concerns of customers; (2) are free from conditions that might weaken customer confidence; and (3) are understandable.

b. How improvements in the company's products and services over the past three years have been translated into stronger commitments. Compare commitments with those of competing companies.

Note: Commitments may include product and service guarantees, product warranties, and other understandings with the customer, expressed or implied.

B.3.7.5. Complaint Resolution for Improvement: Describe how the company handles complaints, resolves them, and uses complaint information for improvement and for prevention of recurrence of problems.

a. How the company ensures that formal and informal complaints and feedback given to different company units are aggregated for overall evaluation and use wherever appropriate throughout the company.

b. How the company ensures that complaints are resolved promptly and effectively. Include: (1) trends and levels in indicators of response time; and (2) trends in percent of complaints resolved on first contact with customer-contact personnel.

c. How complaints are analyzed to determine underlying causes and how the findings are translated into improvements. This translation may lead to improvements such as in processes, service standards, training of customer-contact personnel, and information to customers to help them make more effective use of products and/or services.

d. Key indicators and methods the company uses to evaluate and improve its complaint-related processes. Describe how indicators and methods address effectiveness, response time improvement, and translation of findings into improvements.

Notes:

(1) A major purpose of aggregation of complaint information is to ensure overall evaluation for policy development, planning, training, and resource allocation. However, this does not imply that complaint resolution and improvement should await aggregation or that resolution and improvement are necessarily centralized within a company.

(2) Trends and current levels in complaints are requested in
Item 7.7

B.3.7.6. Determining Customer Satisfaction: Describe the company's methods for determining customer satisfaction, how satisfaction information is used in quality improvement, and how methods for determining customer satisfaction are improved.

a. How the company determines customer satisfaction for customer groups. Address: (1) brief description of market segments and customer groups; and (2) the process for determining customer satisfaction for customer groups. Include what information is sought, frequency of surveys, interviews or other contacts, and how objectivity is assured. Describe how the company sets the customer satisfaction measurement scale to adequately capture key information that accurately reflects customer preference.

b. How customer satisfaction relative to competitors is determined.

c. How customer satisfaction data are analyzed and compared with other customer satisfaction indicators such as complaints and gains and losses of customers. Describe how such comparisons are used to improve customer satisfaction determination.

d. How the company evaluates and improves its overall methods and measurement scales used in determining customer satisfaction and customer satisfaction relative to competitors.

Notes:

(1) Information sought in determining customer satisfaction may include specific product and service features and the relative importance of these features to customers, thus supplementing information sought in determining customer requirements and expectations.

(2) The customer satisfaction measurement scale may include both numerical designators and the descriptors assigned to them. Any effective scale is one that provides the company with accurate information

about specific product and service features and about the customer's likely market behaviors.

B.3.7.7. Customer Satisfaction Results: Summarize trends in the company's customer satisfaction and in indicators of adverse customer response.

a. Trends and current levels in indicators of customer satisfaction for products and services. Segment these results by customer groups, as appropriate.

b. Trends and current levels in major adverse indicators. Adverse indicators include complaints, claims, refunds, recalls, returns, repeat services, litigation, replacements, downgrades, repairs, warranty costs, and warranty work. If the company has received any sanctions under regulation or contract over the past three years, include such information in this item. Briefly describe how sanctions were resolved or current status.

B.3.7.8. Customer Satisfaction Comparison: Compare the company's customer satisfaction results and recognition with those of competitors that provide similar products and services.

a. Comparison of customer satisfaction results. Such comparisons should be made with principal competitors in the company's key markets, industry averages, industry leaders, and world leaders.

b. Surveys, competitive awards, recognition, and ratings by independent organizations, including customers. Briefly describe surveys, awards, recognition, and ratings. Include how quality and quality attributes are considered as factors in the evaluations of these independent organizations.

c. Trends in gaining or losing customers and in customer and customer account retention. Briefly summarize gains and losses of customers, including those gained from or lost to competitors. Address customer groups or market segments, as appropriate.

d. Trends in gaining and losing market share relative to major competitors, domestic and foreign. Briefly explain significant changes in terms of comparisons and trends.

APPENDIX C

TEAM SKILLS

If the environment of the meeting is such that it encourages openness, preparation, and listening, the team participants will gain trust and their individual participation will contribute to the achievement of the team goals.

Several techniques can be used to help encourage this participation and stimulate interaction--brainstorming, consensus building, and conflict resolution.

C.1. Brainstorming

Brainstorming is a means of encouragement for individual team member participation. In a brainstorming session, a time limit is established with each member of the team given a specific period of time to state his opinions/ideas. Everyone has a chance to speak and/or pass if they choose. This procedure continues until the allotted time is up.

In this way, everyone is given a chance to speak and their idea(s), no matter how impractical, are recorded. It also encourages everyone to listen to others and to consider all ideas which have been suggested. The purpose of this session is to build upon each other's ideas--not analyze or reject them and to build a consensus decision.

C.2. Consensus Building

A consensus is a general agreement to support a decision on a specific issue.

When trying to build a consensus, there are generally two rules to follow--don't vote and don't expect unanimous agreement.

Valuable interaction may be lost if there is a call for a vote. An idea that is not liked by the majority may actually be the best one to consider and calling for a vote just to end a discussion will jeopardize the team's final decision. Even though all members may not fully agree with a particular idea, it is best to continue discussions in order to let everyone have a chance to express any concerns they may have.

Often an impasse may occur and if this happens, the team leader may want to ask the following questions in order to encourage members still uncomfortable with an idea or decision to express their concerns in a positive manner:

- What information is required for you to support this decision?

- What results of this decision do you think we have failed to consider?

- How can we build on this idea in order to come to a decision you will be able to support?

By asking these questions, team members are encouraged to voice their concerns (in a positive manner) if still uncomfortable with an idea or decision thus ensuring every possible consideration of any objections prior to the final decision.

C.3. Conflict Resolution

Conflict frequently occurs when there are hard decisions to be made and individuals seem to be striving for incompatible goals. Not until all members agree on a common goal, will a consensus be reached.

The items listed below may help in resolving conflict:

- If a statement of purpose is established, members will be able to keep focused on the specific goal.

- If a strict meeting agenda is followed (time limits), differences between team members can be medicated.

- Whether an individual's ideas are used or not, all team members should be recognized for their contribution.

- If conflict arises, members can attempt to find a win-win situation (one that allows everyone to support a decision).

- By looking for areas of agreement on which to build a consensus, team members will reduce the conflict.

APPENDIX D

FACILITATOR SKILLS

D.1. The Essence of Facilitation

You cannot avoid bringing WHO YOU ARE to the group.

YOU are the most powerful aspect in facilitation.

The more:	The more:
• centered you are	• the group benefits
• you know yourself	• the facilitation works
• share yourself	

WHEN YOU

- Are authentic
- Genuinely try to help the group
- Self disclose
- Tell it like it is openly and honestly, in a caring way

THE FACILITATION WILL GO WELL

D.2. Prepare for the Session

1. Find out what's wanted/needed
   - Leader/owner
   - Group

- Facilitator (you)

2. Assess how challenging the facilitation may be

   - Knowledge of appropriate process (ex: quality, PM, brainstorming, conflict resolution, use of problem solving, decision-making, etc.)

     - group

     - facilitator

   - Amount of unknowns

   - Amount and nature of conflict within the group

   - Volatile, aggressive or difficult personalities

   - Mix of levels and ranks of the facilitator and managers

   - Depth of lack of trust

   - Your ability to relinquish your idea and opinions

3. Decide what it would take for you to feel comfortable with the challenge

   - Teaming with or turning it over to another facilitator

   - Pre-session interviews

   - Pre-session contracting with leader/owners

   - Preparation

4. Either do what it takes to be comfortable or delay or decline the facilitation

   - Conduct pre-session interviews (reference team building question in example session and confidentiality statement)

   - Educate leader/owner regarding facilitation

   - Negotiate contract with leader/owner

5. Prepare for the session

   - Logistics

- location, time
- room layout
- refreshments
- equipment & supplies
    * flipchart(s)
    * markers
    * tape
    * vugraph machine
    * vugraphs (blank or prepared)
    * vugraph markers
    * stick-it pads
    * name tents
    * handouts

• Select process(s) that meets identified group needs
    - PQMI
    - Project management
    - Problem solving
    - Decision-making
    - Conflict resolution
    - Other

• Develop a plan
    - Pre-planning worksheet
    - Session worksheet and agenda
    - Deep, specific probing questions

• Arrive early and set up the room

D.3. **<u>Facilitate the Session</u>**

<u>Kick off the Session</u>

Get started

- If the group is in conflict or tense, use Anonymous Disclosure (3 question shuffle) to safely get the group to put issues on the table.

- Ask the group what their expectations are.

- Ask a warm-up, specific probing question to stimulate discussion.

- Define purpose

    - State already identified purpose or goal or

    - Ask group to define purpose

- Establish and negotiate

- Construct agenda

    - Go over pre-established agenda and ask for put, modifications, or concurrences

    - Ask group to construct agenda <u>with times</u>

- Ask a group member to be time keeper. Be specific about what you want them to do.

- Kick off first agenda item

2. Get group moving

- Get everyone to participate

    - Go around the circle asking each to respond the first deep, specificprobing question

    - Acknowledge each contribution

    - Call on non-participants

D.4. **<u>When the Group is Moving</u>**

3. Keep group moving

- Observe both process and content

- Listen and active listen to both process and content

- Record discussion on a flipchart

- Don't over facilitate. Do nothing additional as long as the group is making steady relevant progress.

- Record conclusions, decisions, action items on flipchart.

- Move to other agenda items on schedule.

- If the group isn't finished with an agenda item on time, ask the group if they want to take more time and revise the agenda or move on. Thendo it.

4. Observe whether the group is getting stuck or in trouble.

- Notice when the group may be getting stuck or derailing.

  - Not making steady progress

  - Some are not participating

  - Anxiety or temperatures are rising

  - Frustration is showing

  - Your intuition is raising a red flag

- Wait, do nothing different and see if the situation self corrects.

- Don't overreact. Ask yourself:

  - Is the group making progress on the <u>task</u>?

    If yes -- DO NOTHING

  - Is anyone getting personally hurt or attacked?

    If no -- DO NOTHING

  - Is the group doing something useful? If it's useful but off the agenda, use your judgment.

- Really watch and listen intently. Confirm in your own mind that the group is in trouble.
- Carefully analyze the problem and decide what you think it is. Keep on watching and listening. Look for non-confirming evidence. Also look for confirming evidence. Monitor the group's frustration level.

APPENDIX E

KEY CONCEPTS AND

TERMINOLOGY

FOR PROJECT MANAGEMENT PRACTITIONERS

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KEY CONCEPTS AND TERMINOLOGY

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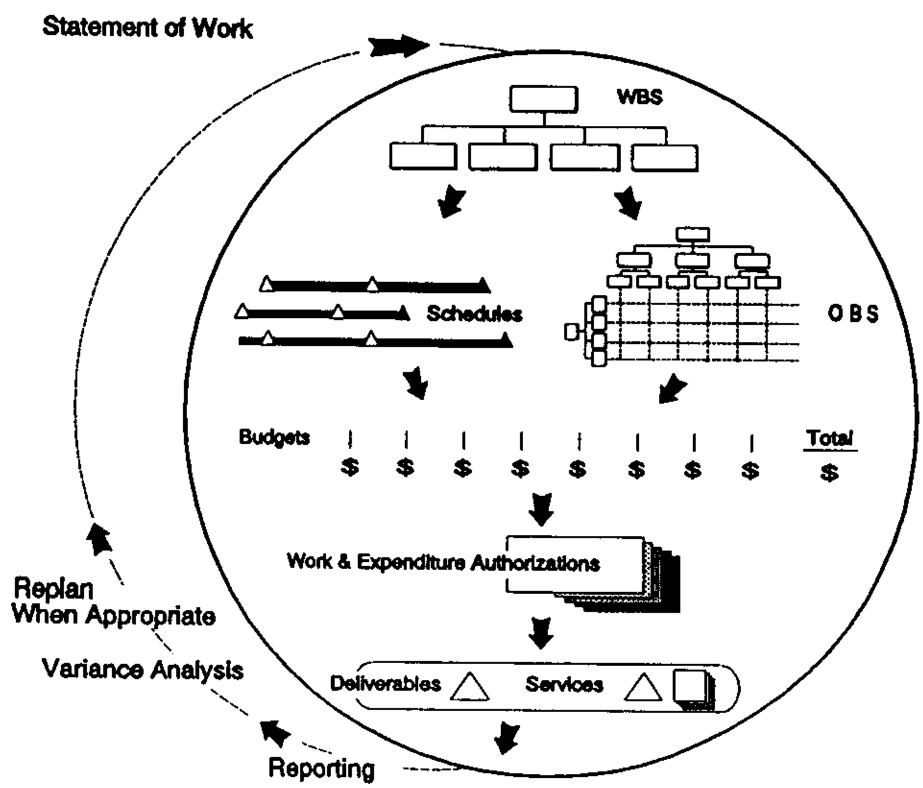


Concepts for Successful Projects

Sandia National Laboratories

Introduction

The purpose of this pamphlet is to pull together the key concepts and terms used in the pamphlets published by the Center for Project Management. The Center's customers and sponsors have expressed a need for a Sandia common vocabulary for project management which will facilitate communication and enhance management efficiency, especially for the increasing number of projects matrixed across different organizations. This is a first attempt at such a vocabulary; we welcome your feedback to help improve the process.

Section 1 contains an alphabetized glossary of terms and their definitions most likely to be used as project management methodology spreads across Sandia. A word or phrase in ALL CAPS indicates that word or phrase is also entered in the glossary. The sentences beginning "More fully discussed in..." refer to pamphlets published by the Center for Project Management. The illustrations are not detailed; they supply only a minimum of visual assistance. Many books available in Sandia's technical library offer far more information on how to develop the charts and other tools.

Section 2 describes functions performed on successful projects and how they might be aggregated into roles and responsibilities of project personnel.

Section 3 lists the project management books available in Sandia's Technical Library as of December 1991. The list is arranged by accession number, with the most recent publications near the end of the list.

Section 1

Glossary

of

Common Project Management Terms

GLOSSARY
of
Common Project Management Terms

Accountability

The condition of personally accepting being answerable for one's actions or lack of action; the state of being totally answerable for the satisfactory (or unsatisfactory) completion or discharge of responsibilities, judged on the basis of a specific assignment or negotiated work agreement. An internal state of obligation to produce results. See also AUTHORITY and RESPONSIBILITY.

Accountability/Responsibility Matrix

ACCOUNTABLE PERSON

PROJECT TASKS	VICE-PRES	GENERAL MGR	PROJECT MGR	MGR SOFTWARE	MGR MFG	MGR MKTG		
Esb project plan	6	2	1	3	3			
Define WBS		5	1	3	3			
Esb hardware specs		2	3	4	4	4		
Esb software specs		2	3	1		4		
Esb interface specs		2	3	4	4	4		
Esb mfg specs		2	3	4	1	4		
Define documentation		2	1	4	4	4		
Prepare manpower est			3	1	1			
Prepare eqpmt cost est			3	1	1			
Prepare materials costs			3	1	1			
Make project assignments			3	1	1			
Estb time schedules		5	3	1	1	3		

Legend

1 Actual reponsibility
2 General supervision
3 Must be consulted
4 May be consulted
5 Must be notified
6 Final approval

Accountability/Responsibility Matrix

A tool that clarifies the work package couplings within the project and succinctly describes the organizational relationships. It shows who participates when an activity is performed or a decision made. It clarifies the authority relationships that arise when people share common work. It records individual team members' ownership of specific work packages and assures a project manager that every element in the work breakdown structure is properly assigned and accounted for. (Sometimes called Linear Responsibility Chart or Responsibility Assignment Matrix.) See also WORK BREAKDOWN STRUCTURE and WORK PACKAGE.

Activities

The jobs, tasks, events, steps, or subprocesses involved in completing a work package. Activities require time and utilize resources.

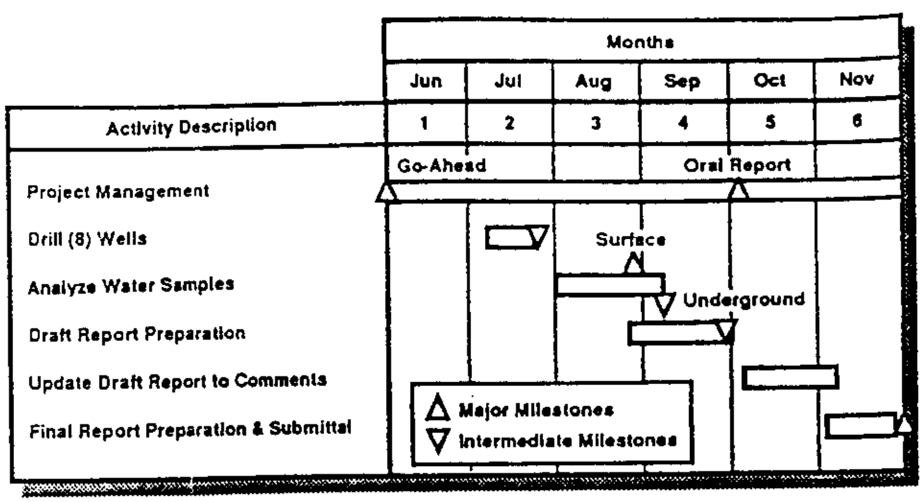
Actual Cost/Schedule

The costs incurred and the amount of time spent to accomplish the work performed within a given time period. Actual costs and schedules are monitored from the beginning of the project and totaled at any time during the project. At the project's conclusion, the actual total figures are compared to the estimates made during the Planning Phase of the life cycle. See also VARIANCE.

Authority

The power granted to an individual so that they can make final decisions for others to follow on a project or a work package process. See also ACCOUNTABILITY and RESPONSIBILITY.

Bar Chart



Bar chart with milestones

A tool that displays simple activities or events plotted against time. Events are described as either the starting or ending point for one or several activities. Milestones represent significant interim events in a project. Bar charts are most commonly used for exhibiting project progress or defining specific work required to accomplish an objective. Bar charts often include such items as listings of activities, activity durations, schedule dates, and progress-to-date. Bar charts are simple to understand and easy to change. They are the least complex means of portraying progress (or lack of it) and can easily be expanded to identify those specific elements which may be either behind or ahead of schedule. However, other graphic representations are better suited for illustrating the effects of interdependencies, the results of either an early or a late start, and the uncertainty involved in performing the activity. See also DURATION, GANTT CHART, NETWORK DIAGRAM, and PROGRAM EVALUATION REVIEW TECHNIQUE.

Baseline Concept

The concept that a project is planned to the fullest reasonable degree before implementation begins such that the actual progress can be monitored against the plan and changes to the concept can be controlled.

Baseline Document

A document that establishes a baseline predicated on estimates for measuring project progress against performance specification, time schedule, and cost constraints. It also documents the work breakdown structure and accountability assignments. The purpose of this document is to provide a reference for all project participants, to ensure that all participants are working toward the same goals, and to provide a means for recording and disseminating changes. Not only will the whole project have a baseline document (the project plan) but also elements of the work breakdown structure may have baseline documents. More fully discussed in *Life Cycle of Project Management*. See also PROJECT PLAN.

Bottom Up Cost Estimating

The method of making detailed estimates for every activity in the work breakdown structure and summing them to provide a total project cost estimate or plan. The opposite of top down, where estimates originate at the total project deliverable level and are subdivided for individual elements. See also WORK PACKAGE.

Buy-In

A willingness to accept and support a suggestion, a proposed situation. More passive than COMMITMENT.

C/SCSC

See COST AND SCHEDULE CONTROL SYSTEMS CRITERIA.

Commitment

A pledge to do something or the state of being bound emotionally or intellectually to a course of action with actual follow-through occurring. In project management, commitment is fostered by participative planning and negotiation among involved parties. More active than BUY-IN.

Configuration Management

The process of identifying and defining the key items in a system that contributes to the baseline design of a project, controlling the release and change of these items throughout the life cycle, recording and reporting their status and change requests, and verifying their completeness and correctness. Decisions for change are based on evaluating the impact on project parameters, i.e., cost, schedule, and technical performance. Necessary or beneficial changes are typically those that (1) correct inefficiencies, (2) satisfy a change in operational or logistics support requirements, (3) effect substantial cost savings, (4) prevent or eliminate slippage in an approved schedule, or (5) to improve technical performance.

Constraint(s)

Usually the restraints or requirements set by the customer in the areas of technical performance, cost, and schedule. Can also be imposed by circumstances or people other than the customer. See also TRIPLE CONSTRAINT.

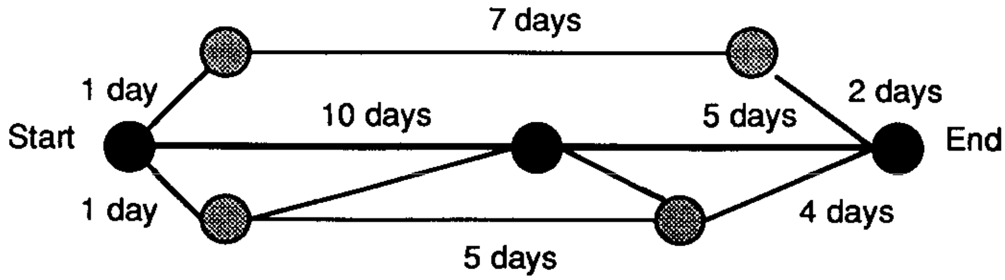
Contingency

An amount of design margin, time, or money reserved as a safety factor to accommodate unexpected and presently unknown occurrences that typically arise during the project.

Cost and Schedule Control Systems Criteria (C/SCSC)

A planning and control system developed by the Department of Defense for its contractors to use on large projects. It is intended to foster uniformity among projects as well as provide early warning of impending schedule or budget overruns on individual projects. This very stringent and detailed system is more useful as a control tool than a planning device. C/SCSC is also used by other government agencies including the DOE.

Critical Path



Critical Path in Bold

The series of interdependent activities of a project, connected end-to-end, which determines the shortest total length of the project. The critical path of a project may change from time to time as activities are completed ahead of or behind schedule. More fully discussed in *Scheduling*. See also NETWORK DIAGRAM and PROGRAM EVALUATION REVIEW TECHNIQUE.

Duration

The total amount of calendar time required to accomplish a task. A related but not identical term is effort or the number of hours devoted to a task. For example, writing a report may require 40 hours of effort. But the writer cannot devote all of his or her time in one week to that task. Realistically, only 10 hours per week can be estimated. Therefore, one month of duration is estimated for writing the report. (Also referred to as "elapsed time" in some literature.) More fully discussed in *Scheduling*. See also EFFORT and SCHEDULING.

Effort

In scheduling, the term that refers to the actual number of hours or people required, e.g., the staffing levels, and the planned hours of work estimated. More fully discussed in *Scheduling*. See also DURATION.

Estimate

The fine art of guessing the amount of time and resources needed to complete a project. Estimating both cost and schedule requirements has three prerequisites: (a) a detailed work breakdown structure, (b) subdivision of work breakdown structure elements into discrete, time-phased work activities, and (c) identification of all activities required to accomplish all of the work. Identification of all of the activities is important because the cost and schedule estimates are made at this lowest level and rolled up to establish the total estimates for the project. More fully discussed in *Life Cycle of Project Management, Cost Management*, and *Scheduling*. See also WORK BREAKDOWN STRUCTURE and WORK PACKAGE.

Functional Manager

The person who is responsible for managing the technical aspects of his or her portion of the project, who determines how it will be done, who within the organization is accountable, and how well the work for the project to be performed by his or her organization.

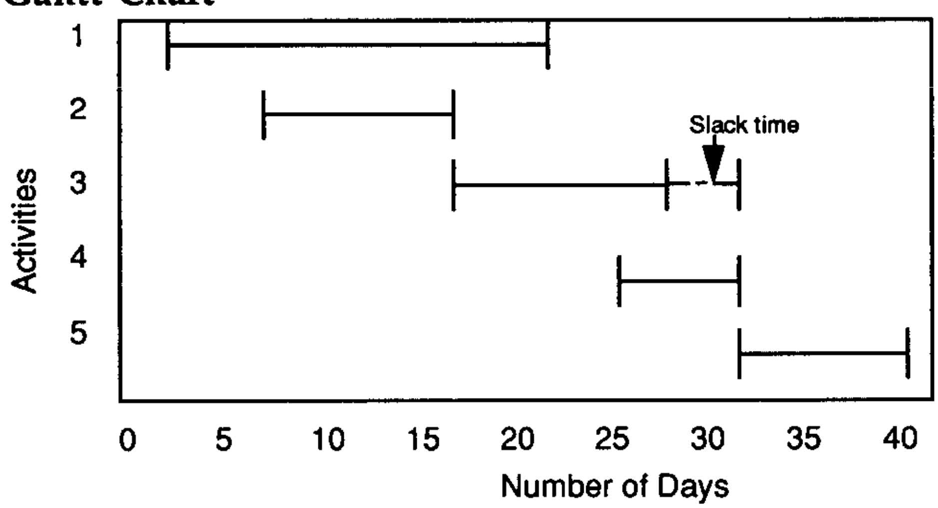
Functional Organization

An organizational form that groups all people with a particular kind of skill (such as combustion sciences) within one vertical line of Sandia's technical organization, reporting to a hierarchical structure of managers for that technical speciality.

Functional Representative

A project team member who represents a technology, such as rocket systems or advanced weapon systems, that will contribute to the project. A functional representative is frequently authorized to speak for that function (technology area) in project planning and decision making and to identify people with the proper technical skills to perform work. The functional representative also represents the project to the functional area.

Gantt Chart



A bar chart developed by Henry L. Gantt during World War I that graphically represents a time scale of current relationships between project activities to be performed; a two-dimensional graphic that plots the time sequence of execution. See also BAR CHART and PROGRAM EVALUATION REVIEW TECHNIQUE.

Internal Contract

See WORK AGREEMENT.

Level of Effort

Work that has no specific deliverable or does not lend itself to subdivision into discrete, scheduled increments. If the level of effort is technical-performance driven, a finite number of people working to achieve a specific technical performance have no time limitation. If the level of effort is schedule driven, a finite number of people will achieve as much as possible within the time specified More fully discussed in *Cost Management*.

Life Cycle Process

The project management process, having a well defined start and end, made up of activities grouped into sequential phases, such as Proposal, Start-up, Planning, Implementation, and Close-out. More fully discussed in *Life Cycle of Project Management*.

Linear Responsibility Chart

Another name for ACCOUNTABILITY/RESPONSIBILITY MATRIX.

Logic Network

A tool that diagrams what activities will take place when and which are dependent on other activities. Synonymous with network diagram. More fully discussed in *Life Cycle of Project Management* and *Scheduling*. See also NETWORK DIAGRAM.

Matrix Organization

A form of organization in which projects temporarily obtain resources across functional organizations to accomplish project work.

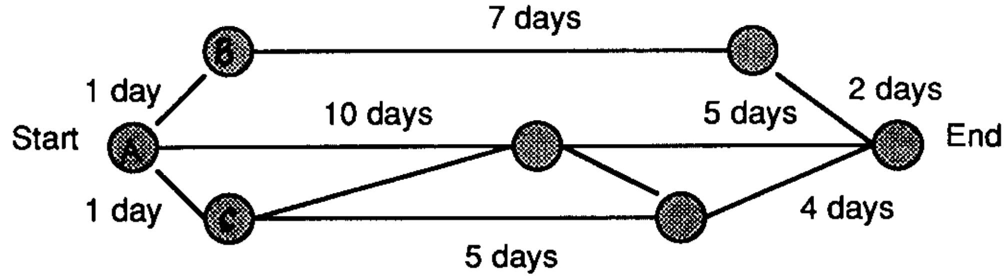
Metrics

In the context of customer satisfaction and process improvement, standards of measurement that ensure the customer requirements will be met with progressively increasing efficiency as efforts are made to improve related work processes. A quantitative measurement of performance. More fully discussed in *Project Management's Relationship with Quality*.

Milestone

A meaningful interim achievement in a project, drawn from the work breakdown structure and logic or network diagrams. More fully discussed in *Scheduling*. See also NETWORK DIAGRAM.

Network Diagram



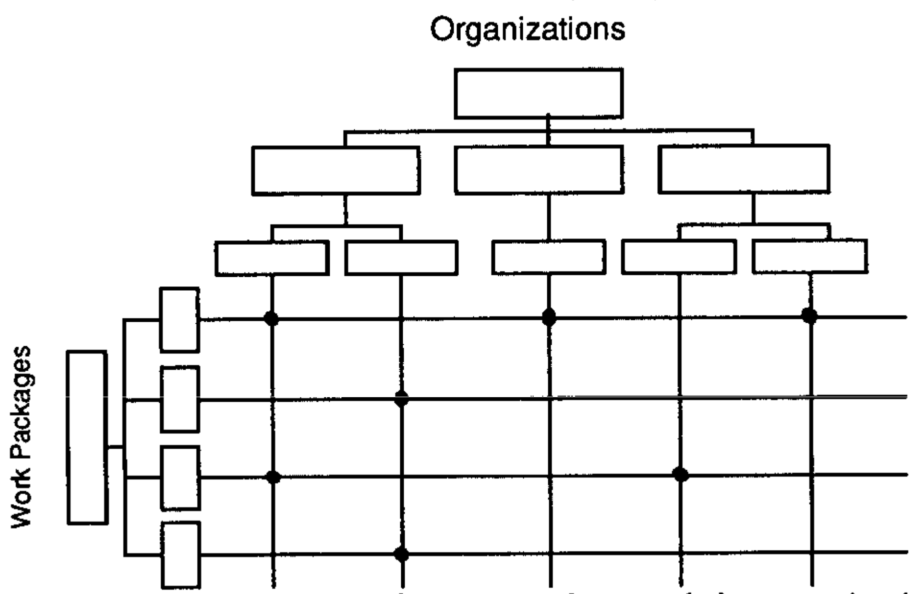
Circles indicate activities
Lines indicate number of days required

A graphic that shows the logical flow of events from start to finish. The network usually begins with the start of the project from which lines are drawn to represent activities. These lines terminate with a circle representing an event, which may be the completion of a project element or an activity. All activities that are to be performed next are then added to the network diagram by drawing a line from the previous event. For example, suppose activities B and C are to be simultaneously performed upon completion of activity A. Activities and events are then added until the project is complete. Constraints are added where required. The network terminates with one or more events or the conclusion of the project. See also PROGRAM EVALUATION and REVIEW TECHNIQUE

OBS

See ORGANIZATIONAL BREAKDOWN STRUCTURE

Organizational Breakdown Structure (OBS)



A graphical presentation of team members and the organizations they represent who are contributing to the individual WORK PACKAGES.

PERT

See PROGRAM EVALUATION AND REVIEW TECHNIQUE.

PMIS

See PROJECT MANAGEMENT INFORMATION SYSTEM.

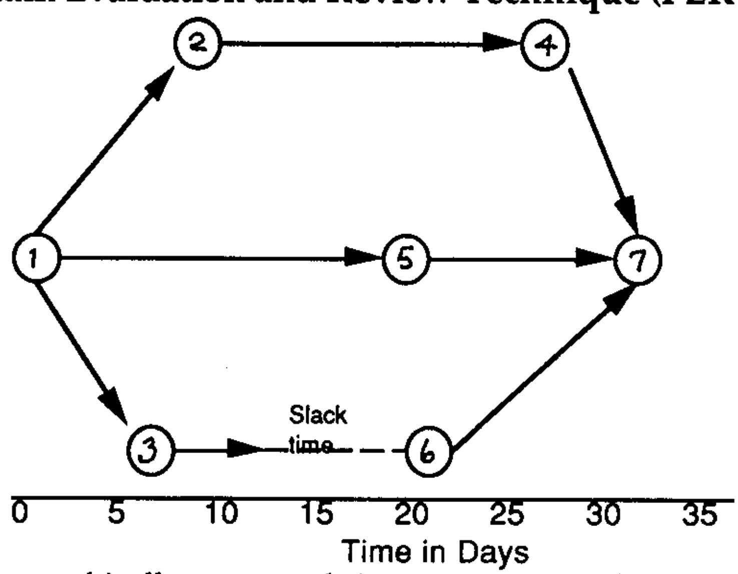
Precedence Diagram

A tool that diagrams which activities are dependent on other activities. Synonymous with NETWORK DIAGRAM.

Program

A focal point desired by an external customer or upper management for ongoing efforts performed in one area, such as energy or weapon development. The program does not usually have a set ending date and may have many discrete projects within it.

Program Evaluation and Review Technique (PERT)



A graphically presented time-event network analysis system in which the various events in a program or project are identified, with the planned time for each, and are placed in a network showing the relationships of each to other events; from the sequence of interrelated events, the path of those events in which there is the least "slack" time in terms of planned completion is the "critical path"; PERT/time systems deal only with time; PERT/cost systems introduce costs of each event and are usually combined with duration of each event or series of events. See also NETWORK DIAGRAM and CRITICAL PATH.

Program Manager

The individual who, operating in the matrix mode, is responsible for maintaining external customer satisfaction, selecting project managers, and guiding and evaluating project performance. The work involves interacting with other Sandia Program Managers and functional managers from other lines to ensure that goals and program objectives are understood and accomplished and to ensure that the resources will support the goals and programs as negotiated. See also Section 2, Functions Characteristic of Successful Projects.

Project

A funded activity with set goals, made up of interrelated tasks, utilizing human and physical resources, having a life cycle with a definite start and end, and producing a product, service, or other outcome which is normally defined by the Triple Constraint (performance specifications, time schedule, and budgeted costs). A project is often a discrete part of a program.

Project Charter

A brief document typically generated during the Start-up Phase which establishes in general terms what the project is to accomplish. The charter is a tool useful in defining and negotiating common expectations (covering accountability, responsibility, and authority) between a project manager and his or her program manager (who ultimately approves the document and authorizes the project to proceed). A charter is frequently comprised of a mission statement (benefits of the project), goal (major accomplishment and completion event), objectives (goal broken into tangible attainments at anticipated times), scope of work (what will and will not be included), and any known constraints, including their priorities. More fully discussed in *Life Cycle of Project Management.*

Project Control

The process of controlling a project within the framework of management policies that delineate the accountability and responsibility of the involved functional and project managers and team members. This control is established by the team members mutually setting objectives and goals, defining the activities to be done, planning and scheduling the activities based on required and available resources, and measuring progress and performance against the baseline through an established, orderly system. Team member peer pressure becomes the most effective vehicle for project control when allowed to function.

Project File

The centralized collection of all relevant documents relating to a project. More fully discussed in *Communications*.

Project Management

The process of managing a project. This includes using a set of basic principles, tools, and techniques for planning, organizing, staffing, controlling, and monitoring all life cycle phases of a project, including both technical and interpersonal skills. Project management promotes quality in terms of meeting customer requirements (performance), while focusing on schedule and cost. Project management provides a structure that enables a person to know what to do and when in order to more easily accomplish the goal of the project. More fully discussed in *Life Cycle of Project Management*.

Project Management Information System (PMIS)

An information system that integrates the financial and scheduling data required to produce, evaluate, and report what is necessary to manage projects efficiently and effectively. It provides facilities for planning, control, and reporting. This definition of a system is broader than just the computerized part of a system. (A centralized system may be under development soon at Sandia.)

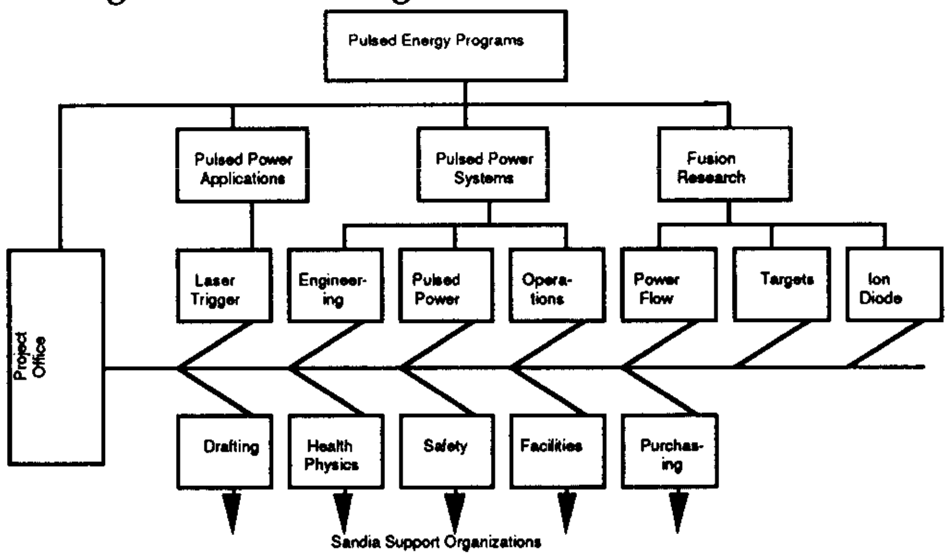
Project Manager

The person who is responsible for managing the project management process throughout the project's life cycle and who is accountable for completing the project within the triple constraint of cost, schedule, and technical performance. The project manager is specifically responsible for establishing the project with people (administrative office, team, etc. as appropriate), developing operating policy, and establishing project team accountability. See also Section 2, Functions Characteristic of Successful Projects.

Project Office Staff

The project manager and any other designated staff who primarily perform project management administrative functions. It may include, but is not limited to, financial support, scheduling, document control, etc. While the majority of projects at Sandia do not warrant a full time project office staff, the functions still must be performed to some degree. See also Section 2, Functions Characteristic of Successful Projects.

Project Organizational Diagram



A graphical representation of the organizations that contribute to a project through the technical and administrative functions.

Project Plan

The document in which the project scope is written down in detail and becomes the baseline against which all progress is tracked. It includes at a minimum a work breakdown structure, an accountability/responsibility matrix, a schedule, and a budget. More fully discussed in *Life Cycle of Project Management.* and *Scope of Work Management.* See also BASELINE DOCUMENT.

Project Team

The team is responsible for establishing the project baseline configuration and providing the basic planning, evaluation, and controlling functions for the project. The project team is composed of the project manager, staff from the project office, and functional representatives, with each individual having different but well-defined accountability for work. See also Section 2, Functions Characteristic of Successful Projects.

RAM

See RESPONSIBILITY ASSIGNMENT MATRIX.

Resource (people, materials, time) Leveling

Adjusting activities to more evenly level out the available resources within a given time frame. The proper time-phasing of manpower with the schedule of activities to be performed such that people available to a project are not assigned more work than they can reasonably deliver.

Responsibility

The obligation individuals incur in their role in a formal organization in order to effectively perform assignments. While it can be delegated to others, part of the responsibility is always retained by the source. Without an environment of accountability, a person may be responsible for performing work but will experience no reprisal or repercussions should the work not be completed. See also ACCOUNTABILITY and AUTHORITY.

Responsibility Assignment Matrix (RAM)

Another name for ACCOUNTABILITY/RESPONSIBILITY MATRIX.

Risk Management

The process of managing risk within the project management methodology. This process provides a structured means for identifying risks and evaluating the impact of these risks on performance, schedule, and cost along with a risk monitoring and reporting capability. The process also defines plans to mitigate each risk, complete with early warning triggers that activate the plans. Examples of risks that should be addressed are technical performance, cost, schedule, and ES&H.

Scheduling

The prescribing of when in calendar time each operation necessary to complete the activity occurs. The determination and assignment of projected time for events and tasks as compared to "expected time" resulting from the estimates. The overall controlling function regarding the allocation of resources with respect to time. More fully discussed in *Scheduling*. See also DURATION and EFFORT.

Scope

A definition of the type of work to be performed. Scope of work states what work will be accomplished, what product or service will be delivered, and when the product or service will be delivered. Scope of work is usually explicitly defined in the proposal or contract and may be negotiated with the customer. More fully discussed in *Scope of Work Management*. See also STATEMENT OF WORK and PROJECT CHARTER.

Slack Time

The extra time an activity can have as a result of its dependent activity on the critical path needing longer time. Activities with slack time can be delayed for specified periods without penalty or can have resources temporarily borrowed without harm to the scheduled deadlines. See also CRITICAL PATH and NETWORK DIAGRAM.

SOW

See STATEMENT OF WORK.

Statement of Work (SOW)

A narrative description of the actual work to be performed, including a description of the major tasks and the "deliverables" as well as references to specifications, directives, or standards. It usually contains the funding or other constraint if one exists and a high level schedule. It forms the basis of the initial baseline configuration. A term used to represent that part of a proposal or contract that states exactly what work will be accomplished, what will be delivered as a product, and when it will be delivered. See also SCOPE and PROJECT CHARTER.

Status Reporting

The regularly scheduled reports of the status of an activity, work package, or whole project to both the project team and to a responsible person. More fully discussed in *Scope of Work Management.*

Team Building

The deliberate effort to develop a cohesive team from a group of individuals that goes through several stages and takes dedicated time to complete. Collective learning is the core of team building. Teams need to answer the following questions: What are we here to do? How do we work together? How shall we organize ourselves? How shall we make decisions? Who is in charge? Who cares about our success? How do we work through problems? How do we fit in with other groups? What benefits do team members need from the team? More fully discussed in *Team and Organizational Dynamics.*

Triple Constraint

The term that describes the three key project objectives that must be simultaneously accomplished - the performance specification, the time schedule, and the monetary budget. Frequently desirable to establish a priority among the three with the lowest priority constraint having greatest flexibility if project requirements change during implementation.

Variance

For cost or schedule, the difference between the estimated amount and the actual amount. A negative variance may provide early warning that the project is not proceeding according to plan. See also ACTUAL COST/SCHEDULE.

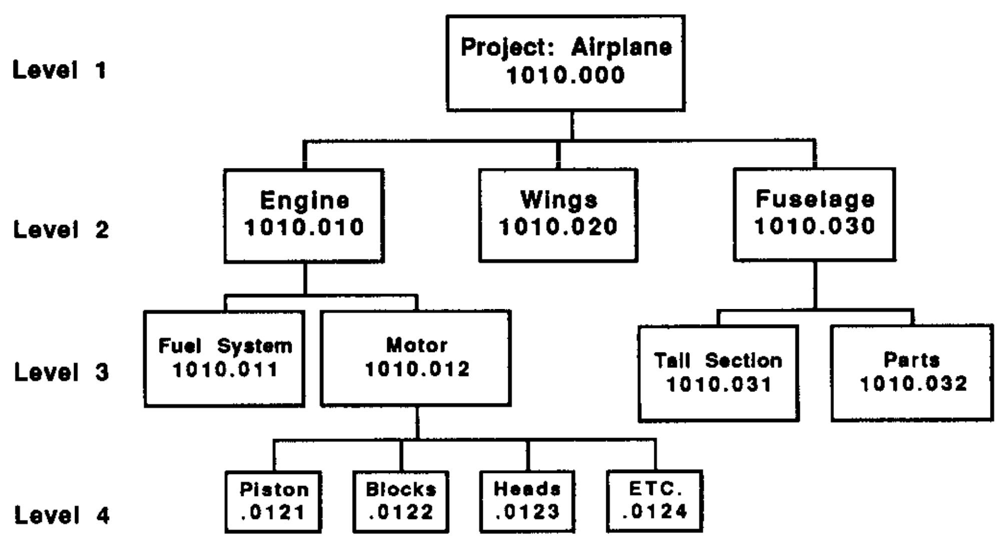
WBS

See WORK BREAKDOWN STRUCTURE.

Work Agreement

An internal agreement between a project manager (the customer or requester) and a line or functional manager (the supplier or responder) to accomplish a specific piece of work (work package) during a negotiated time frame for a negotiated cost. This term is sometimes used interchangeably with "work package." Sometimes also called an internal contract. More fully discussed in *Work Agreements: The Process for Getting Project Work Done.*

Work Breakdown Structure (WBS)



A means of representing what work must be done to accomplish a project. It sub-divides the whole project into individual, manageable activities. The lowest level, needing no more sub-divisions, is called a work package. The work breakdown structure is usually represented graphically as a hierarchical structure displaying the work breakdown or as a numbered list with indentations for the different levels of work. More fully discussed in *Life Cycle of Project Management* and *Scope of Work Management.*

Work Package

A detailed short-span job, or material item, identified by the contractor for accomplishing work required to complete the contract. Generally the lowest hierarchical level of the work breakdown structure for which specific accountability can be given to a person or organization for completion. It is a basic management tool for implementing work and monitoring project performance. The term may also mean the document which describes the work that must be done as negotiated between the project manager and functional representatives or a member of the project team. The owners of work packages estimate the resources, i.e., dollars, people, space, equipment, and time, needed for the activities in their work packages. They also identify dependencies, if there are any. More fully discussed in *Scope of Work Management, Cost Management* and *Work Agreements.*

Section 2

Functions Characteristic of Successful Projects

Functions Characteristic of Successful Projects

This section provides a detailed list of functions typically found on successful projects. It presents information that supplements the flow charts in *Life Cycle of Project Management* and is meant to aid in suggesting how roles and responsibilities for various duties might be apportioned among project members. While this list is extensive, it does not exhaust all possibilities for all projects.

On every project, no matter what its size, certain activities have to occur to produce a successful outcome. "Successful" in this context means meeting the customer requirements or meeting the triple constraint of cost, schedule, and technical performance as well as managing the project well, fostering good team morale, and developing good relations with functional organizations and management.

Typical Functions of a Sponsor

The first step for successful completion of a project is to have clear management support or clear sponsoring activities. The critical step for the project manager at this point is to negotiate with a corporate sponsor to ensure the "customer" requirements are clear, the objectives attainable, and the constraints manageable. Without this foundation, a project has a higher risk of floundering.

Every Sandia project needs a sponsoring agent. That sponsor may be a program manager, an administrative committee, or a directive from upper management. Whatever the source, the successful project has a sponsoring agent that

- understands the project management process.
- champions the project benefits to the program or organization.
- selects project managers and establishes accountability and authority.
- is accessible, stays informed of project status, and provides active support once informed that a project needs help.

- designates project manager as focal point for communication, and backs it up with appropriate notification and action.

- approves project plan (objectives, scope, schedule, support requirements) and future revisions if needed.

- defines priorities among multiple projects and resolves conflicting project priorities.

- sees that conflicts unresolved at lower levels are resolved at higher levels if necessary.

Typical Functions of a Project Manager

On a small project, many of the activities listed below may be performed by the project manager or his or her delegates. For example, every project does not need a dedicated purchasing coordinator, though every project needs to have its purchases well coordinated. A large project may need a dedicated systems integrator, a project purchasing coordinator, a financial controller, and a project documenter in addition to other team members. Whether these management activities will have one person dedicated to do them or whether several team members, including the project manager, will apportion the activities among themselves will depend on the nature and complexity of the project.

The following list is extensive, on the premise that it is easier for you to discard unnecessary activities than to add them. Select or adapt only those activities that are appropriate to your project.

The project manager is accountable for completing the overall project within budget, on time, and meeting the customer's performance requirements. The project manager also provides project management services to the project team throughout the project's life cycle. These services can be grouped into five general areas:

- Communications
- Cost and schedule management
- Team leadership
- Visioning
- Resource management

The following project management activities are grouped according to the phases of the generic life cycle developed and explained in the *Life Cycle of Project Management* pamphlet.

Proposal and Start-up Phases

- Negotiating with the sponsor and customer to establish the project goals, objectives, constraints, and requirements
- Coordinating the product's conceptual development
- Establishing the project team
- Leading the team building development activities
- Developing the project's operating policies jointly with the project team
- Establishing the project team member roles and responsibilities jointly with the team members

Planning Phase

- Facilitating the planning process of the project team
- Leading team development of the work breakdown structure (WBS)
- Negotiating accountability (ownership or stewardship) with individual team members for specific work packages
- Coordinating of individual work package cost estimates and schedules into the total project plan
- Developing the project plan
- Resolving conflicts

Implementation Phase

- Authorizing accountable project team members to implement their work package(s)
- Providing negotiated resources for work package implementation
- Conducting work package status review meetings
- Monitoring, evaluating, and reporting work package cost, schedule, and technical progress

- Enforcing subcontractor performance on work packages
- Managing and documenting configuration change process
- Resolving conflicts
- Providing overall integration function
- Reviewing and approving product releases
- Managing the project overall finances and schedule
- Maintaining up-to-date project plan

Close-out Phase

- Verifying that the project's product has been delivered as required
- Comparing the final cost, schedule, and performance data with original estimates and requirements
- Certifying project team acceptance and documents
- Documenting the customer's feedback about the product
- Archiving the project file
- Providing the final report to the customer and sponsor

Typical Functions of Technical Line Organizations

Projects need support from the technical line organizations to accomplish the work of the project. Successful projects involve members representing the necessary functional organizations in the planning stages.

The project manager negotiates a work agreement with the functional organization for work to be done for the project. The initial negotiation between the project and the functional organization needs to ensure the following:

- The functional organizations ensure their portion of the project plan ("subcontract") is realistic and attainable (They do not agree to a subcontract that cannot be fulfilled).

- The functional organizations commit resources to a project in return for negotiated funding from the project.

The project manager may decide that a representative from the functional organization is needed on the project team. In such a case, the project manager negotiates a work agreement with the functional manager for specific team members.

The representative becomes a project team member and is involved in the day-by-day activities of the project. He or she will most likely become the work package manager for activities performed by his or her functional organization.

- The functional organization ensures functional representatives participate fully in the project planning process defining what is to be done, by whom, when, and at what cost.

- The functional organization holds functional representatives accountable for meeting their portion of the project objectives within schedule and cost constraints.

The following activities are performed by functional representatives over the project life cycle.

Start-up Phase

- Participating in the negotiation of work agreements

Planning Phase

- Participating in planning the whole project

- Providing cost and scheduling estimates for individual work packages that will be performed by his or her organization

- Contributing to criteria for all work packages
  —Critique criteria provided by other functional representatives
  —Identify and solve interface problems

- Contributing to all project meetings

- Providing peer review

- Promoting teamwork

Implementation Phase

- Obtaining resources for work packages by
  - —Direct assignment
  - —Negotiation with other organizations
  - —Outside services

- Educating work package participants about project mode of operation

- Passing along project-related documents

- Keeping work package participants informed about project information

- Promoting team spirit among work package participants

- Approving or disapproving all project baseline and design reviews

Close-out Phase

- Participating in final evaluation of the project (e.g., lessons learned)

- Assisting project manager in close-out activities as needed.

Typical Functions of Project Teams

All project team members share a common set of responsibilities to ensure the project's success. Some responsibilities are performed jointly with the other team members and some are performed individually.

Proposal and Start-up Phases

- If present as part of a proposal development team, jointly developing the project requirements with project sponsor and or customer

- Participating in team building activities

Planning Phase

During the planning phase, the project team members' primary responsibility is to decide what needs to be done, who will do it, when it will be done, and how much will it cost. These details provide necessary information for the development of a project plan. The following activities are associated with this phase.

- Jointly translating these requirements into the work activities that are needed to accomplish the project

- Jointly organizing work activities into a work breakdown structure

- Jointly developing roles and responsibilities definitions (as illustrated by the use of an accountability/responsibility matrix)

- Jointly developing the project team operating policies

- Individually volunteering for work package accountability (ownership)

- Individually taking responsibility for developing work package implementation cost and duration estimates

- Jointly integrating individual work package implementation cost and duration estimates into the overall project total estimated cost and schedule, based on logic, priorities, and other constraints

Implementation Phase

Work Package Manager Responsibilities

Team members become work package managers when they accept responsibility for individual work packages. As such, they typically have the following responsibilities.

- Participating in work package negotiations

- Performing and managing work

- Reporting progress and problems

- Preparing, reviewing, and approving drawings and specifications

- Providing project documentation

- Maintaining liaison with vendors

- Fixing technical problems

In addition to the work package manager responsibilities, the team members have the following general responsibilities.

- Attending project meetings when appropriate

- Reviewing and critiquing all work package criteria

- Providing project control function using peer pressure

- Promoting teamwork

- Reviewing and approving (or disapproving) any configuration (scope) change requests

Close-Out Phase

- Participating in final evaluation of the project (e.g., lessons learned)

- Assisting project manager as needed

Other Functions Frequently Performed by Specialists on Larger Projects

In addition to the more general functions previously described, other, specific functions need to be accomplished, especially to enhance the success of larger projects. The following series of activities are presented from the viewpoint of a specialist performing the aggregate duties, but, if required, they may also be performed in a distributed fashion.

Typical Functions of a Systems Integrator

Overview

Some projects (e.g., those which are large, complex, long-duration, highly matrix organized, or contain multiple sub-projects) require a significant amount of integration of activities, WBS elements, and people. Responsibility for integration may be assigned to someone. Depending on the project organization, integration may be performed by the project manager, a deputy project manager, or a specifically designated systems integrator.

General Responsibilities

- Integrating all systems-related activities of projects
- Managing the baseline configuration
- Managing the relationship between cost effectiveness and schedule performance for all phases of the project
- Accomplishing any necessary facility systems integration in concert with the Facilities Directorate
- Supervising any staff assigned to systems integration team
- Participating in developing project administration
- Acting as technical interpreter to the project manager

Systems Integration Activities

Coordinate, plan, integrate, and document the baseline development for project systems including the following items.

- Developing the work breakdown structure
- Developing the schedule
- Developing the baseline design definition
- Developing resource definition
- Developing performance criteria
- Establishing, documenting, and managing a project engineering and operating philosophy
- Initiating and negotiating work packages with participating project team members and the project financial manager
- Managing all work packages so that deliverables are met on schedule and within defined resource allowables

- Preparing and maintaining a file of all work package deliverables

- Establishing work priorities within the work breakdown structure; where conflict exists, arbitrating differences and interface problems with the project team

- Modifying and reallocating tasks and subtasks and changing allowable resources within the limits of approved work package cost and schedule limits, with the concurrence of the team members involved, the project financial manager, and the project manager

- Participating in evaluation and formulation of alternative plans as required by schedule delays or criteria changes

- Planing and conducting design review meetings and participating in technical reviews

- Approving all designs/plans prior to release

- Developing methodology to ensure that system and subsystem interfaces are understood and documented

- Preparing project status reports as required

Configuration Management Responsibilities

- Developing and implementing a configuration management methodology

- Acting as the baseline configuration manager

Assembly/Test/System Performance Characterization Responsibilities

- For construction projects, acting as the assembly/test manager

- Integrating and coordinating all assembly and test subsystem plans prepared by responsible project team members

- Developing integrated assembly and test plans and schedules

- Managing the assembly/test process

- Negotiating solutions to interface problems

- Documenting the results of the assembly/test phase

- Integrating and coordinating characterization phase test plans prepared by responsible project team members

- Managing the characterization phase process

- Coordinating the transition of project deliverables to the customer

- Documenting the characteristics of the project deliverables

Compliance/Audit Requirements Responsibilities

- Ensure that an appropriate and comprehensive program or plan is developed, documented, and implemented in the following areas, as necessary:
  - —ES&H
  - —QA/AC
  - —Security
  - —Other regulatory requirements

Typical Functions of a Project Purchasing Coordinator

Providing Project Procurement Services

- Establishing and maintaining pre-procurement procedures
  - —reviewing procurement documents for completeness and commitment approvals
  - —verifying that contract change requisitions are consistent with configuration change requests which have been approved by the project team

- Formulating methods for systematic computer input and verification of procurement information for projects

- Instituting and maintaining procurement filing system for project-related purchase actions

- Coordinating regular purchase status meetings
  - —documenting a timely report of the status meeting
  - —pursuing action items resulting from the meeting

- Defining and formulating project procurement reports for use by project team members

- Acting as liaison between purchasing, receiving and payment processing organizations, and the project team

- Developing project budget submittal by fiscal year

- Tracking monthly project cost/budget information

- Preparing procurement documents to meet project requirements for contractor services

Typical Functions of a Project Financial Manager

General Responsibilities

Performing the project financial planning, controlling, reporting, analysis, and evaluation functions to ensure achieving project objectives within the schedule and budget constraints

Start-up Phase

Determining Financial Managing Requirements

- Identifying formats for gathering financial planning data

- Familiarizing project team with financial planning process including
  —Introducing financial procedures and formats
  —Training on preparation of resource estimates

Developing a Financial and Information Database

- Determining what systems (manual or automated) will be used to support timely and accurate planning, tracking, and reporting of financial data

- Developing comprehensive database for managing the project, when needed

Planning Phase

- Coordinating development of high-level cost estimates for work breakdown structure activities (on request)

- Assisting with preparation of cost proposal
- Formulating Project Financial Plan
- Participating in development of WBS so that all tasks to be performed are hierarchically related. Helping identify all WBS activities so that an appropriate numbering scheme can be assigned to the WBS
- Coordinating resource estimates for the project by
  - —Providing formats for gathering resource estimates
  - —Obtaining estimates from the project team for each WBS element for
    - Manhours needed to perform each activity
    - Hardware cost
    - Direct charges (e.g., travel, stores, and operating supplies)
    - Direct support (e.g., computing, shop, technical information, drafting, and test)

Developing Project Cost Baseline for the Project Plan

- Summarizing all task, manpower, and cost estimates.
- Coordinating needed revisions by team members and project manager to match estimates with available project funds. This includes
  - —Entering resource estimates into the project database by each scheduled activity to generate total estimated project cost
  - —Iterating results with project team members to agree on "best estimate" for each WBS element
  - —Establishing level of contingency for project
  - —Preparing project cost estimates for required customer reports

Establishing Corporate Budget

- If necessary, translating the project financial baseline into the corporate financial system. This involves
  - —Obtaining a case number
  - —Determining at what level of the WBS costs will be budgeted and tracked and preparing a map of the WBS numbering scheme to the case numbering scheme
- Preparing corporate (fiscal year) operating budget requests. These requests are detailed by chargeable cost objective, organization, cost element, and funding category

Implementation Phase

Establishing Work Authorization Process

- Approving level of funding required for each work package

- Controlling the release of work package approval documents based on negotiated work agreements

- Reviewing revised cost and schedule estimates resulting from criteria and design reviews and assess impact on overall project

- Incorporating appropriate financial adjustments into project cost baseline

- Developing strategy for accommodating any changes in the Labs' financial policies

Monitoring Progress and Evaluating Status

- Comparing actual costs and commitments against estimates and evaluating variances. Preparing budget adjustments when necessary

- Analyzing monthly cost and purchase reports for operating, construction, and equipment funds to ensure compliance with project manager's authorizations and corporate budget constraints

- Obtaining quarterly updates of estimates to complete (labor hours, costs, etc.) from project team members and updating the overall financial plan accordingly

- Identifying potential financial problem areas

- Recommending solutions to project manager for any known or potential financial problems

Preparing Management Reports

- Publishing monthly project cost and commitment status against funding for project team and internal management

- Publishing monthly report on status of obligation funding received from customer or sponsor and status of costing

- Coordinating preparation of project cost variance reports

- Preparing sponsor's Quarterly Report incorporating schedule progress, milestones, and cost status

Close-out Phase

- Closing out completed contracts

- Closing out financial system case numbers

- Preparing a final cost summary for the project sponsor or customer

- Participating in lessons learned session to improve project financial management process

- Transferring project financial corporate memory to appropriate project or program manager

Typical Functions of a Project Documenter

The project documenter drafts many of the following documents from various sources, though some may be drafted by other persons and edited by the project documenter.

Typical documentation includes

- Baseline documents

- Quality assurance plans or guidelines

- Brochures and handouts

- Project plans, according to customer requirements

- Periodic progress or status reports, as required

Miscellaneous Documentation Duties

- Writing internal documents, such as minutes of project planning meetings

- Contributing to the setup and maintenance of the project file

- Consulting with project team on effective writing

- Maintaining familiarity with capabilities of text and graphic software and output devices

Contact with Functional Personnel to maintain informal communications

- Gathering information for reports and other documents
- Developing broad perspective for presenting information
- Making documentation an integral part of each project

Provide Liaison with Other Organizations

- Developing and maintaining working relationships with other organizations, especially in the information and communication service areas

Section 3

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of

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Available in the

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APPENDIX F

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August 27, 1991

"Red Team" Review of the Savannah River Consolidated Waste Incinerator

__________, Manager
Savannah River Operations Office

In a memorandum of March 29, 1991 (Attachment 1) on the status of the Hanford Waste Vitrification Plant, the Under Secretary of Energy indicated plans to institutionalize the "Red Team " review of DOE projects. The review at Hanford has been completed, and as part of the institutionalization of this process other reviews are being planned and executed. The next project to be reviewed is the Consolidated Incinerator Facility (CIF) at Savannah River. It is anticipated that this review will start in October and be completed in the first half of FY 1992.

We are beginning initial preparations for review of the incinerator at Savannah River. Dr./Mr.________ of the _______ will be responsible for organizing, directing and conducting the effort on behalf of the Office of Environmental Restoration and Waste Management. Dr. Philip Thullen of the Los Alamos National Laboratory will be responsible for establishing and managing the Team. The purpose of the "Red Team" review is to examine the scientific fundamentals and engineering basis of the Project to thereby establish an independent picture of the status of the technology and engineering practice as they exist within the CFI. Attachment 2 is an outline of the approach we plan to use in the execution of the "Red Team " review. Further information on the review process will be made available following receipt of this letter.

We are committed to finding solutions to the Department's radioactive waste disposal problems. It is critically important that there be solutions to these problems and that the Department be in a position to move forward with them. To assure that the outstanding questions and issues are addressed expeditiously, we are soliciting your cooperation in working with Dr./Mr. _________ and the review group. He will contact you in the near future to establish protocols and schedules. We are confident, despite the numerous other pressures your are facing, that every effort will be made to respond to his inquiries and to provide the information and support that is requested.

If you have any questions with regard to this review, please contact me as soon as possible.

Jill E. Lytle
Associate Director
Office of Waste Operations
Environmental Restoration
and Waste Management.

DOE F 1325.8
(8-89)

United States Government Department of Ener

memorandum

DATE: May 28, 1991

REPLY TO
ATTN OF: EM-35 (D. Vieth, FTS 233-7183)

SUBJECT: "Red Team" Review of the Hanford Waste Vitrification Project

TO: John Wagoner, Manager
Richland Operations Office

At the Energy Systems Acquisition Advisory Board Meeting in February, issues were raised regarding the technical and engineering aspects of the Hanford Waste Vitrification Project (HWVP). In his subsequent memorandum of March 29, 1991, to Leo Duffy, Director of the Office of Environmental Restoration and Waste Management, the Under Secretary commended the use of the "Red Team" concept and directed that the independent technical assessment of the HWVP be completed in time to support the new baseline for the Project. A copy of that memorandum is provided as Attachment 1. The new budget baseline, along with an interim report from the independent engineering review, are to be available in support of the submission of the FY 1993 Budget to the Office of Management and Budget.

We have completed the initial phase of establishing the "Red Team." Dr. Donald L. Vieth, Deputy Assistant Manager for Environment, Safety and Health for the Nevada Operations Office, will be responsible for organizing, directing, and conducting the effort on behalf of the Office of Environmental Restoration and Waste Management. The purpose of the "Red Team" review will be to examine the scientific and engineering basis for the Project in order to establish an independent picture of the status of the technology and engineering practice that is available to facilitate the Project. Attachment 2 is an outline of the approach we plan to use in the execution of the "Red Team's" review.

It is clear that there are numerous questions regarding the Project that must be addressed before significant financial commitments can be made. We are committed to finding solutions to the Department's legacy of high-level radioactive waste problems. It is critically important that there are valid solutions to these problems and that the Department be in a position to move forward with them. To assure that the outstanding questions and issues are addressed expeditiously, we are soliciting your cooperation in working with Dr. Vieth and his review group. He will be contacting you in the near future to establish protocols and schedules. We are confident, despite the numerous other pressures you are facing, that every effort will be made to respond to his inquiries and to provide the information and support that is requested.

If there are any questions with regard to this review, please contact me as soon as possible.

Jill E. Lytle
Associate Director
Office of Waste Operations
Environmental Restoration
and Waste Management

(2) Attachments

02/04/92 13:57 ☎505 665 6318 LANL N-DO RED →→→ WEAVER ☒002
02/03/92 16:57 ☎301 903 7201 →→→ LANL N-DO RED ☒002

DOE F 1325.8 (8-89) EG (03-90)

United States Government Department of Energy

memorandum

DATE:

REPLY TO ATTN OF: EM-343

SUBJECT: Review Teams for Defense Waste Processing Facility Process Technology Issues and Integrated Startup Schedule

TO: R. Claytor, DP-1

In your capacity as Principle Secretarial Officer for the Savannah River Site, I wish to inform you that I have assembled: 1) a Red Team to perform a review of process technology issues confronting the startup of the Defense Waste Processing Facility (DWPF), and 2) a team to perform an independent review of the Westinghouse Savannah River Company (WSRC) integrated startup schedule for the DWPF.

During the performance of the Integrated Water Runs for the DWPF and testing of the Integrated DWPF Melter System, WSRC personnel identified a number of process technology concerns. These have been reported to Savannah River Field Office (SR) and Headquarters (HQ) management, and corrective action plans have been developed by WSRC. Resources and timeframes for resolving these issues have also been incorporated in WSRC's integrated startup schedule for DWPF.

In addition to the technology concerns, programmatic, institutional, and operational issues have risen which have also contributed to extending the projected radioactive operations startup of DWPF beyond the schedule baseline date approved at the last DWPF Energy Systems Acquisition Advisory Board. Also, the Federal Facilities Compliance Agreement covering the Savannah River site requires start of DWPF radioactive operations by December 31, 1993. Recent briefings by WSRC have indicated this date is not achievable and HQ has requested SR to review the startup plan to minimize the impact of proposed schedule changes.

Because of the high visibility of the DWPF and its importance to the Department of Energy high-level waste vitrification program, I have established a Red Team to perform an independent review of the process technology concerns. The objective of this team is to independently review the approach adopted by SR and WSRC to resolve these concerns and evaluate whether this program will lead to satisfactory resolution in a timely manner. Similarly, a separate HQ team has been chartered to review the integrated schedule to assess whether the schedule is complete, realistic, sufficiently aggressive, and accounts for unanticipated activities (i.e., contingency). The schedule review team will receive input from the Red Team regarding potential impact on the schedule.

Attached for your information are the charters for performing these reviews. These charters identify the missions of the reviews, review team interfaces, tasks to be performed by the review teams, the review team organizations, and schedules of review team activities.

If you have any questions regarding this review, please contact me or Stephen Cowan (EM-30) at FTS 233-7100.

Leo P. Duffy
Assistant Secretary for Environmental
Restoration and Waste Management

Attachments
1. Charter for Red Team DWPF Process Technology Review Panel
2. Charter for DOE-HQ Review of the DWPF Integrated Schedule

cc:
P. Hekman, SR
L. Sjostrom, SR
C. Terrell, SR
S. Cowan, EM-30
K. Chacey, EM-343
K. Carlson, AL

APPENDIX G

TECHNICAL OVERSIGHT BOARD

Additional information can be provided about the membership of the Technical Oversight Board, if requested.

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APPENDIX H

REVIEW SKILLS

ITR TRAINING CASE STUDY

H.1 Review Technique Viewgraphs

See attached Review Technique Viewgraph set.

H.2 Consolidated Waste Generation Facility Independent Technical Review, a Case Study

Suntech, a DOE M&O contractor at the Heartlands Site, has completed Title I design of the Consolidated Waste Generation Facility (CWGF). DOE chartered an Independent Technical Review (ITR) of the CWGF to evaluate the project's integrated system, scientific, and engineering practice basis, prior to approval of detailed design.

Suntech Heartlands Corp. (SHC) has proposed the CWGF to generate experimental waste streams for use in testing mid level waste (MLW) storage, retrieval, pretreatment, and metalization facilities. The Heartlands site currently has two tanks containing 1.7 million gallons of MLW from previous production operations. Additional mid level wastes are anticipated from future Decontamination and Decommissioning (D&D) activities at the Heartlands Site. Construction of additional storage and pretreatment tankage has been requested. The Heartlands Smelter Facility (HSF), which is nearing completion, metalization process will bind MLW solids in a molten steel alloy matrix. The steel ingots are then shipped to a Metalized Waste Storage Facility (MWSF). The HSF, as well as ancillary facilities, must be fully tested and certified for waste form and environmental compliance prior to smelting of actual radioactive wastes. The CWGF will be used to provide the 5 years of simulated wastes required to carry out tankage, retrieval, pretreatment, HSF, and ancillary facility testing. The proposed $499M CWGF design was authorized and initiated in July, 1991. Construction is currently scheduled for early FY94.

The SHC CWGF project manger, Doug Silk, is meeting with the ITR members of several ITR subpanels to provide an overview of the project. Doug has been with Suntech for 25 years, primarily in the development of newmetalization technology. SHC selected Doug Silk as the CWGF project manager based on his years of technical expertise and his successful implementation of the Demonstration Waste Generation Project (DWGP).

The ITR members include:

Stu Pope	The Management and Control subpanel leader, Stu has worked on a prior ITR's. He has extensive project management experience particularly with regard to the requirements of DOE Orders.
Alice Frank	Alice is project leader for a National Labs metalization development program. This is her first ITR.
Deborah Talent	Deborah managed the design, construction, and operation of the smaller DOE East Peak Metalization Facility (EPMF) project prior to becoming an independent consultant. This is Deborah's first ITR.
Norm Sage	Norm is the Metalization Sciences Department Chair at Mount Valley University. He is world renowned for his research in the metalization of radioactive wastes. This is his first ITR experience.

In the video, we join Doug Silk and the ITR members as Doug is providing an overview presentation and a detailed interview begins.

H.3 Case Study Viewgraphs

See attached Case Study Viewgraph set.

H.4 ITR Case Study Worksheet

ASSIGNMENT: ______________________________

VIDEO #1

Key Information Obtained in This Session	Improper Interview Techniques
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________

VIDEO #2

Key Information Obtained in This Session	Good Interview Techniques
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________

H.5 <u>Interview Skills Workshop</u>

Based on the their interview of Doug Silk, the CWGF ITR team identified 9 issues for further investigation (handout - **Video #2 Issues Identified)**. Your workshop group is to further develop or close out the team's concerns. The person you interview has been provided additional case study facts as a part of his/her assigned role. Your group's workshop assignment is to ascertain as much of the information as possible using the techniques of video #2 while avoiding the pitfalls of video #1.

<u>GROUP 1:</u> will interview CWGF Project Management Supervisor Ed Bean to further explore the project financial, staffing, and management planning issues. Ed is one of the 5 supervisors reporting to Doug Silk.

<u>GROUP 2:</u> will interview the Lead Scientist, Bill Knight, to further understand the technical basis of the project. Like Bob Orley, Bill reports to John Jacobs - Vice President of Environmental Management.

<u>GROUP 3:</u> will interview the HSF Project Manager, Ann/Al Smith, to explore the CWGF need justification and potential Tank Waste Management Division internal communications difficulties.

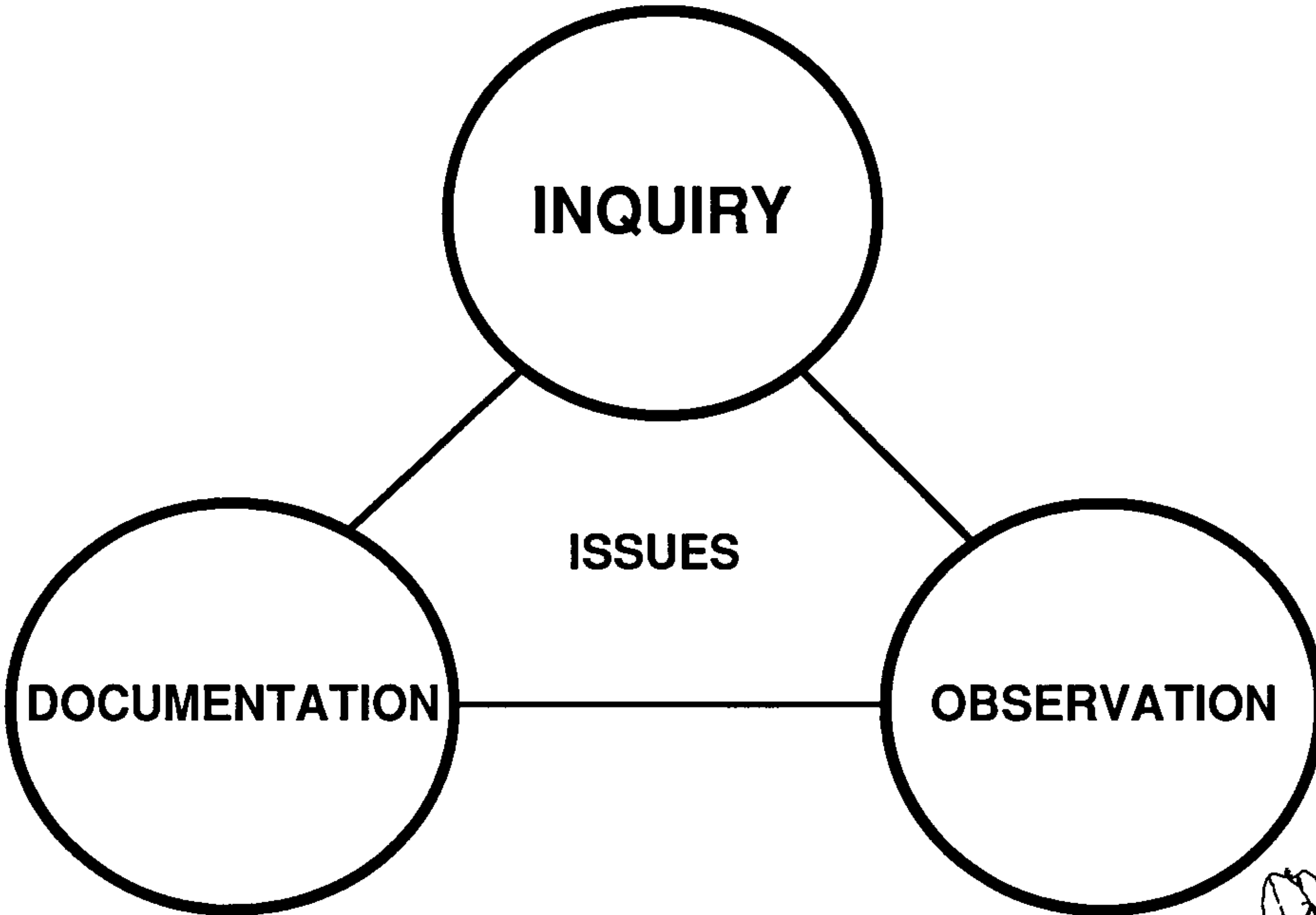
The process and schedule for the workshop is as follows:

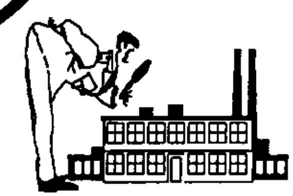
Define group interview approach	10 min.
Conduct assigned interview	15 min.
Summarize issues developed or closed on one viewgraph. Summarize workshop lessons learned on one viewgraph	15 min.
Present issues and lessons learned to the team as a whole.	10 min./gp

The output of today's workshop will be the basis for tomorrow's assessment workshop—so take good notes from the group summary presentations!

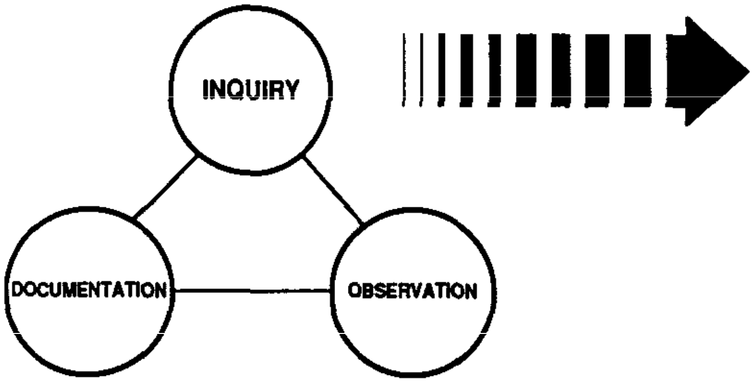
REVIEW TECHNIQUES

SOURCES OF INFORMATION





SOURCES for INQUIRY



- PRESENTATIONS
- INTERVIEWS
- ONE on ONE DISCUSSIONS
- INFORMAL INTERACTIONS

REVIEW TECHNIQUES

INQUIRY STYLES

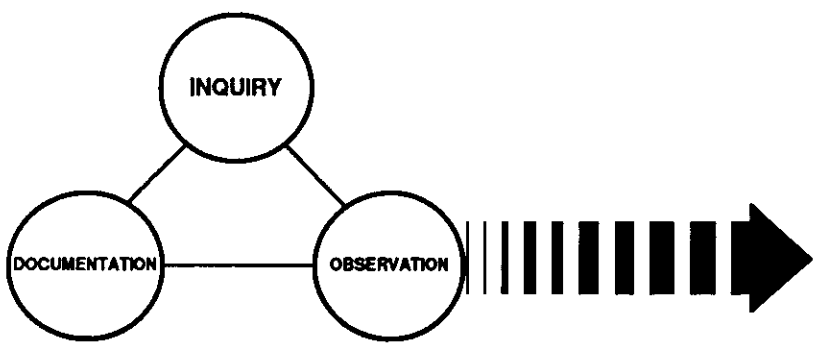
INTERVIEW:

an in formal consultation to ascertain information

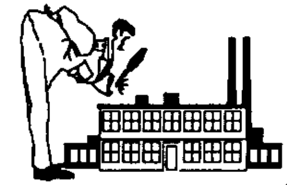
INTERROGATE:

to adversarially question, formally and systematically, to verify known information

SOURCES of OBSERVATION

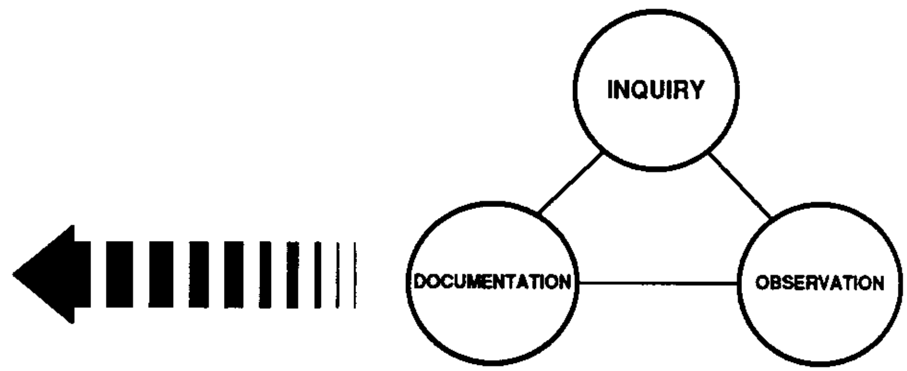


- TOURS
- INSPECTIONS
- VERTICAL INVESTIGATIONS



DOCUMENTS

- REQUIRED DOCUMENTS
- PLANS & PROCEDURES
- PRESENTATIONS
- INTERVIEWS
- INSPECTIONS
- VERTICAL INVESTIGATIONS
- NOTES



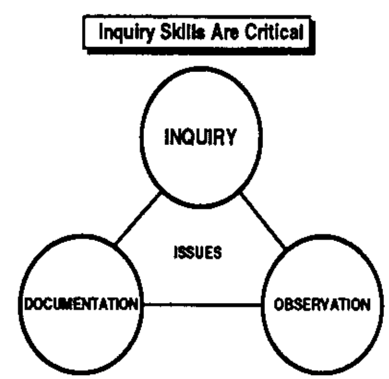
REVIEW TECHNIQUES

INFORMATION SOURCES

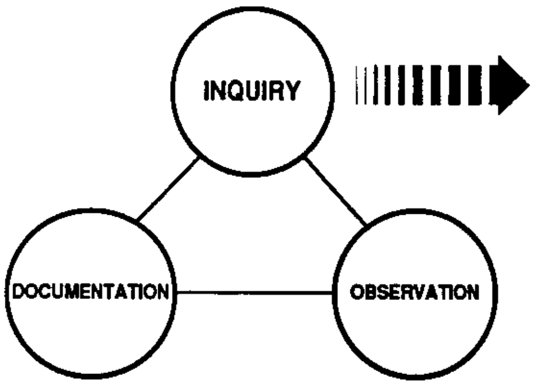
PROCESS FLOW

PREP	OVERVIEW ON-SITE	OFF-SITE DISCUSSIONS	DETAILED ON-SITE	ASSESSMENT
HISTORICAL DOCUMENTS	**PRESENTATIONS** CURRENT DOCUMENTS **INTERVIEWS**	NOTES CURRENT & HISTORICAL DOCUMENTS	**INTERVIEWS** **PRESENTATIONS** CURRENT DOCUMENTS	NOTES CURRENT & HISTORICAL DOCUMENTS

AVAILABLE SOURCES



INQUIRY TECHNIQUES



Overview Presentations

- Ask questions of clarification
- Write down detailed questions and save for the subpanel presentations
- Do Not waste other team members' time by asking detailed questions

Interview Sessions

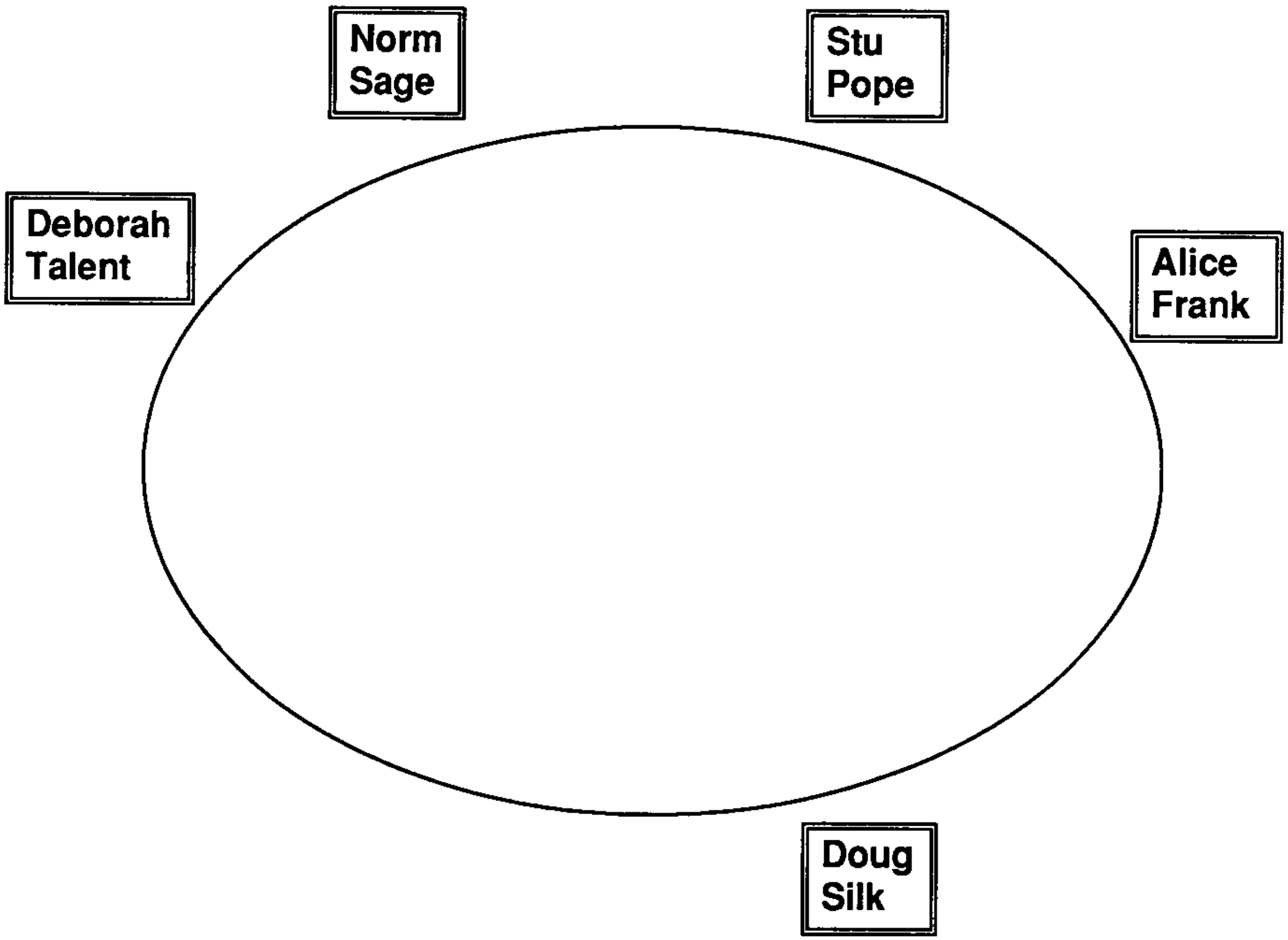
- Use open ended questions; follow up with specific questions
- Look for opportunities for quantification
- Be persistent; try rephrasing the question
- Be open to opportunities to explore a subject
- Address one issue at a time; fully explore that issue before proceeding
- Confirm what you hear; rephrase what was just said
- Don't be afraid of silence
- Let the host do the talking

Review Conduct

The review occurs in a highly charged environment. The team's credibility can be destroyed by a single person's actions

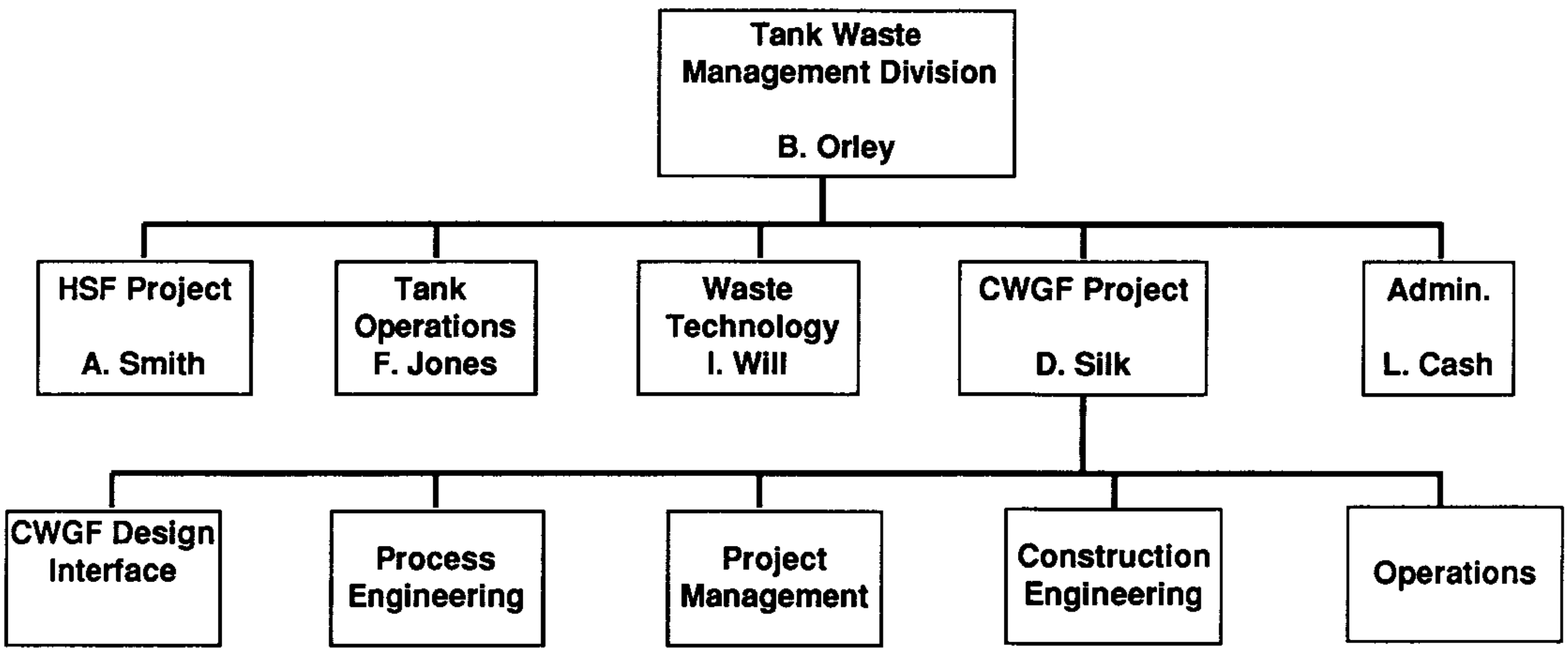
- All aspects of the review are to be treated as sensitive controlled information
  - Do not discuss the review with anyone other than team members
  - Protect review documents and files from unauthorized access.
- Marketing and personal bias have no place in an ITR
- Interactions with the site personnel are to be maintained at the highest professional level
  - Treat personnel with professional respect and courtesy
  - Be cautious in social interactions

ITR CASE STUDY

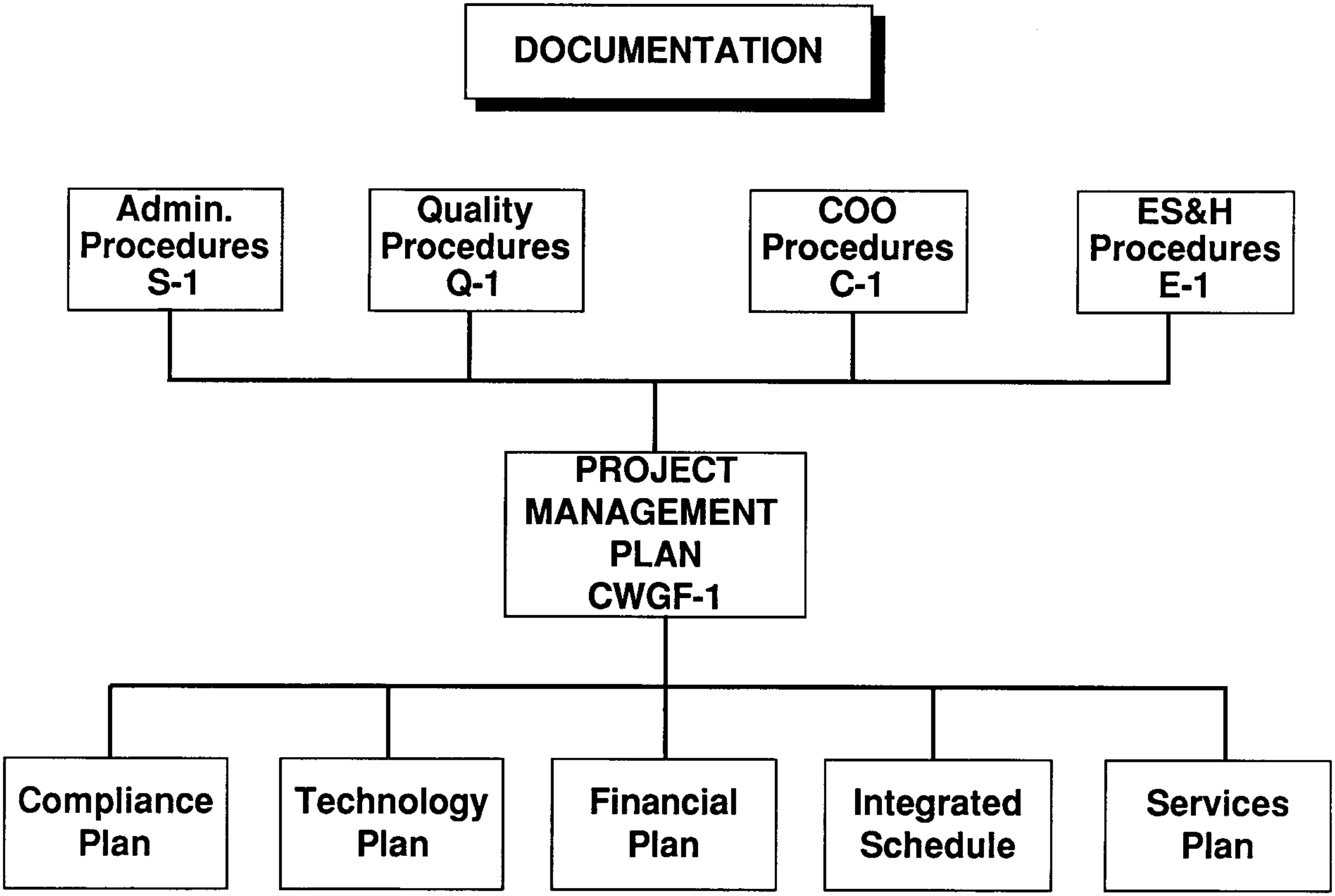


CONSOLIDATED WASTE GENERATION FACILITY

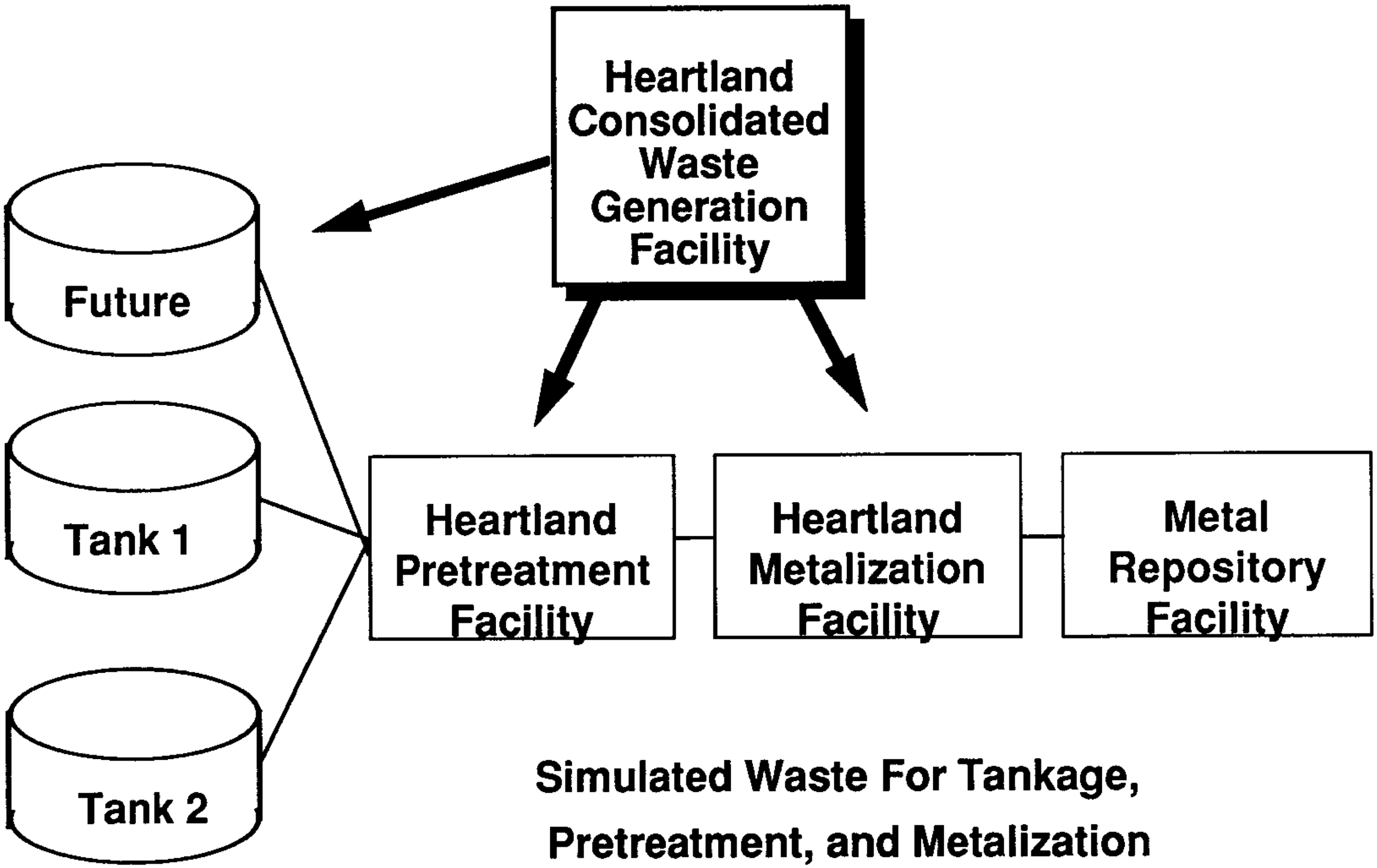
ORGANIZATION



CONSOLIDATED WASTE GENERATION FACILITY



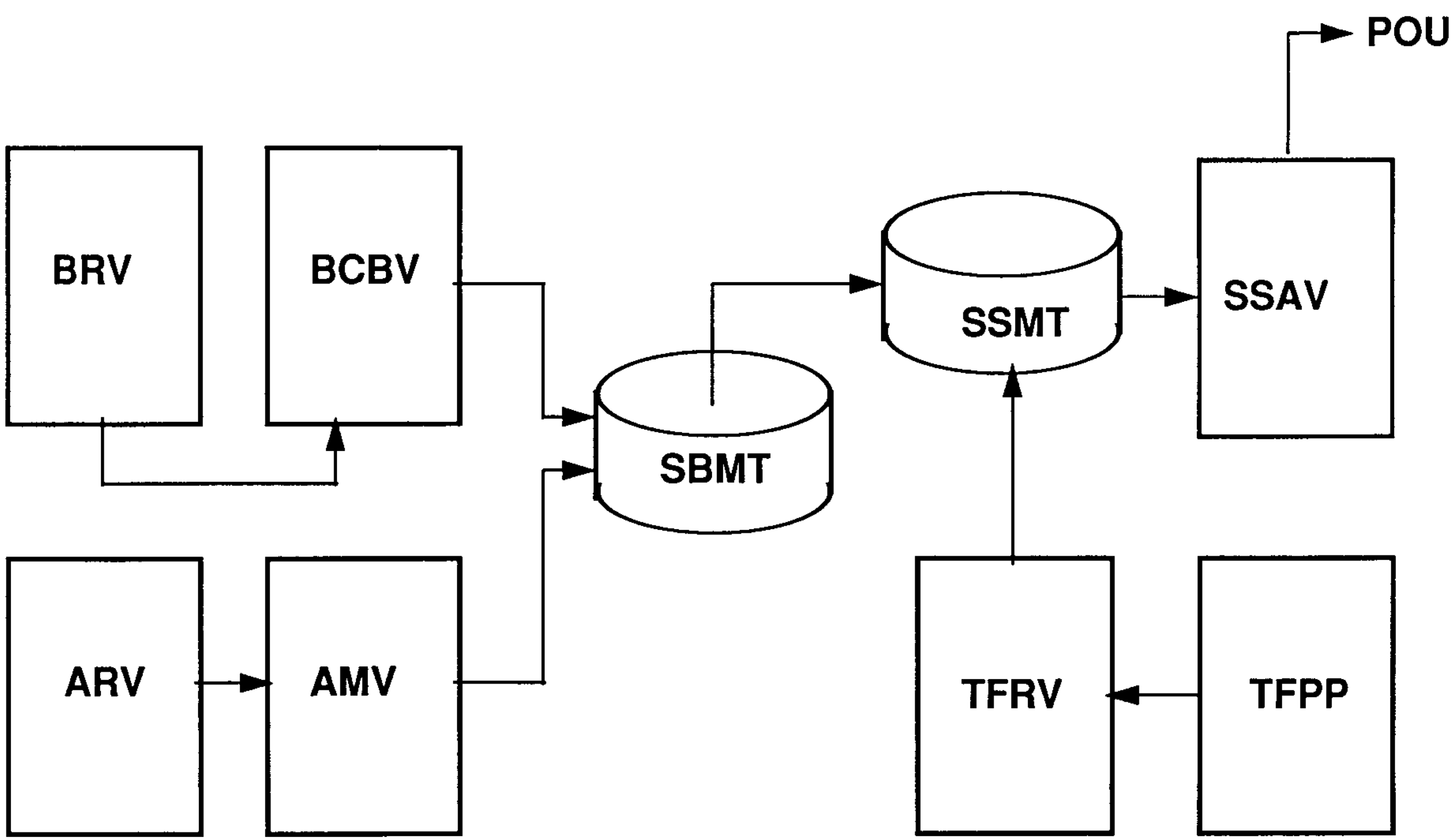
CONSOLIDATED WASTE GENERATION FACILITY



Simulated Waste For Tankage, Pretreatment, and Metalization Facilities Testing

CONSOLIDATED WASTE GENERATION FACILITY

PROCESS FLOW



CONSOLIDATED WASTE GENERATION FACILITY

SUMMARY

- BACKGROUND
- OBJECTIVES
- ORGANIZATION
- DOCUMENTATION
- PROCESS FLOW

APPENDIX I

TYPICAL FIELD REQUIREMENTS

I.1. Typical Field Requirements

I.1.1. Facilities

- Large Conference Room
  - Up to 30 team members plus the program/project personnel
  - Viewgraph projector and screen
  - Prefer tables and chairs for the team
  - Available for use by uncleared personnel from 8 AM to 9 PM
- Breakout Rooms
  - One breakout room per subpanel (5 total)
  - Breakout room for up to 6 subpanel members plus the program/project personnel
  - Available for use by uncleared personnel from 7 AM to 9 PM
  - Furnished with a white board and a flip chart and pens
- Team Leader Office
  - Small office with desk, conference table, and chairs
- Document Library
  - Copy of significant documents

I.1.2. Equipment

- Fax
- Telephone
- Copying Machine

I.1.3. Personnel

- Counterparts for Team and Subpanel Leaders
- Secretary - Library Clerk

I.2. Typical Review Documents

- DOE and Contractor Org. Chart with Names
- DOE Five Year Site Specific Plan
- Project, Program, and Capability Management Plans
- System Integration Plan
- DOE Justification For a New Project Start
- Project Applied Technology Plan
- Preliminary or Safety Analysis Report
- Project Functional Design Criteria
- Records of Decision
- Environmental Impact Assessment or Statement
- Project Functions and Requirements
- Project Functional Design Criteria
- Project Technical Data Package
- Project Conceptual Design Report
- Process Flowsheet
- Technical Information Exchange Plan

- Independent Evaluations of the Project, Program, or Capability
- Index to Company Policies, Procedures, and Practices
- Development Plans and Roadmaps

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APPENDIX J

REVIEW DOCUMENTS

AND DOCUMENT CONTROL

J.1. Typical Review Documents

- DOE and Contractor Org. Chart with Names
- DOE Five Year Site Specific Plan
- Project, Program, and Capability Management Plans
- System Integration Plan
- DOE Justification For a New Project Start
- Project Applied Technology Plan
- Preliminary or Safety Analysis Report
- Project Functional Design Criteria
- Records of Decision
- Environmental Impact Assessment or Statement
- Project Functions and Requirements
- Project Functional Design Criteria
- Project Technical Data Package
- Project Conceptual Design Report
- Process Flowsheet
- Technical Information Exchange Plan
- Independent Evaluations of the Project, Program, or Capability
- Index to Company Policies, Procedures, and Practices
- Development Plans and Roadmaps

J.2. Document Control

J.2.1. General:

- Application Used for Document database: ***(FileMaker Pro)***
- Font: Helvetica, 12 pitch

J.2.2. Database Fields:

- Control #:
- Title:
- Author:
- Document #/Rev.:
- Document Date:
- Originating Org.:
- Date Recv'd:
- Keywords/Topic:
- Format:

J.2.3. Document Numbering Sequence

All documents for a particular site (even if there is more than one IRT) are numbered consecutively beginning with #1. For example, all PUREX documents, whether requested by the Rocky Flats or Oak Ridge teams, have been numbered beginning with #1 and continue on.

The site will provide the documents for the Red Team Library. They will consecutively number each document to be included in the Library beginning with #1. The site will also provide a list which corresponds with these numbered documents for the Red Team's use which includes:

- Document date
- Document number
- Title
- Author

APPENDIX K

REVIEW TEAM

KICK-OFF PRESENTATION

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OUTLINE

- Basis
- Structure
- Integrated Systems Perspective
- ITR Team Structure
- Process
- Activities

BASIS FOR REVIEWS

Initiated by EM-1 in the Spring of 1991 to Provide —

- DOE-HQs with an Independent *Technical* Assessment for Use in
  - Key Decisions
  - Identification of Emergent Issues
  - Continuous Program Improvement

- A Systems Level Assessment of Program or Project
  - Science Basis
  - Engineering Practice
    - Process
    - Regulatory
    - Facilities
    - Management and Control

REVIEW STRUCTURE

- Individual Review Charters and DOE Team Leaders Approved by EM-1

- Ad-Hoc Team Members are:

Drawn From	Based on
National Labs	*Specific Technical Expertise*
Consultants	*Broad Technical Experience*
DOE Contractors	*Significant Practical Experience*
Private Industry	*Absence of Organization Conflict of Interest*
Universities	
DOE	

- A Core Support Group Provides

  The Review Process

  Training

  Facilities and Equipment

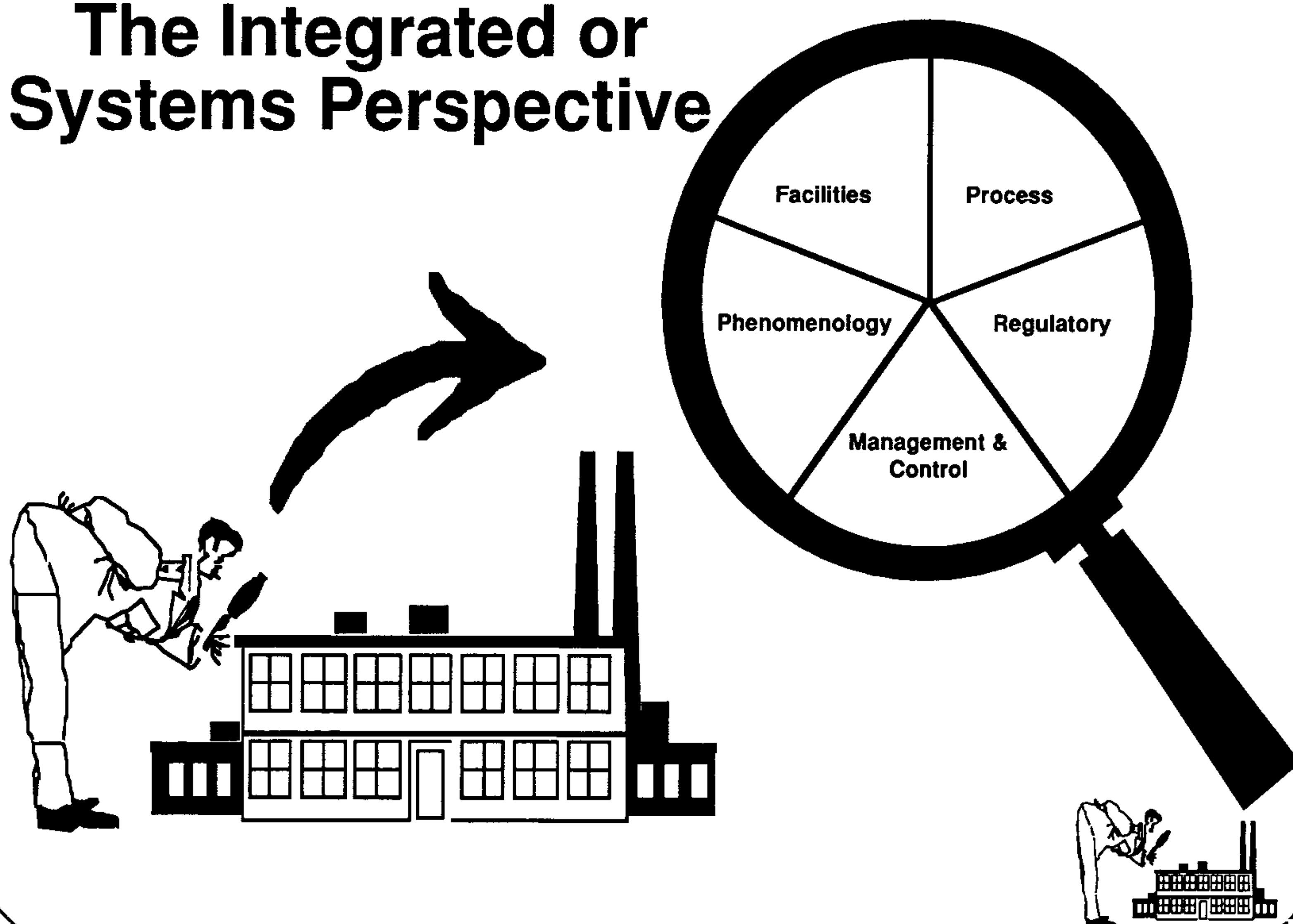
  Review Memory

- A Technical Oversight Board Critiques Review Activities

  Nationally Recognized Credentials

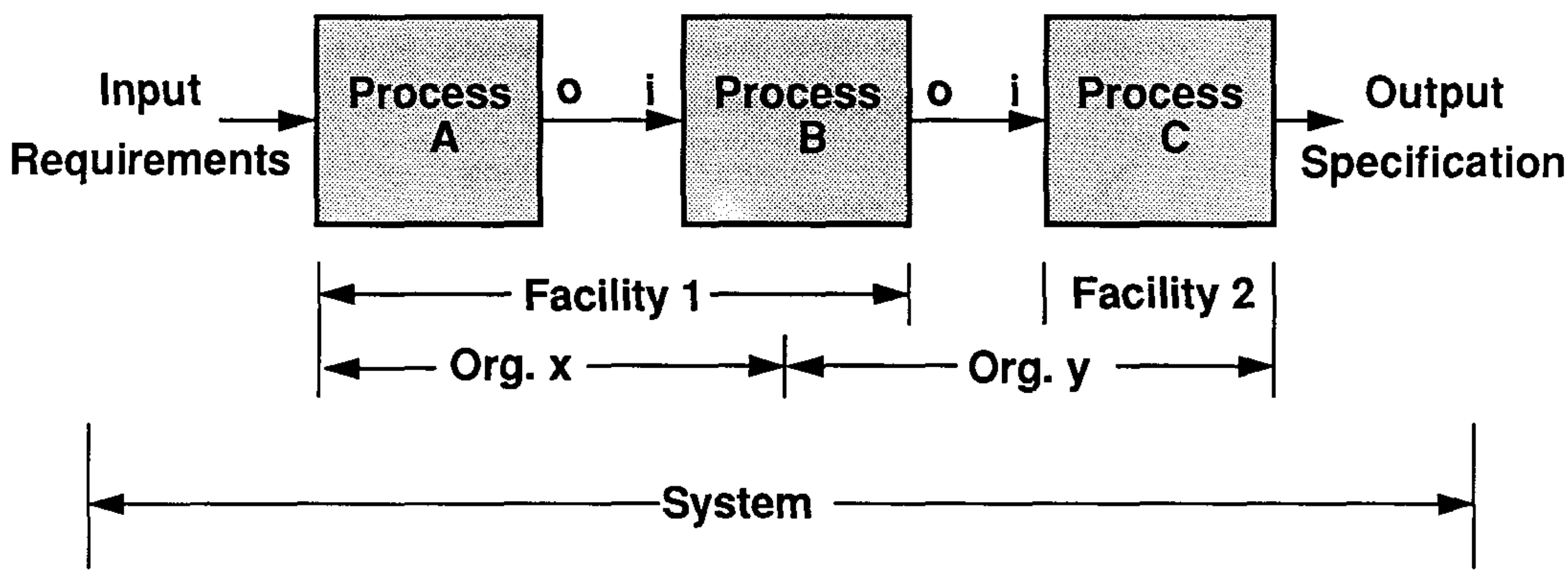
Independent Technical Review

The Integrated or Systems Perspective



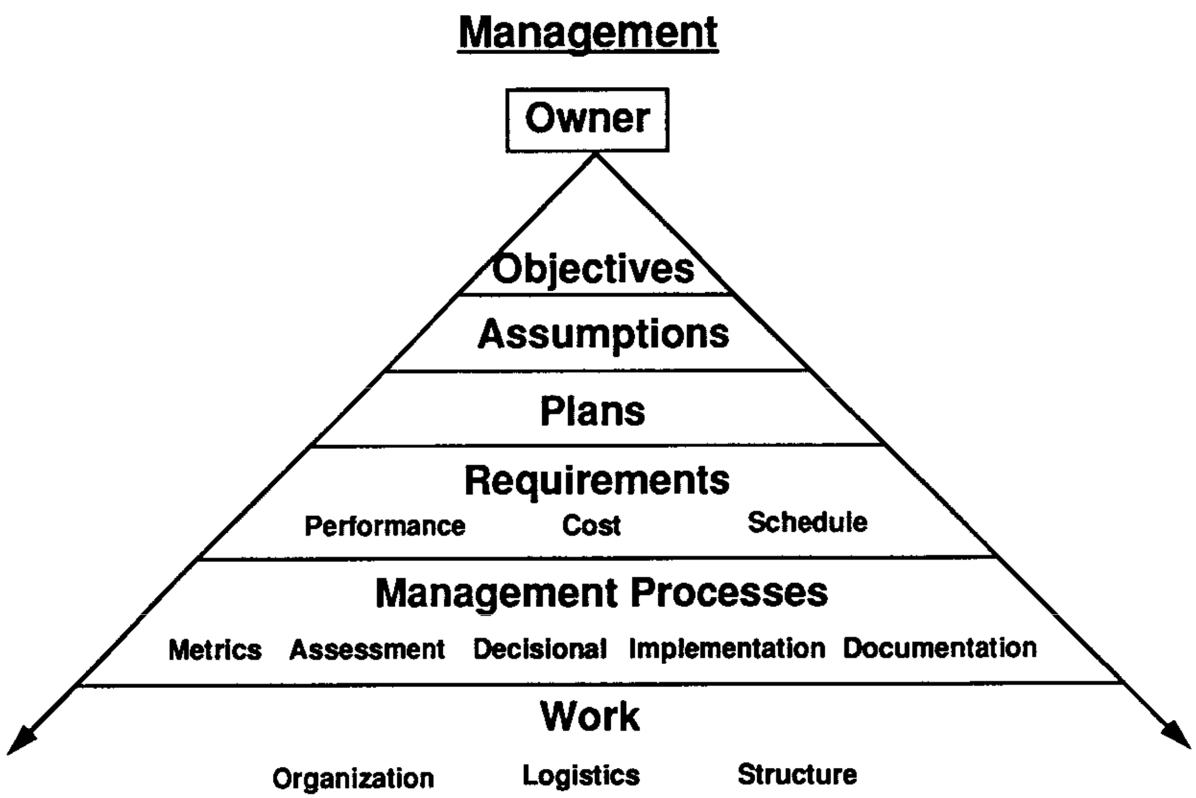
Systems Perspective

Physical



Audits, studies, and validations usually don't address the complete system

Integrated Perspective



Audits, studies, and validations usually don't address the integrated system

TEAM STRUCTURE

Program Secretarial Officer

DOE ITR Director

Core Group
- Process
- Facilities
- Systems

Assessment Team
- Phenomenology
- Process
- Facilities
- Regulatory
- Mgt & Control

Technical Oversight Board
- Edward Kintner, Chair
- Dick Baxter
- James Duckworth
- Bill Hamilton Sr.
- Colin Heath
- Mujid Kazimi
- Kermit Garlid

Independent Technical Review

TEAM STRUCTURE

PHENOMENOLOGY

Assesses the understanding of the relevant science

- **Science basis**
- **Status of support technologies**
- **Merits of emerging technologies**
- **Issues requiring further research**

TEAM STRUCTURE

PROCESS

Assesses the processes used to convert the input to the output, including the state of development, control, and production infrastructure

- Input/output specifications
- Process definition
- Alternative processes evaluation
- Control systems and methodologies
- Maintainability/reliability evaluations
- Equipment/hardware designs/specifications
- Waste and hazard minimization

Independent Technical Review

TEAM STRUCTURE

FACILITIES

Assesses the suitability of the site and buildings to support the activity

- Site suitability
- Building and subsystem design and layout
- Structural stability
- Subsystem isolation and containment
- Reliability and maintainability
- Environmental release control
- Security and physical protection
- Waste and hazard minimization

Independent Technical Review

TEAM STRUCTURE

REGULATORY

Ensure that relevant regulations and orders have been identified and incorporated into the activity plan and the operation

- NEPA
- Clean Air Act
- Clean Water Act
- RCRA
- TSCA
- CERCLA
- OSHA
- DOE orders
- State and local regulations
- ALARA
- Radiation protection

TEAM STRUCTURE

MANAGEMENT & CONTROL

Assesses if management has the structure, processes, and discipline to meet ES&H protection prerequisites while simultaneously meeting technical, cost, and schedule objectives

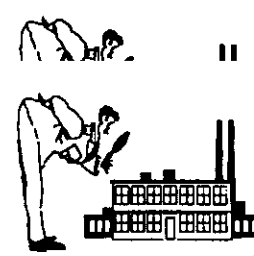
- System and project management
- Configuration control and management
- Systems integration
- Quality requirements
- Procedures and documentation
- Management processes
- Safeguards and security

TEAM STRUCTURE

Technical Oversight Board

Critiques the methods and activities of the Independent Technical Review support group and review teams to continuously improve the quality of the review processes and products. The Board is composed of permanent and ad-hoc members recognized in their respective fields as seasoned executives and/or technical experts.

- Safeguards and security



THE REVIEW PROCESS

- Charter Negotiated and Approved
- Initial Site Visit
- Staff and Train Team
- Prepare Review Plan; TOB Critique
- **Information Site Visit — Presentations, Tours, and Document Collection**
- Off-Site Analysis; Benchmark Other Sites/Activities
- **Detailed Site Visit — Interviews, Inspections**
- Develop Consensus Assessment; TOB Critique
- Brief EM; Site
- Finalize Report

REVIEW ACTIVITIES

FACILITY	STATUS
• Hanford Waste Vitrification System Review	Report Issued
• Hanford Site Tank Waste Disposal Strategy Review	Complete
• Hanford Tank Waste Goals Workshop	Report to Assistant Secretary
• Hanford Tank Waste Strategy Workshop	Results Presented to Secretary
• Hanford Tank Farm Operations Review	Report in Preparation
• SR Defense Waste Processing Facility Review	Report in Preparation
• Hanford PUREX Plant Safe Store Review	Draft Charter
• Hanford Solid Waste Review	Pending Site Funding in FY93

APPENDIX L

WORD PROCESSING/GRAPHICS FORMAT

L.1. **Title Formats**

CHAPTER TITLE 1

CHAPTER TITLE 2

CHAPTER TITLE 3

Chapter Titles are centered, 14 point, bold, capitalized. Three chapter title lines provide uniformity through the document, and should lead directly to an A-Level heading.

A.1. **A-level Subhead (the principal subhead)**

Subhead set on line separate from text; bold; 12 pt; number not underlined, period, tab, subhead underlined; only initial capital letters except prepositions and articles, with no period following title; 24 pts (2 single lines) below preceeding paragraph, 12 pts (1 single line) above following paragraph

A.1.1. **B-level Subhead (the secondary subhead)**

Same as A-level subhead except: 12 pts below preceeding paragraph, 0 pts above following paragraph

A.1.1.1. **C-level Subhead (run-in side head).** Same as A-level subhead except: period at end of title, 2 spaces, beginning of paragraph

(NOTE: subhead aspects derived from Chicago Manual of Style (1.58) and LANL style manual)

L.2. **Headers and Footers**

Header: 1st line="PREDECISIONAL DRAFT" (centered, bold, 14 pt);2nd line= automatic date stamp (centered, 12 pt);3rd line blank

Footer: 1st line blank; 2nd line=chapter page number (centered, 12 pt); 3rd line="PREDECISIONAL DRAFT" (centered, bold, 14 pt)

L.3 Format Settings

Character: 12 pt; Palatino; position normal; spacing normal

Paragraph: left justify; other aspects as specified in style

Section:

Document:

Margins: inside=1.5, outside=1.0, top=1.0, bottom=1.0

Mirror even/odd; widow control; even/odd headers

Footnotes: position=bottom of page, number from 1

Set file series during printing

L.4. Figures and Tables

Tables

Title: On pages separate from text. The word *Table* and the table number, an arabic figre, typed on a line above the table. The table title is typed on line below the number, with only initial capital letters except prepositions and articles, with no period following title. (Chicago Manual of Style, 2.23)

Figures

Title: **Fig. 1.2. Title**--Figure is abbreviated as Fig, period, 2 spaces, number, period, 2 spaces, title initially capialized with remainder in lower case, title placed below figure. (Chicago Manual of Style, page 35)

Text: In text, referred to in lower case type, number in arabic numeral. The word "figure" is spelled out unless the reference is a simple parenthetical one (fig.3). (Chicago Manual of Style, 11.8)

L.5. Macintosh Style Sheet

A standard style sheet is available with character,paragraph and bullet settings for direct application to any document.

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APPENDIX M

REVIEW PLAN FORMAT

AND EXAMPLES

M.1. Review Plan Function

The Plan Defines And Documents The Review Specific Detailed Structure, Process, And Lines Of Inquiry

The review plan serves the following functions:

- Is a driver for focusing the ITR team on the key review questions
- Is the basis for the TOB critique of the specific ITR approach
- Provides an "intent" reference during the process
- Communicates to the detailed ITR approach to the site management
- Is a bench mark for the assessment statements

M.2. Review Plan Structure

SECTION	PURPOSE	AUTHOR
• INTRODUCTION	The basis and authority under which ITRs are conducted	Team Coordinator
• STRUCTURE	A summary of the structure defined and approved in the HQs charter	Team Leader/Coordinator
• PROCESS	A summary of the basic ITR process and any charter mandated modifications	Team Leader/Coordinator

• LINES OF INQUIRY	Subpanel or task based central/key questions to be addressed during the review	Subpanel/Task leaders

M.3. PUREX Review Plan Example

Note that the formatting and numbering of the PUREX Review Plan documented in the DOE report has been preserved.

PUREX REVIEW PLAN

A.4 PUREX Review Plan

The PUREX Review Plan was prepared by the ITR Team before the first week of review at the site. It is based on anticipated site conditions. Some of the planned activities could not be completed because anticipated information did not exist.

A.4.a Introduction

Independent Technical Review (ITR) of Major Projects, Major System Acquisitions, and programs was established as an DOE-EM activity in a memorandum from the Under Secretary of Energy dated March 29, 1991 on the Status of the Hanford Waste Vitrification Plant. The DOE-EM ITR process was developed from this base.

In a June 1992 memo to John Wagoner, Manager - DOE Richland Field Office, Willis W. Bixby, Director - Facility Transition Planning Group, Office of Environmental Restoration and Waste Management, established an ITR of the PUREX (Plutonium-Uranium Extraction) Plant. The memo states the objective of the PUREX ITR, is to "perform a review of the PUREX Plant related to the transition from standby to shutdown". The Charter for the PUREX Independent Technical Review, Attachment 1, establishes the: (1) Mission, (2) Objectives, (3) Interfaces, (4) Task Description, and (5) Organization.

A.4.b Review Approach

The PUREX ITR will determine the state of PUREX end-states-requirements definition (D&D ready and shutdown), the planned technical, regulatory, and management path to that end state, and the barriers to reaching the end state. The PUREX ITR team will initially focus on understanding and assessing the existing transition-shutdown technical basis, strategies, planning, approach-implementation, and mechanisms for technical, regulatory, and management issues identification and resolution. The team will then investigate barriers to achieving the desired D&D ready end state. As appropriate, the ITR team will identify potential methods of barrier elimination and alternate paths to quickly and safely achieve minimum cost PUREX transition and shutdown. While the review is focused specifically on the PUREX plant, the ITR team will, if appropriate, make recommendations on broader, complex-wide implications.

NOTE: The ITR process does not encompass, nor the charter suggest, a compliance audit to laws, regulations, or DOE orders, a financial audit, or a cost validation.

In response to specific PUREX ITR Charter objectives, the ITR process and team will be structured to identify, review, and assess the Hanford and PUREX technical-regulatory-management approach and implementation in, at minimum, the following areas:

- Integration of PUREX plant, Tank Waste Remediation System (TWRS), Waste Receiving and Packaging (WRAP), Basins, Z plant, 242 Evaporator, and other ancillary facilities and activities
- Applicable regulations, codes, standards, DOE Orders, and OSR as well as technical operating specifications; cost effective, time-graded reduction of these requirements during PUREX transition and shutdown
- Hazardous materials and process equipment clean-out criteria and basis
- Safety risks, source term inventories, and associated surveillance requirements
- National Environmental Protection Act (NEPA) compliance requirements.
- Technical, regulatory, and management issues identification and resolution.
- Hanford support infrastructure needs and costs during the transition and after shutdown.
- Scope-Budget-Schedule management.

In response to specific PUREX ITR Charter tasks, the process and team will be structured to provide an assessment of Hanford's analysis, approach, and implementation of:

A.4.b.1 <u>Technical Issues</u>

PUREX transition - shutdown technical strategy, planning, plant activities, requirements, and end point criteria.

Technical codes and standards applicable to the transition and shutdown plant, per the DOE-EM DNFSB 90-2 approach.

Technical issues that might inhibit time-graded application or elimination of codes and standards.

Other technical barriers and potential solutions.

Radiological and hazardous material characterization data, plans, technical documents, procedures and photographs needed for transition, shutdown, and decommissioning.

A.4.b.2 <u>Regulatory Issues</u>

Regulatory requirements, codes, standards, and DOE SARs/OSRs impacts on transition to and shutdown.

Policy issues and future rule making, which might inhibit time-graded application or elimination of codes and standards.

Safety documentation needs for the decreasing safety envelop; the minimum acceptable, cost effective level of safety documentation and change control.

NEPA strategy and documentation.

Other regulatory issues and potential solutions.

A.4.b.3 <u>Management/Planning Issues</u>

PUREX strategy, planning, and implementation

Facility and site conditions, institutional, labor/resource, infrastructure, and other potential conflicts or restraints

Management/planning issues and potential resolutions.

Budgets, cost and schedule performance reporting framework, contingency allowances, budget realism, management's capability to manage cost, schedule and technical risk, and other performance limitations.

A.4.c <u>Review Process and Structure</u>

The PUREX ITR will use the process developed for past reviews and documented in the Independent Technical Review Handbook, July, 1992 issue. The standard ITR team structure has been modified from the phenomenology - process - regulatory - facilities - management subpanel organization to a technical - regulatory - management task structure. Coordinators will be designated for each task assessment, however, due to the interdependence of the tasks, individual team members will not be assigned to one task but will be expected to contribute to all task assessments.

The review team will consist of a Team Leader, a Team Coordinator, nine team members and support personnel. The team members, affiliation, and expertise are:

•	Phil Thullen	LANL	Team Leader
•	Deborah Bennett	LANL	Team Coordinator
•	Fred Carlson	Consultant	DOE Orders, OSRs, Regulatory
•	Pete Davis	PRD Cons.	Risk Assessment
•	Bob Keel	WVNS Co.	D/D, Mgt, Ops, Maintenance
•	Tom LaGuardia	TLG Eng.	D/D Financial
•	Boris Rosev	LANL	Investigator
•	George Toto	Consultant	OSRs, Waste Ops, D/D,
•	Doug Weaver	SNL	System Mgt, Integration
•	Stephen Wiegman	SAIC	Regulatory
•	Lyle Zahn	Consultant	Canyons, TPA, Regulatory

The ITR assessment will be developed by the team leader and members as a consensus document. As required, the team will call upon expert consultants for supporting information, but the consultants will not be involved in development of the consensus assessment.

The PUREX ITR review plan and assessment will be critiqued by a Technical Oversight Board (TOB) composed of senior level individuals who have extensive experience in the development, execution, management, and evaluation of large and technically involved projects. The TOB provides a solid experience reference against which the ITR Team can test its lines of inquiry and the logic and validity of the assessment conclusions. The Board will function as a check to assure that the scope and depth of the science and engineering review is adequate to achieve the charter objective, and to assure the proper systematic evaluation of the activity. The Board also will examine the results of the review to assure internal technical consistency and to confirm that findings are supported with sufficient information.

Initial preparation for the review will be carried out by the Team Leader and the Team Coordinator. This will include: team mobilization, initial site visits, initial document requests, and preparation of the draft review plan with subsequent presentation to the Technical Oversight Board.

Team members will be involved in three basic activities: (1) preparation for the review, (2) the review process, and (3) assessment consensus and documentation. Preparation for the review will include two days of ITR process training, per the ITR Training Handbook, finalizing the draft review plan, discussion of the ITR process application to the PUREX review, and review of available documentation. Preparation also may involve visits to other relevant sites such as nuclear facilities that have been shutdown.

The review process has three elements: 1) a week of on-site informational briefings and discussions, (2) an off-site analysis period, and (3) a week of detailed on-site investigations and validations. During the first on-site week the team listens to information presented by the site and asks questions of clarification and understanding. During the second on-site week the team fully develops answers to the review plan lines of inquiry through detailed discussions and investigations. Additional visits, phone conversations or other communication may be required to address specific issues that arise during the assessment report preparation.

Report preparation will begin during the assessment. An executive summary will be prepared by the team, working at Los Alamos or Sandia immediately following the second-detailed on-site visit, and sent to DOE Headquarters, and the TOB. The full draft report will be compiled by the Team Leader and Team Coordinator based on subsections drafted by team members. The report will be reviewed for factual errors by the site, and corrections made as necessary.

During the review, the team will meet in private to integrate observations, consider the progress of the review, and make revisions of the review plan. Revisions of the review plan may require changes in presentations, tours, or discussions planned by DOE-RL or WHC.

A.4.d Review Schedule

Team Training and Preparations	July 7 - 10
Informational Site Visit	July 13 - 17
Team Discussions; Benchmarking	July 20 - 31
Investigative Site Visit	Aug. 3 - 7
Develop Consensus Assessment	Aug. 10 - 14
Assessment Presentation to DOE-HQs	Aug. 25
Assessment Presentation to The Site	Aug. 27

Draft Report Issued	Sept. 8
Report submitted to DOE-HQs	Oct. 6

A.4.e **Lines of Inquiry**

A.4.e.1 **Technical Issues**

For each PUREX phase:

- transition
- D&D ready shutdown
- shutdown with restart option as it impacts preparation for transition to D&D ready

The review will focus on the deactivation strategy and planning:

- current and projected requirements
- the technical basis
- and data base (program baseline) for:
    - characterizing
    - immobilizing
    - retrieving
    - treating
    - handling and disposition (disposal, storage, and/or shipping) for the:
        - canyon building, ancillary facilities, and tunnels
        - process equipment
        - process materials.
        - hazardous and radioactive wastes (current and to be generated)

Each area will be assessed based on the review criteria of:

- A technically defensible basis for safe, quick, minimum cost transition to shutdown or a D&D ready state.

- Timely, proactive identification and resolution of technical barriers
- Proactive evaluation of alternate approaches and solutions

In addition the team will consider the DOE complex implications of the PUREX transition-shutdown technical assessment; i.e., UO3 plant impact

Examples of generic issues that will be addressed by this subgroup include but are not limited to:

A Safety and health of workers and the general public

B. Shutdown or D&D ready technical requirements

C. Technical basis for the clean-out requirements

D. State of technology to support the clean-out process

E. Historical process and facility knowledge base

F. Technical codes and standards

G. Selection of clean-out process technology

H. Clean-out waste and waste stream requirements

I. Shutdown-D&D ready technical issues

J. Shutdown maintainability and reliability issues

K. Hazardous materials isolation/containment

L. Waste minimization

M. Safety/hazard - minimization

N. R&D requirements

O. Environmental impacts

P. DNFSB 90-2 approach

Q. Waste disposition

R. Contaminated equipment disposal

S. Future rulemaking issues

T. General

A.4.e.2 Regulatory Issues

For each PUREX phase:

- Transition
- Shutdown with restart option
- Deactivation

The review will focus on the understanding of and planning for time-phased, cost effective reduction of:

- regulations
- codes and standards
- DOE Orders
- requirements, without compromising:
  - safety
  - health
  - the environment

and without potential for regulatory violation.

Each will be assessed based on the review criteria of:

- A realistic, defensible regulatory basis for safe, timely, minimum cost transition to shutdown or a Deactivation state.
- Timely proactive identification and resolution of regulatory requirements
- Identification and resolution of self-imposed or artificial barriers
- Proactive evaluation of alternate approaches and solutions

In addition the team will consider the DOE complex implications of the PUREX transition-shutdown regulatory assessment

NOTE: The regulatory team line of inquiry does not include a compliance audit for regulations and DOE Orders.

Examples of generic issues that will be addressed by the subgroup include but are not limited to:

- Regulatory and DOE Order criteria
- Documentation and Data
- Radiation protection
- As Low As Reasonably Achievable (ALARA) requirements
- National Environmental Policy Act
- Clean Air Act
- Clean Water Act
- Resource Conservation and Recovery Act
- Comprehensive Environmental Response, Compensation and Liability Act
- Occupational Safety and Health Act
- Toxic Substance Control Act
- DOE Orders
- Risk Acceptance Criteria for Workers and Public
- Federal Facility Compliance Agreements
- State and Local Permits
- Safety Analysis Report
- Operational Safety Requirements
- Agreements With DNFSB
- Issues With the Office of Nuclear Safety

A.4.e.3 Management /Planning Issues

- The PUREX management lines of inquiries are:
  - Is the scope, cost, and schedule basis for the PUREX standby program sound and justifiable? How has actual work performance tracked the plan?

- What strategies have been formulated and what processes and activities will be required to develop the deactivation plan? What activities have been initiated?

- Have the deactivation program schedule and budget bounding cases been evaluated? Has the reallocation of existing resources been evaluated as a means of reducing total cost.

- What management processes are used to identify and resolve emergent issues in a timely, cost effective manner? How have these processes been used during the PUREX transition?

- The review will focus on the:

  - assumptions used in developing base cost estimate and schedule
  - adequacy of the radiological characterization to prepare estimates
  - base cost estimate and basis of costs
  - contingency analyses for each major activity
  - analysis of risks and risk mitigation
  - risk analysis of cost variability
  - cost - benefit analysis of alternatives
  - basis for the determination of the schedule
  - institutional and site constraints and barriers
  - infrastructure support requirements and loads justifications
  - cost estimate reporting format for traceability and project control - WBS

- The review will be based on an analysis of:

  - major project objectives and assumptions
  - approach, strategies, and plans
  - detailed activity descriptions for staff and operating crew

- assessment of manloading levels for assigned/necessary activities
- management staffing levels
- relationship of staff -to- operating crew ratio
- union work rule agreements and interpretation of those agreements
- collateral costs of energy (power, lighting, HVAC)
- supporting detailed cost estimate documentation
- supporting schedule documentation
- data base reasonableness to support estimate - historical vs. allowances
- implementation history and issues to date.
- the impact of award fee criteria on program planning.

• Each will be assessed based on the review criteria of:

  - sound management practice, planning, and implementation basis for safe, quick, minimum cost transition to shutdown or a D&D ready state.
  - timely, proactive identification and resolution of management and institutional barriers
  - pro-active evaluation of alternate approaches and solutions

In addition the team will consider the DOE complex implications of the PUREX transition-shutdown management assessment

NOTE: The management/planning team line of inquiry does not include an audit for DOE Orders, financial practices or validation, or quality compliance

Examples of the generic issues that will be addressed by the task group includes but are not limited to:

• Shutdown -D&D ready requirements

• Availability of historical-basis expertise

- Strategies and planning
- Scope, schedule, and cost management
- Risk Management
- Management processes
- Integration with down stream waste programs
- Operational procedures

A.4.f **Review Questions**

A.4.f.1 **Technical Questions:**

A. Safety and health of workers and the general public

1. To what extent have risk assessments been performed or planned to characterize facility risk during shutdown?
2. What radioactive materials (quantity and type) will exist after shutdown and what is the basis for allowing this material to exist in the shutdown condition?
3. Which group is responsible for safety during transition to shutdown and how do they interface with and control activities of other groups?

B. Shutdown or D&D ready technical requirements

1. What is the scope and status of the PUREX plant transition to D&D ready?
2. Have the technical criteria the facility must meet for shutdown or D&D ready condition been defined, documented, and approved?
3. Has the time between shutdown and D&D been established?
4. What technical assumptions were made with regard to the degree of radioactive/hazardous materials clean-out and the removal of process equipment and materials of the plant?
5. Are the assumptions technically sound based on the review criteria?

C. Technical basis for the clean-out requirements

1. Is there an established technical basis for the cleanout requirements?

D. State of technology to support the clean-out process

1. Is the clean-out technology and process based on available, cost effective commercial technology, equipment, and materials?

2. Has the clean-out technology and process been adequately proven within the DOE complex?

3. Has the clean-out technology and process been externally reviewed?

4. Have they applied lessons-learned from the rest of the complex (to avoid re-inventing solutions)?

E. Historical process and facility knowledge base

1. Is there an adequate historical record of operating systems and equipment?

2. Is there an adequate historical record of operating upsets and clear definitions of known problem areas from these upsets?

F. Technical codes and standards

1. Have technical codes and standards been appropriately used in the development of the technical plan and process for clean-out and shutdown of the plant?

2. Has the time-graded reduction of code requirements been adequately considered?

3. Are there technical codes and standards currently under consideration which might impact the clean-out or shutdown?

4. Has there been interface with industry codes/standards?

G. Selection of clean-out process technology

1. Have process description and flow sheets been developed for the immobilization and removal of the hazardous waste from the canyon and tunnels?

2. Have all appropriate methods for removing or immobilizing the hazardous materials and wastes from the canyon and tunnels been considered?

3. Which method appears to have the greatest potential for working on a safe, timely, cost effective, and continuous basis?

4. Has any test or development work been devoted to this issue?

5. Has the chemistry important for removal processing been established and have material compatibility issues been identified?

6. Have the parameters important for clean-out process control been identified?

7. Are measurement techniques and sensors to handle these parameters been developed and demonstrated?

8. Is the equipment necessary for hazardous wastes clean-out and recovery of process equipment, materials commercially available?

9. Has testing been carried out to confirm the effectiveness and reliability of the equipment?

10. Have the requirements and options for equipment dismantlement and removal from the facility been considered?

11. If process vessels are to be removed while containing high-level radioactive waste, how will they be handled and where will they be stored?

12. Is the clean-out and shutdown technical plan and process been evaluated against commercial experience?

H. Clean-out waste and waste stream requirements

1. Is the knowledge of the composition and constituents of the hazardous materials and wastes (solids, liquids, and gases) sufficient to define effluent storage and treatment?

2. Are there specific constituents that must be removed from the waste and waste streams to prevent problems?

3. What are the expected volumes and activity levels of hazardous and radioactive wastes that will be generated during clean-out operations?

4. Have these quantities been identified to Waste Tank Facility (WTF) operations?

5. Do these estimates include the new liquid wastes to be generated during the process?

6. Have clean-out tank-waste-volume projections been developed in a comprehensive and technically defensible manner that adequately supports decision making within the tank waste system?

7. What interface issues have been identified between the upstream PUREX waste generator, and downstream waste tanks and solid waste programs; how have these issues been resolved?

8. How will clean-out equipment be dispositioned after the PUREX clean-out is completed?

9. Does contingency planning exist to respond to unexpected decreases in treatment/disposal capacities or increases in waste volume input or both?

I. Shutdown-D&D ready technical issues

1. What shutdown-D&D ready technical issues have been identified to date? Is there a timely, cost effective plan for their resolution?

2. What other emergent technical issues might be encountered?

3. Have new, different resource needs and/or retraining issues been addressed?

J. Shutdown maintainability and reliability issues

1. What level of analysis and planning has been devoted to the issue of maintenance and repair support facility subsystems during long term facility storage?

2. Will the approach result in a safe, cost effective solution?

3. Has the physical and functional condition of existing equipment been documented?

4. Will any critical support systems need to be overhauled or replaced during the shutdown period?

5. Is the current maintenance program, organization, and planning adequate or required for safe transition to shutdown?

6. What metrics, systems, information, and documentation are being used to measure, track, assess, and report the physical and functional status of existing subsystems, tanks, piping, equipment, and instrumentation?

7. Are they adequate or required to insure safe, minimum cost operation of the facility during transition to safe storage?

8. Is contingency planning for equipment failure adequate for:

   - Critical equipment, utilities and subsystems

   - Back up systems for critical system components

9. Is maintenance department organizational structure and staffing adequate?

10. Is maintenance responsive to operating needs?

11. Is maintenance qualifications and training adequate?

12. Is prioritizing and scheduling maintenance activities adequate?

13. What if any additions, modifications, and retrofits are being considered to improve PUREX shutdown condition; and when; and are they technically justifiable?

K. Hazardous materials isolation/containment

1. What approach has been taken to provide for double containment of all processes that are handling hazardous material?

L. Waste minimization

1. Are the clean-out processes engineered to minimize the amount of wastes produced?

2. Would alternate technology produce less waste?

M. Safety/hazard - minimization

1. Are industrial safety measures adequately addressed?
2. Have fire protection issues been addressed?
3. What emergency requirements for the facility operation have been considered?
4. Which utilities, such as power and water supply, must be maintained under emergency conditions?
5. Which subsystems must be maintained operational in an emergency operation?
6. What ventilation systems modifications or impacts are identified?

N. R&D requirements

1. Are there any unique R&D efforts that need to be undertaken to support the transition to D&D ready?

O. Environmental impacts

1. Have potential environmental impacts been taken into consideration?

P. DNFSB 90-2 approach

1. Is the approach for transition to D&D-ready consistent with the DOE-EM DNFSB 90-2 philosophy?

Q. Waste disposition

1. Is there adequate knowledge of the composition and quantity of the radioactive/hazardous materials and wastes?
2. Is there an understanding of the level of uncertainty in the composition?
3. Are the estimates of composition and constituents based on calculations and historical records or are they the result of sampling and analytical measurements?
4. Have all potential sources been identified?

5. Is there reasonable knowledge of the physical characteristics of the waste important to the process of removing the waste from the canyon and tunnels?

6. Is there a reasonable understanding of the degree of uncertainty or variability of the composition and physical properties of the waste?

7. Are the various phases (solids, liquids, and gases) in the canyon and tunnels understood?

8. Are their physical characteristics known?

9. Has adequate consideration been given to monitor gas generation, including radon, temperature, volume levels, and other internal conditions within the canyon during clean-out?

R. Contaminated equipment disposal

1. Has adequate consideration been given to final disposition of removed contaminated equipment?

S. Future rulemaking issues

1. Have the impacts of potential future rulemaking issues been considered in developing the shutdown/deactivation plans?

T. General

1. Are technical interfaces required with remaining Hanford utilities, facilities identified? (LERF, 242 evaporator, etc.)

A.4.f.2 Regulatory Questions:

A. Regulatory and DOE Order criteria

1. Have the applicable regulatory requirements and regulations been identified; and are they understood?

2. What is the defined scope of the facility. Have the regulatory criteria the facility must meet for transition, shutdown, or D&D ready condition been assessed, documented, and approved? Has the time between shutdown and D&D been estimated? What assumptions were made with regard to the condition of the plant at various stages?

3. Have the regulatory requirements been translated into clean-out process design criteria, operational procedures, waste generation and/or facility policies? Have the criteria, procedures, and policies been implemented at the working level; and have the permits been obtained where required by regulations?

4. Have any agreements between DOE and NRC been made which could impact clean-out operations?

5. Has WHC identified the applicability of state and federal regulations and the current status of compliance with these regulations. In addition, where notices of violations under existence permits or notice of deficiency under permit applications received.

6. Have regulatory and DOE Order requirements applicable to clean-out operations and shutdown/D&D- storage been evaluated to determine how they can be applied in a time-graded manner; how they affect policies, safety, schedules, costs, procedures, and practices at the facility.

7. Is the regulatory and DOE Order implementation justifiable from a environment, safety, and health standpoint and from a cost effectiveness perspective?

B. Documentation and data

1. Are existing hazardous waste data and proposed programs to obtain new data to characterize the waste and the sampling and analytical facilities associated with the characterization program adequate and justifiable.

2. Are the radioactivity levels in waste products acceptable for disposal?

3. What is known (and what not known) about the specific composition of the canyon and tunnels?

4. What criticality analyses have been carried out for plant operations?

5. What gaseous releases of radioactive materials are projected to occur during clean-out operation? During abnormal events? What dose models have been employed for accidental releases of radioactivity?

C. Radiation protection

1. What evaluations of radiation exposures during clean-out operation have been undertaken?

2. What accident conditions have been evaluated? What are the radiological consequences of the analyzed events? Are the consequences acceptable or overstated? Is there a high potential for accidents that could produce occupational radiation exposures? Are the analyzed accidents appropriate and bounding? What man-REM and individual radiation exposures are projected for occupational employees? What clean-out operations will produce the major exposures?

3. What approach has been taken with respect to process design for worker radiation protection?

4. What is the off-site man-REM exposure rate (and accumulated man-REM) associated with normal operation? What dose models were employed to make this assessment?

5. What radiation exposures are anticipated during the removal and transfer of radioactive process equipment and material from the plant and tunnels?

6. Is alternate future use of the facility congruent with the potential radiation exposures and risks to clean-out the facility for that use?

7. Do the safety analyses consider all credible accident scenarios that may arise from the clean-out processes.

D. ALARA requirements

1. Has an ALARA review been undertaken for the clean-out operation? What are the results and conclusions? Have ALARA concepts been incorporated in the process design?

E. National Environmental Policy Act

1. What is the WHC implementation of the NEPA process under DOE Order 5440.1C with emphasis on identification of ways to reduce the time and expense required to comply with NEPA requirements.

F. Clean Air Act; Clean Water Act; Resource Conservation and Recovery Act; Comprehensive Environmental Response, Compensation and Liability Act; Occupational Safety and Health Act; Toxic Substance Control Act

1. Do the change in PUREX status have any potential for re-opening the EIS process (and thereby further perturbing the plant shutdown schedule?)

2. Have interim environmental compliance assessments been conducted since the publication of the SAR which would influence the transition?

3. If the grouted low-level waste forms fail to meet NRC acceptance criteria, have adequate engineering contingencies (for waste storage or reprocessing) been made to sustain plant clean-out operations until the regulatory issues have been resolved?

G. DOE Orders

1. What is the status of compliance with DOE 5400 and the DOE 5800-series Orders with emphasis on the NEPA Order 5440.1C and Waste Management Orders 5400.3 and 5820.2A, Radiation Protection, Orders 5400.4 and 5400.5 Technical Safety Requirements. Has the interconnections of these orders with shutdown facilities and the evolving regulatory requirements and inter-agency agreements (TPA) been explored and assessed.

2. What have been the results of past audits by WHC (such as self-assessments), Unusual Occurrence Reports (UORs), and external audit reports?

3. What is the WHC implementation of Waste Management in conformance with the requirements of DOE Order 5820.2A.

G. Risk Acceptance Criteria for Workers and Public

1. What DOE and other agency requirements related to radioisotope releases, exposure doses or radiation protection must be met during plant clean-out operation?

H. Federal Facility Compliance Agreements

1. Does the Tri-Party Agreement appear to be having any influence on evolving plant shutdown, particularly on RCRA or CERCLA compliance issues, or on the plant stack filtration and monitoring requirements?

2. Could pending Environmental Protection Agency (EPA) or State of Washington actions pose an issue to PUREX plant shutdown?

3. What analyses have been carried out on the consequences of potential fires that could occur during clean-out or shutdown storage?

I. Regulatory Aspects in Final Deactivated State

1. Effluent streams

2. Permits

3. Migration of materials or contamination

4. Continuing streams such as in leakage, runoff, and service functions

5. Fire protection

6. Ventilation systems

7. Shutdown surveillance, including operational, radiological, and environmental

A.4.f.3 <u>Management Questions</u>

A. Standby and deactivation requirements

1. What is the scope of the PUREX facility; what other ancillary facilities are no longer required when PUREX is shutdown?

2. What other ancillary facilities are needed to support shutdown? Waste disposal tankage capacity, processing capability to remove residual fuel, special tooling to remove spilled fuel rods, special processing to neutralize, solidify and dispose of spent solvents, and repairs or special maintenance to equipment to maintain facility in safe, environmentally acceptable manner?

3. What are the criteria the facility must meet for shutdown or D&D ready condition? Has the time between shutdown and D&D been estimated? What assumptions were made with regard to the degree of clean-out for the hazardous materials and process equipment and materials of the plant; with regard to schedules and funding? How were the

requirements and assumptions internally and externally validated and approved?

4. What management processes were used to define and select the clean-out treatment system elements, baseline technology to satisfy these requirements? What assumptions were made or required? What external search was made to evaluate and select the cleanout technology , such as West Valley or Savannah River? What internal process was used to internally and externally validate these selections?

B. Strategies and planning

1. Are the PUREX transition and shutdown or D&D ready planning and strategies based on safe, quick, minimum cost, and sound business principles?

2. What is the basis for validating the aforementioned strategies?

3. Are modifications to the plans and strategies feasible which would significantly reduce the time or funding required to reach shutdown? Were these plans and strategies demonstrated at other facilities? What are the barriers to these modifications or alternate approaches? Have the alternative approaches been successfully demonstrated at other facilities?

4. What is the management track record on carrying out plans and strategies?

C. Scope, schedule, and cost management

1. What are the major assumptions used in the development of the base cost estimate and schedule? How do these relate to the overall project objectives?

2. Has a detailed "bottoms-up" estimate been prepared for each alternative? Does the "bottoms-up" estimate start with an identification of the activities and tasks to be performed, the resources of manpower , equipment and materials needed and necessary and appropriate management staffing levels to provide only those activities identified for the project.

3. Does the estimate include detailed activity descriptions for staff and crew which justifies their need on the project? For each of these activity descriptions, has the necessary and

minimum manpower loading been estimated? Has a comparison been made of the staff-to-crew ratio for this project to other projects of similar scope and difficulty? Do the crew loadings represent "traditional" or typical union labor agreements as to work rules and crew size?

4. What is the definition of "contingency" as used in the cost estimate? What elements are included - emissions or errors in the estimate, allowances, regulation changes, engineering changes, schedule slippages, scope changes, inflation, escalation, field technical problems including equipment breakdown, industrial accidents, weather or other factors? Have these factors been separately assigned contingency percentages? What is the technical basis for assigning these percentages? Has an independent review been performed as to the reasonableness of these percentages? Is there any on-site track record of similar contingency percentages? Are there also "internal contingency" factors used in the estimate such as allowances for unknowns? Are these contingency elements separable from the estimate?

5. Has a risk analysis been performed on the major elements of contingency , particularly with respect to inflationary factors or escalation factors? Examples might include the cost for on-site or off-site disposal of chemical hazardous and toxic or radioactive wastes?

6. Have cost-benefit analyses been performed of the alternatives for each of the major potential problem areas identified in the estimate?

7. What is the basis for the calculation of schedule? Was the schedule "backed-into," or developed from a "bottoms-up" approach? Were the elements of labor availability and safety to workers included in the utilization of the maximum number of work crews needed to perform the identified activities?

8. Were the institutional barriers of labor union agreements a major concern in the development of the crew size and productivity?

9. Has the cost estimating format been reviewed with respect to traceability of budget and schedule cost controls? Is there sufficient detailed breakdown to track each major task as to labor, materials, equipment and consumables?

10. What collateral costs are accounted for in the estimate, such as power, lighting HVAC, etc.

11. Is the data base used in the estimate based on historical data on-site, or on estimates and allowances judged "reasonable" by the estimating staff?

12. What has been the track record of the staff to meet budget and schedule commitments on prior major projects?

13. What management and planning issues have been identified to date? Does an adequate, justifiable plan exist for their resolution? What other emergent management issues may be an issue during the transition and shutdown phase?

14. What other management and planning limitations may impact the transition and shutdown?

D. Risk Management

1. What are the key risks associated with the clean-out and shutdown-storage? How was each risks defined/determined? What assumptions were required? How were the risks validated and prioritized?

2. What contingency planning has occurred in anticipation of waste treatment system problems? What is the cost of each contingency scenario?

3. What is management's track record on recognition and resolution of institutional, programmatic, and technical risk?

E. Management processes

1. How are the PUREX transition participant's roles, responsibilities, and accountabilities defined and implemented? What metrics are used to assess performance?

2. What are the formal and working relationship and communication channels among the program and project participants?

3. Within and across organizational activities, how are issues identified and addressed, decisions reached, and conflicts resolved?

4. Integration with down stream waste programs

5. Are clean-out process-engineering planning and activities integrated with Tank Farm operations and WRAP?

F. Operational procedures

1. Are day-to-day operations performed according to technically sound, practical, and monitored practices that ensure safe conditions at all times? Have engineering analysis been performed of what practices are required for shutdown?

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APPENDIX N

BENCHMARKING PROCEDURES*

N.1. Benchmarking Defined

There are several bases on which to define benchmarking as an activity. Benchmarking has a formal definition which has wide application to all business functions. Webster's definition is also informative. Perhaps even more important is the need for a working definition.

N.1.1. Formal Definition

The formal definition was derived from experience and successes of the earliest days of applying benchmarking techniques in the manufacturing area:

> *Benchmarking is the continuous process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders.* (David T. Kearns, chief executive officer, Xerox Corporation)

There are several considerations in this definition requiring further description.

Continuous process. Benchmarking is a self-improvement and management process that must be continuous to be effective. It cannot be performed once and disregarded thereafter on the belief that the task is done. It must be a continuous process because industry practices constantly change. Industry leaders constantly get stronger. Practices must be continually monitored to ensure that the best of them are uncovered. Only those firms that pursue benchmarking with discipline will successfully achieve superior performance. In an environment of constant change complacency is fatal.

Measuring. The term benchmarking implies measurement. Measurement can be accomplished in two forms. The internal and external practices can be

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* This text taken from Benchmarking: The Search for Industry Best Practices That Lead to Superior Performance, by Robert C. Camp (Xerox), ASQC Quality Press, ISBN: 0873890582, 1989, pgs. 10-21, with the permission of the publishers Quality Resources, White Plains, NY and ASQC Quality Press, Milwaukee, WI.

compared and a statement of significant differences can be documented. This is a word statement measurement of the industry best practices that must be implemented to achieve superiority, although qualitative in nature. It describes the opportunity for change to best practices.

The practices can be quantified to show an analytical measurement of the gap between practices. It quantifies the size of the opportunity. This metric is often the single-minded measurement that most managers want. While it is important and traditional to strive to obtain analytically derived benchmark metrics, it will become apparent that both must be pursued. Practices on which the metrics are based should be pursued first. Benchmarking is not just an investigation of the metrics of the external business function, but an investigation to determine what practices are being used to ensure effectiveness and eventually superiority and which practices achieve the metrics. Benchmarking is not just a study of competition but a process of determining the effectiveness of industry leaders by measuring their results.

Products, services, and practices. Benchmarking can be applied to all facets of a business. It can be applied to the basic products and services. It can be applied to the processes that go into manufacturing those products. It can be applied to all process practices and methods that are in support of getting those products and services effectively to customers and meeting their needs. Benchmarking goes beyond the traditional competitive analysis to not only reveal what the industry best practices are, but to also obtain a clear understanding of how best practices are used.

It will be the view here that most business activities can be analyzed as processes. Most business activities have a beginning, an end, and a main activity. There is an output from the process that is what the next customer wants, whether that customer is internal or an external, end user or consumer of the output or product. A study of business processes and their methods and practices will be the main objective of the benchmarking approach.

Companies renowned as industry leaders. Benchmarking should not be aimed solely at direct product competitors. In fact it could be a mistake to do so since they may have practices that are less than desirable. Benchmarking should be directed at those firms and business functions within firms that are recognized as the best or as industry leaders, such as banks for error-free document processing. The company serving as a benchmark partner is not always obvious. Careful investigation is needed to determine which firms to seek as benchmarking partners and why. Fortunately there are ways to uncover who and why they should be chosen.

In the formal sense benchmarking is an ongoing investigation and learning experience that ensures that best industry practices are uncovered, analyzed, adopted, and implemented. It focuses on what best practices are available. It ensures an understanding of how they are performed. Any finally, it determines the worth of the practices or how well they are performed.

N.1.2. Webster's Definition

The Webster's dictionary definition is also informative. It defines a benchmark as:

> *A surveyor's mark . . . of previously determined position . . . and used as a reference point . . . standard by which something can be measured or judged.*

Both definitions serve to reinforce the benchmark as being a standard for the comparison of other objects or activities. It is a reference point from which others are to be measured.

Outside of land surveying where a benchmark is well understood and accepted, there is only one other common use of the term. The computer industry has used the term to mean a standard process for measuring the performance capabilities of software and hardware systems from various vendors. The standard then serves as a basis of choice between the alternative offerings, each of which can be different features and functions, but meet the overall requirements by a different mix of capabilities.

Benchmarking used in the dictionary sense serves as a standard, but one which may change over time to reflect the real conditions of the business world, namely that business practices must change over time to remain competitive.

N.1.3. A Working Definition

The definition of benchmarking, as seen from the perspective of one who has been involved in the process over a number of years and exercised the process many times, incorporates the previous definitions. But it goes beyond to emphasize some important considerations not included in these definitions. The working definition preferred for benchmarking is:

> *Benchmarking is the search for industry best practices that lead to superior performance.*

This definition is preferred because it it understandable by operationally oriented business units and functions. If they know their operations thoroughly, then the search to ensure that the best of proven practices are incorporated is a clear objective. The definition covers all possible business endeavors whether a product, service, or support process. It is not necessary to include them by specific reference.

The focus is on practices. It is only the change of current practices or methods of performing the business processes that overall effectiveness will be achieved. It stresses practices and the understanding of practices before deriving a benchmarking metric. Benchmarking metrics are seen as a result of understanding best practices, not something that can be quantified first and understood later.

The definition concentrates on achieving superior performance. In this regard it pursues *dantotsu*, the best of the best practices, best of class, or best of breed. That is, those best practices that are to be pursued regardless of where they exist—in one's own company, industry, or outside one's industry. It is only this view that will ensure superiority rather than parity.

The definition is proactive. It is a positive endeavor. It is one calculated to obtain cooperation of benchmarking partners. There should be few professionals who would object to constantly seeking best practices. There should be a constant sharing of ideas and debating about how the industry is going to constantly improve itself. This will only occur if the search is open and seen as benefiting both benchmark partners.

Benchmarking should be approached on a partnership basis in which both parties should expect to gain from the information sharing. The discussion of practices and methods, especially among noncompetitors, can only result in both parties gaining from the investigation and discussions. Even competitors can gain in discussions that appropriately skirt proprietary and sensitive topics. The concentration solely on best practices permits that objective to be achieved.

Benchmarking as a term should motivate managers because it is a positive activity, perceived as a mechanism for improving operations to proactively search for best practices. It will be only through the test of finding the best of the best in industry that any manager will be able to justify his or her own operation and assure that he or she has performed to the ultimate standard.

Benchmarking is the most credible of all justifications for operations. There can be little argument about a manager's position if he or she has sought the best in industry and incorporated it it his or her plans and processes.

N.2. What Is Benchmarking?

There should be some understanding of what benchmarking is and is not, and its relationship to target setting. There are many misconceptions of what benchmarking is and these should be clearly understood and reinforced. What benchmarking is not should be quickly dispelled. Likewise, since benchmarking involves setting new directions, its relationship to targets should be understood also. These should give a better understanding of where benchmarking fits into the overall planning scheme.

N.2.1. What it is, What it is not

Benchmarking is not a mechanism for determining resource reductions. While that may occur because many operations do not emulate best industry practices, it does not necessarily mean a reduction. Resources will be redeployed to the most effective way of supporting customer requirements and obtaining customer satisfaction as a result of benchmarking activities. It may be that benchmarking will require a resource increase, both people and spending, as a result of more correctly determining true customer satisfaction levels and needs from benchmarking activities.

Benchmarking is not a panacea or program. It must be an ongoing management process that requires constant updating—the collection and sifting of external best practices and performance into the decision making and communications functions at all levels of the business. Benchmarking must have a structured methodology to ensure successful completion of thorough and accurate investigations. However, it must be flexible to incorporate new and innovative ways of assembling difficult-to-obtain information. The benchmarking process steps can be applied repetitively, yet be adaptable. The benchmarking process must keep those conducting the studies aware of new avenues of approach and information sources while accomplishing the basic task.

Benchmarking is not a cookbook process that requires only looking up ingredients and using them for success. Benchmarking is a discovery process and a learning experience. It requires observing what the best practices are and projecting what performance should be in the future. Through it, information can be gathered that will permit setting performance goals which are realistic in the context of the external business environment by ensuring that best, feasible, proven practices are incorporated into business operations.

Benchmarking is not a fad, but a winning business strategy. It assists managers in identifying practices that can be adapted to build winning, credible, defensible plans and strategies, and complement new initiatives to achieve the highest performance goals—namely, superior performance.

Benchmarking is a new way of doing business. It forces an external view to ensure correctness of objective setting. It is a new management approach. It forces constant testing of internal actions against external standards of industry practices. It promotes teamwork by directing attention on business practices to remain competitive rather than personal, individual interest. It removes the subjectivity from decision making.

N.2.2. Benchmarking and Targets

Benchmarking is basically an objective-setting process. Benchmarks, when best practices are translated into operational units of measure, are a projection of a future state or endpoint. In that regard their achievement may take a number of years to attain. The benchmarks may most importantly indicate the direction that must be pursued rather than specific operationally quantifiable metrics that are immediately achievable. A benchmarking study may indicate that costs must be reduced and customer satisfaction levels increased or return on assets increased. In addition, the concentration on best practices supports the general direction that must be pursued with specific insights into how the benchmarks can or should be attained. The conversion of benchmarks to operational targets translates the long-term actions into specifics.

Targets are more precise although their quantification should be based on achievement of a benchmark. Furthermore, a target incorporates in it what realistically can be accomplished within a given time frame, usually one yearly budget cycle or business plan horizon. Considerations of available resources, business priorities, and other operational considerations convert benchmark findings to a target, yet steadily show progress toward benchmark practices and metrics. The significant difference between a complete benchmark definition and a target is that a carefully conducted benchmark investigation will not only show what the benchmark metric is but also how it will be achieved.

N.3. Key Process Steps

The benchmarking process is displayed in Figure N.3 - 1. The individual steps will be covered in more detail in later chapters. The L. L. Bean case study in Chapters 3 through 12 takes readers through each step in a real-life applications. The key ways of conducting a benchmarking investigation through to successful conclusion will also be detailed.

It is important, however, to have a general understanding of the generic phases and some understanding their rationale. The benchmarking process consists of five phases. The process starts with a planning phase and proceeds through analysis, integration, action, and finally maturity.

N.3.1. Planning Phase

The objective of this phase is to plan for the benchmarking investigations. The essential steps are those of any plan development—what, who, and how.

What is to be benchmarked? Every function of a business has or delivers a product. The product is the output of the business process of the function, whether a physical good, an order, a shipment, an invoice, a service, or a report. Benchmarking is appropriate for these and all other outputs. The products therefore must first be determined.

To whom or what will we compare? There are business to business, direct product competitors. These are certainly prime candidates to benchmark. But they are not enough. Benchmarking must be conducted against leadership companies and business functions regardless of where they exist. Only in this fashion will superiority be ensured.

How will the data be collected? There is no one way to conduct benchmarking investigations. There is a process. There are an infinite variety of ways to obtain required data, and most data are readily and publicly available. A certain level of inquisitiveness and ingenuity is required, but a combination of methods that best meets the study needs will most often be productive. Sources of information are limited only by one's imagination.

What will be important is to recognize that benchmarking is a process not only to derive quantifiable metric goals and targets but more importantly to investigate and document those best industry practices which permit achievement of the goals and targets. A benchmarking study should concentrate on practices and methods. Their effect can always be quantified. (See the L. L. Bean case study in Chapters 3 through 5.)

N.3.2. Analysis Phase

After determining what, how, and who is to be benchmarked, actual data gathering and analysis must be accomplished.

The analysis phase must involve a careful understanding of current process practices as well as those of benchmarking partners. The benchmarking process is, after all, a comparative analysis. What is desired is an understanding of internal performance on which to assess strengths and weaknesses. Is the benchmarking partner better? Why are they better? By how much? What best practices are being used now or anticipated? How can their practices be incorporated or adapted for implementation?

Answers to these questions will be the dimensions of any performance gap: negative, positive, or parity. The gap provides an objective basis on which to act—to close the gap or capitalize on a positive one. The gap, however, is a projection of performance and therefore will be one which changes as industry practices change. What is needed is not only an understanding of today's practices but where performance will be in the future. It is important that benchmarking be a continuing process so that performance is constantly recalibrated to ensure superiority. (See the L. L. Bean case study in Chapters 6 and 7.)

N.3.3. Integration

Integration is the process of using benchmark findings to set operational targets for change. It involves careful planning to incorporate new practices in the operation and to ensure benchmark findings are incorporated in all formal planning processes.

The first step is to gain operational and management acceptance of benchmark findings. Findings must be clearly and convincingly demonstrated as being correct and based on substantive data. Credible data can be supported by deriving data and information from several sources to support the findings. Based on the findings action plans can then be developed.

Benchmark findings must be communicated to all organizational levels to obtain support, commitment, and ownership. This essential step can usually be accomplished through a variety of communications approaches. The key to the process will be the conversion of benchmark findings into a statement of operational principles to which the organization can subscribe and by which actions for change will be judged. These principles place the organization on notice that they are the rules by which the organization will improve itself to meet customer needs and eventually to attain superiority. (See the L. L. Bean case study in Chapters 8 and 9.)

N.3.4. Action

Benchmarking findings and operational principles based on them must be converted to action. They must be converted to specific implementation actions and a periodic measurement and assessment of achievement must be put in place. People who actually perform the work tasks are most capable of determining how the findings can be incorporated into the work process. Their creative talents should be used to perform this essential step.

In addition, any plan for change should also contain milestones for updating the benchmark findings themselves, since the external practices are constantly changing. Therefore provision should be made for recalibration. Also, an ongoing reporting mechanism is needed. Progress toward benchmark findings must be reported to all employees. This feedback is especially necessary to those who assist with the implementation. They will want to know how they are doing. (See the L. L. Bean case study in Chapters 10 and 11.)

N.3.5. Maturity

Maturity will be reached when best industry practices are incorporated in all business processes, thus ensuring superiority. Superiority can be tested in several ways. In some instances services are sold to external customers in addition to serving the internal customer. If the now-changed process were to be made available to others would a knowledgeable businessperson prefer it? That becomes a powerful confirmation of a benchmark. Needless to say if other companies benchmark your own internal operations that also would be confirmation.

Maturity also is achieved when it becomes an ongoing, essential, and self-initiated facet of the management process. It becomes institutionalized. It is done at all appropriate levels of the organization, and not by specialists. While knowledgeable specialists may exist to consult on the most productive approaches for benchmarking, only when the focus on external practices becomes the responsibility of the entire organization will benchmarking truly have achieved its objectives of ensuring superiority through incorporation of best industry practices.

N.4. How to Get Started in Benchmarking

Those who initially are exposed to the subject of benchmarking often ask how they can get started. The author's preferred way is to have them read this text completely and implement and practice the 10-step benchmarking process. But for those who cannot spare the initial time and want a quick primer, Quick Reference Guide 1.1 is provided. It is broken down into two sections. The first section covers initial and somewhat general information gathering, but sound steps in the investigation process. The second section discusses information gathering in the unit's own functional area or area of interest.

To get started in the process of benchmarking there are some proven first steps. One must determine what to benchmark, assuming there is agreement that the next steps will be directed to gathering available data. This may come from library research and contacting internal personnel and sources. Those shown in Quick Reference Guide 1.1 are easily initiated approaches and should be done early in any benchmarking investigation. The guide gives initial target areas to turn to in these starting steps.

The focus of the second area of investigation is more external and on a specific function or area of interest. The information comes from periodicals about the function, associations that represent the function, service bureaus that offer services surrounding the function, and consultants who are knowledgeable about the function. Initial contact with these external sources starts the process of ensuring that all available public information is covered and relevant information is documented. These require a higher level of effort to get underway and should be approached based on sound planning and careful understanding of the scope of the investigations. It also includes two unique sources: industry experts and software vendors. The reason for these will become evident with descriptions in later chapters.

While the guide is not to be inclusive, it does give quick reference to the initial steps found to be productive. A more thorough approach can be tailored following in-depth study of the text and time to define a careful benchmarking investigation. Starting with the guide will provide a faster start and nothing will be lost in the process. The guide is, however, only a guide. It cannot substitute for exercising the full 10-step process. *Caveat emptor* benchmarkers!

N.5. Summary

Successful benchmarking is based on achieving several important factors and management behaviors. It requires management commitment to make tough decisions to base operational goals on a concerted view of the external environment. There must be a willingness on the part of those performing benchmarking to learn from others. There needs to be a realization that internal operations cannot always have the best answer for every problem. They can and should learn from others and constantly measure themselves against the best in the industry. This text describes the necessary skills to conduct successful benchmarking activities. Creativity in extending the basic process will enhance what is covered here to achieve truly superior benchmarking results.

Benchmarking is a continuous process of measuring against the best. Goals are based on the benchmark findings to achieve superiority. Progress is measured periodically to update the organization's position toward achieving the benchmarks. Benchmarking results in process practices and measurable goals based on what the best in the industry is doing and is expected to do. The approach contrasts sharply with the rather imprecise, intuitive estimates of what needs to be done to characterize current searches for productivity. Benchmarking is the rational way of ensuring the organization is satisfying customer requirements and will continue to do so as customer requirements change over time. Benchmarking ultimately reflects an attitude to strive for excellence in every business endeavor.

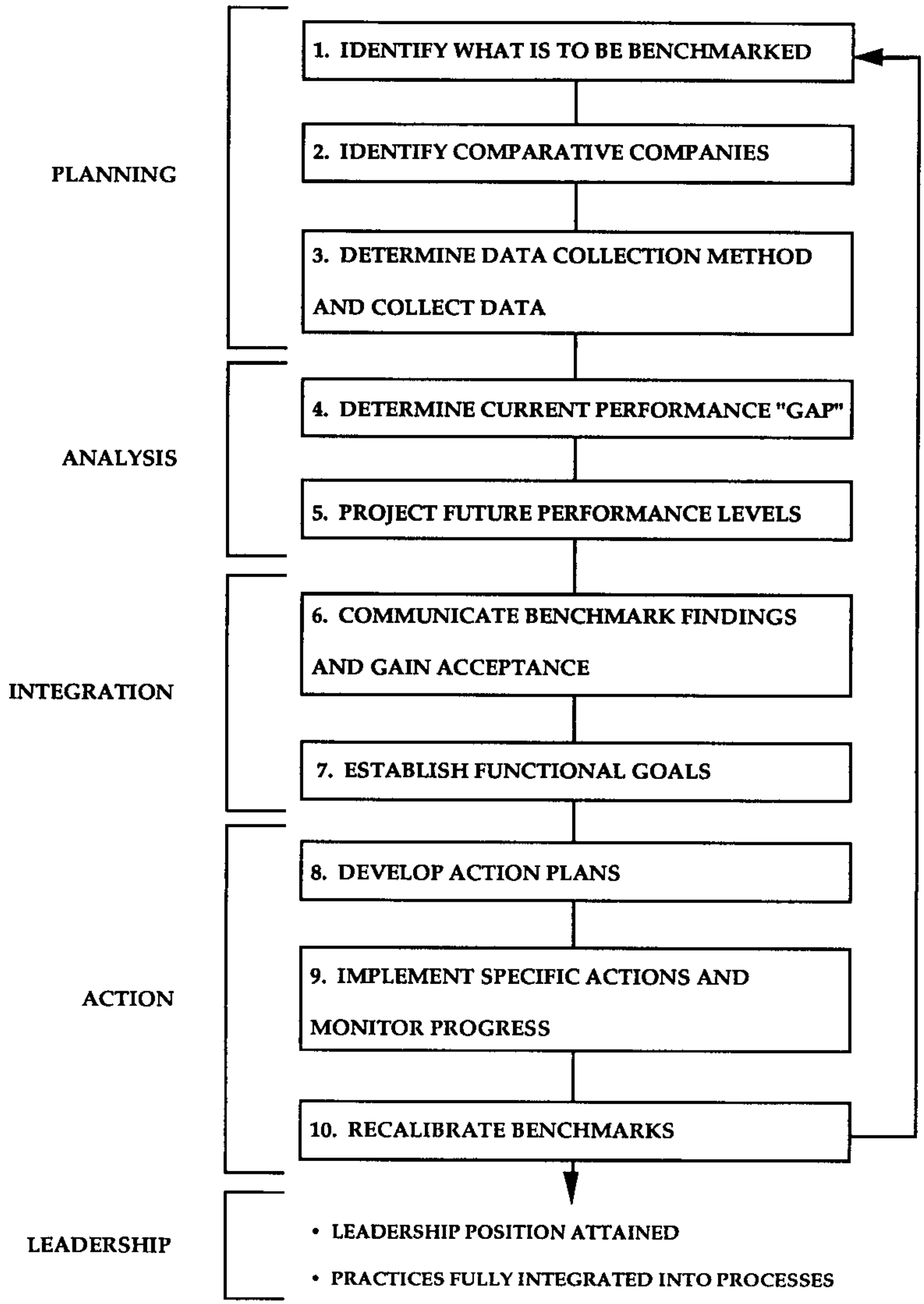

Figure N.3 - 1. Benchmarking Process Steps

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APPENDIX L

WORD PROCESSING/GRAPHICS FORMAT

L.1. Title Formats

CHAPTER TITLE 1

CHAPTER TITLE 2

CHAPTER TITLE 3

Chapter Titles are centered, 14 point, bold, capitalized. Three chapter title lines provide uniformity through the document, and should lead directly to an A-Level heading.

A.1. A-level Subhead (the principal subhead)

Subhead set on line separate from text; bold; 12 pt; number not underlined, period, tab, subhead underlined; only initial capital letters except prepositions and articles, with no period following title; 24 pts (2 single lines) below preceeding paragraph, 12 pts (1 single line) above following paragraph

A.1.1. B-level Subhead (the secondary subhead)

Same as A-level subhead except: 12 pts below preceeding paragraph, 0 pts above following paragraph

A.1.1.1. C-level Subhead (run-in side head). Same as A-level subhead except: period at end of title, 2 spaces, beginning of paragraph

(NOTE: subhead aspects derived from Chicago Manual of Style (1.58) and LANL style manual)

L.2. Headers and Footers

Header: 1st line="PREDECISIONAL DRAFT" (centered, bold, 14 pt);2nd line= automatic date stamp (centered, 12 pt);3rd line blank

Footer: 1st line blank; 2nd line=chapter page number (centered, 12 pt); 3rd line="PREDECISIONAL DRAFT" (centered, bold, 14 pt)

L.3 Format Settings

Character: 12 pt; Palatino; position normal; spacing normal

Paragraph: left justify; other aspects as specified in style

Section:

Document:

Margins: inside=1.5, outside=1.0, top=1.0, bottom=1.0

Mirror even/odd; widow control; even/odd headers

Footnotes: position=bottom of page, number from 1

Set file series during printing

L.4. Figures and Tables

Tables

Title: On pages separate from text. The word *Table* and the table number, an arabic figre, typed on a line above the table. The table title is typed on line below the number, with only initial capital letters except prepositions and articles, with no period following title. (Chicago Manual of Style, 2.23)

Figures

Title: **Fig. 1.2. Title**--Figure is abbreviated as Fig, period, 2 spaces, number, period, 2 spaces, title initially capialized with remainder in lower case, title placed below figure. (Chicago Manual of Style, page 35)

Text: In text, referred to in lower case type, number in arabic numeral. The word "figure" is spelled out unless the reference is a simple parenthetical one (fig.3). (Chicago Manual of Style, 11.8)

L.5. Macintosh Style Sheet

A standard style sheet is available with character,paragraph and bullet settings for direct application to any document.

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APPENDIX M

REVIEW PLAN FORMAT

AND EXAMPLES

M.1. Review Plan Function

The Plan Defines And Documents The Review Specific Detailed Structure, Process, And Lines Of Inquiry

The review plan serves the following functions:

- Is a driver for focusing the ITR team on the key review questions
- Is the basis for the TOB critique of the specific ITR approach
- Provides an "intent" reference during the process
- Communicates to the detailed ITR approach to the site management
- Is a bench mark for the assessment statements

M.2. Review Plan Structure

SECTION	PURPOSE	AUTHOR
• INTRODUCTION	The basis and authority under which ITRs are conducted	Team Coordinator
• STRUCTURE	A summary of the structure defined and approved in the HQs charter	Team Leader/Coordinator
• PROCESS	A summary of the basic ITR process and any charter mandated modifications	Team Leader/Coordinator

• LINES OF INQUIRY	Subpanel or task based central/key questions to be addressed during the review	Subpanel/Task leaders

M.3. PUREX Review Plan Example

Note that the formatting and numbering of the PUREX Review Plan documented in the DOE report has been preserved.

PUREX REVIEW PLAN

A.4 PUREX Review Plan

The PUREX Review Plan was prepared by the ITR Team before the first week of review at the site. It is based on anticipated site conditions. Some of the planned activities could not be completed because anticipated information did not exist.

A.4.a Introduction

Independent Technical Review (ITR) of Major Projects, Major System Acquisitions, and programs was established as an DOE-EM activity in a memorandum from the Under Secretary of Energy dated March 29, 1991 on the Status of the Hanford Waste Vitrification Plant. The DOE-EM ITR process was developed from this base.

In a June 1992 memo to John Wagoner, Manager - DOE Richland Field Office, Willis W. Bixby, Director - Facility Transition Planning Group, Office of Environmental Restoration and Waste Management, established an ITR of the PUREX (Plutonium-Uranium Extraction) Plant. The memo states the objective of the PUREX ITR, is to "perform a review of the PUREX Plant related to the transition from standby to shutdown". The Charter for the PUREX Independent Technical Review, Attachment 1, establishes the: (1) Mission, (2) Objectives, (3) Interfaces, (4) Task Description, and (5) Organization.

A.4.b Review Approach

The PUREX ITR will determine the state of PUREX end-states-requirements definition (D&D ready and shutdown), the planned technical, regulatory, and management path to that end state, and the barriers to reaching the end state. The PUREX ITR team will initially focus on understanding and assessing the existing transition-shutdown technical basis, strategies, planning, approach-implementation, and mechanisms for technical, regulatory, and management issues identification and resolution. The team will then investigate barriers to achieving the desired D&D ready end state. As appropriate, the ITR team will identify potential methods of barrier elimination and alternate paths to quickly and safely achieve minimum cost PUREX transition and shutdown. While the review is focused specifically on the PUREX plant, the ITR team will, if appropriate, make recommendations on broader, complex-wide implications.

NOTE: The ITR process does not encompass, nor the charter suggest, a compliance audit to laws, regulations, or DOE orders, a financial audit, or a cost validation.

In response to specific PUREX ITR Charter objectives, the ITR process and team will be structured to identify, review, and assess the Hanford and PUREX technical-regulatory-management approach and implementation in, at minimum, the following areas:

- Integration of PUREX plant, Tank Waste Remediation System (TWRS), Waste Receiving and Packaging (WRAP), Basins, Z plant, 242 Evaporator, and other ancillary facilities and activities

- Applicable regulations, codes, standards, DOE Orders, and OSR as well as technical operating specifications; cost effective, time-graded reduction of these requirements during PUREX transition and shutdown

- Hazardous materials and process equipment clean-out criteria and basis

- Safety risks, source term inventories, and associated surveillance requirements

- National Environmental Protection Act (NEPA) compliance requirements.

- Technical, regulatory, and management issues identification and resolution.

- Hanford support infrastructure needs and costs during the transition and after shutdown.

- Scope-Budget-Schedule management.

In response to specific PUREX ITR Charter tasks, the process and team will be structured to provide an assessment of Hanford's analysis, approach, and implementation of:

A.4.b.1 Technical Issues

PUREX transition - shutdown technical strategy, planning, plant activities, requirements, and end point criteria.

Technical codes and standards applicable to the transition and shutdown plant, per the DOE-EM DNFSB 90-2 approach.

Technical issues that might inhibit time-graded application or elimination of codes and standards.

Other technical barriers and potential solutions.

Radiological and hazardous material characterization data, plans, technical documents, procedures and photographs needed for transition, shutdown, and decommissioning.

A.4.b.2 Regulatory Issues

Regulatory requirements, codes, standards, and DOE SARs/OSRs impacts on transition to and shutdown.

Policy issues and future rule making, which might inhibit time-graded application or elimination of codes and standards.

Safety documentation needs for the decreasing safety envelop; the minimum acceptable, cost effective level of safety documentation and change control.

NEPA strategy and documentation.

Other regulatory issues and potential solutions.

A.4.b.3 Management/Planning Issues

PUREX strategy, planning, and implementation

Facility and site conditions, institutional, labor/resource, infrastructure, and other potential conflicts or restraints

Management/planning issues and potential resolutions.

Budgets, cost and schedule performance reporting framework, contingency allowances, budget realism, management's capability to manage cost, schedule and technical risk, and other performance limitations.

A.4.c Review Process and Structure

The PUREX ITR will use the process developed for past reviews and documented in the Independent Technical Review Handbook, July, 1992 issue. The standard ITR team structure has been modified from the phenomenology - process - regulatory - facilities - management subpanel organization to a technical - regulatory - management task structure. Coordinators will be designated for each task assessment, however, due to the interdependence of the tasks, individual team members will not be assigned to one task but will be expected to contribute to all task assessments.

The review team will consist of a Team Leader, a Team Coordinator, nine team members and support personnel. The team members, affiliation, and expertise are:

•	Phil Thullen	LANL	Team Leader
•	Deborah Bennett	LANL	Team Coordinator
•	Fred Carlson	Consultant	DOE Orders, OSRs, Regulatory
•	Pete Davis	PRD Cons.	Risk Assessment
•	Bob Keel	WVNS Co.	D/D, Mgt, Ops, Maintenance
•	Tom LaGuardia	TLG Eng.	D/D Financial
•	Boris Rosev	LANL	Investigator
•	George Toto	Consultant	OSRs, Waste Ops, D/D,
•	Doug Weaver	SNL	System Mgt, Integration
•	Stephen Wiegman	SAIC	Regulatory
•	Lyle Zahn	Consultant	Canyons, TPA, Regulatory

The ITR assessment will be developed by the team leader and members as a consensus document. As required, the team will call upon expert consultants for supporting information, but the consultants will not be involved in development of the consensus assessment.

The PUREX ITR review plan and assessment will be critiqued by a Technical Oversight Board (TOB) composed of senior level individuals who have extensive experience in the development, execution, management, and evaluation of large and technically involved projects. The TOB provides a solid experience reference against which the ITR Team can test its lines of inquiry and the logic and validity of the assessment conclusions. The Board will function as a check to assure that the scope and depth of the science and engineering review is adequate to achieve the charter objective, and to assure the proper systematic evaluation of the activity. The Board also will examine the results of the review to assure internal technical consistency and to confirm that findings are supported with sufficient information.

Initial preparation for the review will be carried out by the Team Leader and the Team Coordinator. This will include: team mobilization, initial site visits, initial document requests, and preparation of the draft review plan with subsequent presentation to the Technical Oversight Board.

Team members will be involved in three basic activities: (1) preparation for the review, (2) the review process, and (3) assessment consensus and documentation. Preparation for the review will include two days of ITR process training, per the ITR Training Handbook, finalizing the draft review plan, discussion of the ITR process application to the PUREX review, and review of available documentation. Preparation also may involve visits to other relevant sites such as nuclear facilities that have been shutdown.

The review process has three elements: 1) a week of on-site informational briefings and discussions, (2) an off-site analysis period, and (3) a week of detailed on-site investigations and validations. During the first on-site week the team listens to information presented by the site and asks questions of clarification and understanding. During the second on-site week the team fully develops answers to the review plan lines of inquiry through detailed discussions and investigations. Additional visits, phone conversations or other communication may be required to address specific issues that arise during the assessment report preparation.

Report preparation will begin during the assessment. An executive summary will be prepared by the team, working at Los Alamos or Sandia immediately following the second-detailed on-site visit, and sent to DOE Headquarters, and the TOB. The full draft report will be compiled by the Team Leader and Team Coordinator based on subsections drafted by team members. The report will be reviewed for factual errors by the site, and corrections made as necessary.

During the review, the team will meet in private to integrate observations, consider the progress of the review, and make revisions of the review plan. Revisions of the review plan may require changes in presentations, tours, or discussions planned by DOE-RL or WHC.

A.4.d <u>Review Schedule</u>

Team Training and Preparations	July 7 - 10
Informational Site Visit	July 13 - 17
Team Discussions; Benchmarking	July 20 - 31
Investigative Site Visit	Aug. 3 - 7
Develop Consensus Assessment	Aug. 10 - 14
Assessment Presentation to DOE-HQs	Aug. 25
Assessment Presentation to The Site	Aug. 27

Draft Report Issued	Sept. 8
Report submitted to DOE-HQs	Oct. 6

A.4.e **Lines of Inquiry**

A.4.e.1 **Technical Issues**

For each PUREX phase:

- transition
- D&D ready shutdown
- shutdown with restart option as it impacts preparation for transition to D&D ready

The review will focus on the deactivation strategy and planning:

- current and projected requirements
- the technical basis
- and data base (program baseline) for:
    - characterizing
    - immobilizing
    - retrieving
    - treating
    - handling and disposition (disposal, storage, and/or shipping) for the:
        - canyon building, ancillary facilities, and tunnels
        - process equipment
        - process materials.
        - hazardous and radioactive wastes (current and to be generated)

Each area will be assessed based on the review criteria of:

- A technically defensible basis for safe, quick, minimum cost transition to shutdown or a D&D ready state.

- Timely, proactive identification and resolution of technical barriers
- Proactive evaluation of alternate approaches and solutions

In addition the team will consider the DOE complex implications of the PUREX transition-shutdown technical assessment; i.e., UO3 plant impact

Examples of generic issues that will be addressed by this subgroup include but are not limited to:

A Safety and health of workers and the general public

B. Shutdown or D&D ready technical requirements

C. Technical basis for the clean-out requirements

D. State of technology to support the clean-out process

E. Historical process and facility knowledge base

F. Technical codes and standards

G. Selection of clean-out process technology

H. Clean-out waste and waste stream requirements

I. Shutdown-D&D ready technical issues

J. Shutdown maintainability and reliability issues

K. Hazardous materials isolation/containment

L. Waste minimization

M. Safety/hazard - minimization

N. R&D requirements

O. Environmental impacts

P. DNFSB 90-2 approach

Q. Waste disposition

R. Contaminated equipment disposal

S. Future rulemaking issues

T. General

A.4.e.2 Regulatory Issues

For each PUREX phase:

- Transition
- Shutdown with restart option
- Deactivation

The review will focus on the understanding of and planning for time-phased, cost effective reduction of:

- regulations
- codes and standards
- DOE Orders
- requirements, without compromising:
  - safety
  - health
  - the environment

and without potential for regulatory violation.

Each will be assessed based on the review criteria of:

- A realistic, defensible regulatory basis for safe, timely, minimum cost transition to shutdown or a Deactivation state.
- Timely proactive identification and resolution of regulatory requirements
- Identification and resolution of self-imposed or artificial barriers
- Proactive evaluation of alternate approaches and solutions

In addition the team will consider the DOE complex implications of the PUREX transition-shutdown regulatory assessment

NOTE: The regulatory team line of inquiry does not include a compliance audit for regulations and DOE Orders.

Examples of generic issues that will be addressed by the subgroup include but are not limited to:

- Regulatory and DOE Order criteria
- Documentation and Data
- Radiation protection
- As Low As Reasonably Achievable (ALARA) requirements
- National Environmental Policy Act
- Clean Air Act
- Clean Water Act
- Resource Conservation and Recovery Act
- Comprehensive Environmental Response, Compensation and Liability Act
- Occupational Safety and Health Act
- Toxic Substance Control Act
- DOE Orders
- Risk Acceptance Criteria for Workers and Public
- Federal Facility Compliance Agreements
- State and Local Permits
- Safety Analysis Report
- Operational Safety Requirements
- Agreements With DNFSB
- Issues With the Office of Nuclear Safety

A.4.e.3 Management /Planning Issues

- The PUREX management lines of inquiries are:
  - Is the scope, cost, and schedule basis for the PUREX standby program sound and justifiable? How has actual work performance tracked the plan?

- What strategies have been formulated and what processes and activities will be required to develop the deactivation plan? What activities have been initiated?
- Have the deactivation program schedule and budget bounding cases been evaluated? Has the reallocation of existing resources been evaluated as a means of reducing total cost.
- What management processes are used to identify and resolve emergent issues in a timely, cost effective manner? How have these processes been used during the PUREX transition?

- The review will focus on the:
  - assumptions used in developing base cost estimate and schedule
  - adequacy of the radiological characterization to prepare estimates
  - base cost estimate and basis of costs
  - contingency analyses for each major activity
  - analysis of risks and risk mitigation
  - risk analysis of cost variability
  - cost - benefit analysis of alternatives
  - basis for the determination of the schedule
  - institutional and site constraints and barriers
  - infrastructure support requirements and loads justifications
  - cost estimate reporting format for traceability and project control - WBS
- The review will be based on an analysis of:
  - major project objectives and assumptions
  - approach, strategies, and plans
  - detailed activity descriptions for staff and operating crew

- assessment of manloading levels for assigned/necessary activities
- management staffing levels
- relationship of staff -to- operating crew ratio
- union work rule agreements and interpretation of those agreements
- collateral costs of energy (power, lighting, HVAC)
- supporting detailed cost estimate documentation
- supporting schedule documentation
- data base reasonableness to support estimate - historical vs. allowances
- implementation history and issues to date.
- the impact of award fee criteria on program planning.

- Each will be assessed based on the review criteria of:
  - sound management practice, planning, and implementation basis for safe, quick, minimum cost transition to shutdown or a D&D ready state.
  - timely, proactive identification and resolution of management and institutional barriers
  - pro-active evaluation of alternate approaches and solutions

In addition the team will consider the DOE complex implications of the PUREX transition-shutdown management assessment

NOTE: The management/planning team line of inquiry does not include an audit for DOE Orders, financial practices or validation, or quality compliance

Examples of the generic issues that will be addressed by the task group includes but are not limited to:

- Shutdown -D&D ready requirements
- Availability of historical-basis expertise

- Strategies and planning
- Scope, schedule, and cost management
- Risk Management
- Management processes
- Integration with down stream waste programs
- Operational procedures

A.4.f **Review Questions**

A.4.f.1 **Technical Questions:**

A. Safety and health of workers and the general public

1. To what extent have risk assessments been performed or planned to characterize facility risk during shutdown?
2. What radioactive materials (quantity and type) will exist after shutdown and what is the basis for allowing this material to exist in the shutdown condition?
3. Which group is responsible for safety during transition to shutdown and how do they interface with and control activities of other groups?

B. Shutdown or D&D ready technical requirements

1. What is the scope and status of the PUREX plant transition to D&D ready?
2. Have the technical criteria the facility must meet for shutdown or D&D ready condition been defined, documented, and approved?
3. Has the time between shutdown and D&D been established?
4. What technical assumptions were made with regard to the degree of radioactive/hazardous materials clean-out and the removal of process equipment and materials of the plant?
5. Are the assumptions technically sound based on the review criteria?

C. Technical basis for the clean-out requirements

1. Is there an established technical basis for the cleanout requirements?

D. State of technology to support the clean-out process

1. Is the clean-out technology and process based on available, cost effective commercial technology, equipment, and materials?

2. Has the clean-out technology and process been adequately proven within the DOE complex?

3. Has the clean-out technology and process been externally reviewed?

4. Have they applied lessons-learned from the rest of the complex (to avoid re-inventing solutions)?

E. Historical process and facility knowledge base

1. Is there an adequate historical record of operating systems and equipment?

2. Is there an adequate historical record of operating upsets and clear definitions of known problem areas from these upsets?

F. Technical codes and standards

1. Have technical codes and standards been appropriately used in the development of the technical plan and process for clean-out and shutdown of the plant?

2. Has the time-graded reduction of code requirements been adequately considered?

3. Are there technical codes and standards currently under consideration which might impact the clean-out or shutdown?

4. Has there been interface with industry codes/standards?

G. Selection of clean-out process technology

1. Have process description and flow sheets been developed for the immobilization and removal of the hazardous waste from the canyon and tunnels?

2. Have all appropriate methods for removing or immobilizing the hazardous materials and wastes from the canyon and tunnels been considered?

3. Which method appears to have the greatest potential for working on a safe, timely, cost effective, and continuous basis?

4. Has any test or development work been devoted to this issue?

5. Has the chemistry important for removal processing been established and have material compatibility issues been identified?

6. Have the parameters important for clean-out process control been identified?

7. Are measurement techniques and sensors to handle these parameters been developed and demonstrated?

8. Is the equipment necessary for hazardous wastes clean-out and recovery of process equipment, materials commercially available?

9. Has testing been carried out to confirm the effectiveness and reliability of the equipment?

10. Have the requirements and options for equipment dismantlement and removal from the facility been considered?

11. If process vessels are to be removed while containing high-level radioactive waste, how will they be handled and where will they be stored?

12. Is the clean-out and shutdown technical plan and process been evaluated against commercial experience?

H. Clean-out waste and waste stream requirements

1. Is the knowledge of the composition and constituents of the hazardous materials and wastes (solids, liquids, and gases) sufficient to define effluent storage and treatment?

2. Are there specific constituents that must be removed from the waste and waste streams to prevent problems?

3. What are the expected volumes and activity levels of hazardous and radioactive wastes that will be generated during clean-out operations?

4. Have these quantities been identified to Waste Tank Facility (WTF) operations?

5. Do these estimates include the new liquid wastes to be generated during the process?

6. Have clean-out tank-waste-volume projections been developed in a comprehensive and technically defensible manner that adequately supports decision making within the tank waste system?

7. What interface issues have been identified between the upstream PUREX waste generator, and downstream waste tanks and solid waste programs; how have these issues been resolved?

8. How will clean-out equipment be dispositioned after the PUREX clean-out is completed?

9. Does contingency planning exist to respond to unexpected decreases in treatment/disposal capacities or increases in waste volume input or both?

I. Shutdown-D&D ready technical issues

1. What shutdown-D&D ready technical issues have been identified to date? Is there a timely, cost effective plan for their resolution?

2. What other emergent technical issues might be encountered?

3. Have new, different resource needs and/or retraining issues been addressed?

J. Shutdown maintainability and reliability issues

1. What level of analysis and planning has been devoted to the issue of maintenance and repair support facility subsystems during long term facility storage?

2. Will the approach result in a safe, cost effective solution?

3. Has the physical and functional condition of existing equipment been documented?

4. Will any critical support systems need to be overhauled or replaced during the shutdown period?

5. Is the current maintenance program, organization, and planning adequate or required for safe transition to shutdown?

6. What metrics, systems, information, and documentation are being used to measure, track, assess, and report the physical and functional status of existing subsystems, tanks, piping, equipment, and instrumentation?

7. Are they adequate or required to insure safe, minimum cost operation of the facility during transition to safe storage?

8. Is contingency planning for equipment failure adequate for:

   - Critical equipment, utilities and subsystems

   - Back up systems for critical system components

9. Is maintenance department organizational structure and staffing adequate?

10. Is maintenance responsive to operating needs?

11. Is maintenance qualifications and training adequate?

12. Is prioritizing and scheduling maintenance activities adequate?

13. What if any additions, modifications, and retrofits are being considered to improve PUREX shutdown condition; and when; and are they technically justifiable?

K. Hazardous materials isolation/containment

1. What approach has been taken to provide for double containment of all processes that are handling hazardous material?

L. Waste minimization

1. Are the clean-out processes engineered to minimize the amount of wastes produced?

2. Would alternate technology produce less waste?

M. Safety/hazard - minimization

1. Are industrial safety measures adequately addressed?

2. Have fire protection issues been addressed?

3. What emergency requirements for the facility operation have been considered?

4. Which utilities, such as power and water supply, must be maintained under emergency conditions?

5. Which subsystems must be maintained operational in an emergency operation?

6. What ventilation systems modifications or impacts are identified?

N. R&D requirements

1. Are there any unique R&D efforts that need to be undertaken to support the transition to D&D ready?

O. Environmental impacts

1. Have potential environmental impacts been taken into consideration?

P. DNFSB 90-2 approach

1. Is the approach for transition to D&D-ready consistent with the DOE-EM DNFSB 90-2 philosophy?

Q. Waste disposition

1. Is there adequate knowledge of the composition and quantity of the radioactive/hazardous materials and wastes?

2. Is there an understanding of the level of uncertainty in the composition?

3. Are the estimates of composition and constituents based on calculations and historical records or are they the result of sampling and analytical measurements?

4. Have all potential sources been identified?

5. Is there reasonable knowledge of the physical characteristics of the waste important to the process of removing the waste from the canyon and tunnels?

6. Is there a reasonable understanding of the degree of uncertainty or variability of the composition and physical properties of the waste?

7. Are the various phases (solids, liquids, and gases) in the canyon and tunnels understood?

8. Are their physical characteristics known?

9. Has adequate consideration been given to monitor gas generation, including radon, temperature, volume levels, and other internal conditions within the canyon during clean-out?

R. Contaminated equipment disposal

1. Has adequate consideration been given to final disposition of removed contaminated equipment?

S. Future rulemaking issues

1. Have the impacts of potential future rulemaking issues been considered in developing the shutdown/deactivation plans?

T. General

1. Are technical interfaces required with remaining Hanford utilities, facilities identified? (LERF, 242 evaporator, etc.)

A.4.f.2 <u>Regulatory Questions:</u>

A. Regulatory and DOE Order criteria

1. Have the applicable regulatory requirements and regulations been identified; and are they understood?

2. What is the defined scope of the facility. Have the regulatory criteria the facility must meet for transition, shutdown, or D&D ready condition been assessed, documented, and approved? Has the time between shutdown and D&D been estimated? What assumptions were made with regard to the condition of the plant at various stages?

3. Have the regulatory requirements been translated into clean-out process design criteria, operational procedures, waste generation and/or facility policies? Have the criteria, procedures, and policies been implemented at the working level; and have the permits been obtained where required by regulations?

4. Have any agreements between DOE and NRC been made which could impact clean-out operations?

5. Has WHC identified the applicability of state and federal regulations and the current status of compliance with these regulations. In addition, where notices of violations under existence permits or notice of deficiency under permit applications received.

6. Have regulatory and DOE Order requirements applicable to clean-out operations and shutdown/D&D- storage been evaluated to determine how they can be applied in a time-graded manner; how they affect policies, safety, schedules, costs, procedures, and practices at the facility.

7. Is the regulatory and DOE Order implementation justifiable from a environment, safety, and health standpoint and from a cost effectiveness perspective?

B. Documentation and data

1. Are existing hazardous waste data and proposed programs to obtain new data to characterize the waste and the sampling and analytical facilities associated with the characterization program adequate and justifiable.

2. Are the radioactivity levels in waste products acceptable for disposal?

3. What is known (and what not known) about the specific composition of the canyon and tunnels?

4. What criticality analyses have been carried out for plant operations?

5. What gaseous releases of radioactive materials are projected to occur during clean-out operation? During abnormal events? What dose models have been employed for accidental releases of radioactivity?

C. Radiation protection

1. What evaluations of radiation exposures during clean-out operation have been undertaken?

2. What accident conditions have been evaluated? What are the radiological consequences of the analyzed events? Are the consequences acceptable or overstated? Is there a high potential for accidents that could produce occupational radiation exposures? Are the analyzed accidents appropriate and bounding? What man-REM and individual radiation exposures are projected for occupational employees? What clean-out operations will produce the major exposures?

3. What approach has been taken with respect to process design for worker radiation protection?

4. What is the off-site man-REM exposure rate (and accumulated man-REM) associated with normal operation? What dose models were employed to make this assessment?

5. What radiation exposures are anticipated during the removal and transfer of radioactive process equipment and material from the plant and tunnels?

6. Is alternate future use of the facility congruent with the potential radiation exposures and risks to clean-out the facility for that use?

7. Do the safety analyses consider all credible accident scenarios that may arise from the clean-out processes.

D. ALARA requirements

1. Has an ALARA review been undertaken for the clean-out operation? What are the results and conclusions? Have ALARA concepts been incorporated in the process design?

E. National Environmental Policy Act

1. What is the WHC implementation of the NEPA process under DOE Order 5440.1C with emphasis on identification of ways to reduce the time and expense required to comply with NEPA requirements.

F. Clean Air Act; Clean Water Act; Resource Conservation and Recovery Act; Comprehensive Environmental Response, Compensation and Liability Act; Occupational Safety and Health Act; Toxic Substance Control Act

1. Do the change in PUREX status have any potential for re-opening the EIS process (and thereby further perturbing the plant shutdown schedule?)

2. Have interim environmental compliance assessments been conducted since the publication of the SAR which would influence the transition?

3. If the grouted low-level waste forms fail to meet NRC acceptance criteria, have adequate engineering contingencies (for waste storage or reprocessing) been made to sustain plant clean-out operations until the regulatory issues have been resolved?

G. DOE Orders

1. What is the status of compliance with DOE 5400 and the DOE 5800-series Orders with emphasis on the NEPA Order 5440.1C and Waste Management Orders 5400.3 and 5820.2A, Radiation Protection, Orders 5400.4 and 5400.5 Technical Safety Requirements. Has the interconnections of these orders with shutdown facilities and the evolving regulatory requirements and inter-agency agreements (TPA) been explored and assessed.

2. What have been the results of past audits by WHC (such as self-assessments), Unusual Occurrence Reports (UORs), and external audit reports?

3. What is the WHC implementation of Waste Management in conformance with the requirements of DOE Order 5820.2A.

G. Risk Acceptance Criteria for Workers and Public

1. What DOE and other agency requirements related to radioisotope releases, exposure doses or radiation protection must be met during plant clean-out operation?

H. Federal Facility Compliance Agreements

1. Does the Tri-Party Agreement appear to be having any influence on evolving plant shutdown, particularly on RCRA or CERCLA compliance issues, or on the plant stack filtration and monitoring requirements?

2. Could pending Environmental Protection Agency (EPA) or State of Washington actions pose an issue to PUREX plant shutdown?

3. What analyses have been carried out on the consequences of potential fires that could occur during clean-out or shutdown storage?

I. Regulatory Aspects in Final Deactivated State

1. Effluent streams

2. Permits

3. Migration of materials or contamination

4. Continuing streams such as in leakage, runoff, and service functions

5. Fire protection

6. Ventilation systems

7. Shutdown surveillance, including operational, radiological, and environmental

A.4.f.3 Management Questions

A. Standby and deactivation requirements

1. What is the scope of the PUREX facility; what other ancillary facilities are no longer required when PUREX is shutdown?

2. What other ancillary facilities are needed to support shutdown? Waste disposal tankage capacity, processing capability to remove residual fuel, special tooling to remove spilled fuel rods, special processing to neutralize, solidify and dispose of spent solvents, and repairs or special maintenance to equipment to maintain facility in safe, environmentally acceptable manner?

3. What are the criteria the facility must meet for shutdown or D&D ready condition? Has the time between shutdown and D&D been estimated? What assumptions were made with regard to the degree of clean-out for the hazardous materials and process equipment and materials of the plant; with regard to schedules and funding? How were the

requirements and assumptions internally and externally validated and approved?

4. What management processes were used to define and select the clean-out treatment system elements, baseline technology to satisfy these requirements? What assumptions were made or required? What external search was made to evaluate and select the cleanout technology , such as West Valley or Savannah River? What internal process was used to internally and externally validate these selections?

B. Strategies and planning

1. Are the PUREX transition and shutdown or D&D ready planning and strategies based on safe, quick, minimum cost, and sound business principles?

2. What is the basis for validating the aforementioned strategies?

3. Are modifications to the plans and strategies feasible which would significantly reduce the time or funding required to reach shutdown? Were these plans and strategies demonstrated at other facilities? What are the barriers to these modifications or alternate approaches? Have the alternative approaches been successfully demonstrated at other facilities?

4. What is the management track record on carrying out plans and strategies?

C. Scope, schedule, and cost management

1. What are the major assumptions used in the development of the base cost estimate and schedule? How do these relate to the overall project objectives?

2. Has a detailed "bottoms-up" estimate been prepared for each alternative? Does the "bottoms-up" estimate start with an identification of the activities and tasks to be performed, the resources of manpower , equipment and materials needed and necessary and appropriate management staffing levels to provide only those activities identified for the project.

3. Does the estimate include detailed activity descriptions for staff and crew which justifies their need on the project? For each of these activity descriptions, has the necessary and

minimum manpower loading been estimated? Has a comparison been made of the staff-to-crew ratio for this project to other projects of similar scope and difficulty? Do the crew loadings represent "traditional" or typical union labor agreements as to work rules and crew size?

4. What is the definition of "contingency" as used in the cost estimate? What elements are included - emissions or errors in the estimate, allowances, regulation changes, engineering changes, schedule slippages, scope changes, inflation, escalation, field technical problems including equipment breakdown, industrial accidents, weather or other factors? Have these factors been separately assigned contingency percentages? What is the technical basis for assigning these percentages? Has an independent review been performed as to the reasonableness of these percentages? Is there any on-site track record of similar contingency percentages? Are there also "internal contingency" factors used in the estimate such as allowances for unknowns? Are these contingency elements separable from the estimate?

5. Has a risk analysis been performed on the major elements of contingency , particularly with respect to inflationary factors or escalation factors? Examples might include the cost for on-site or off-site disposal of chemical hazardous and toxic or radioactive wastes?

6. Have cost-benefit analyses been performed of the alternatives for each of the major potential problem areas identified in the estimate?

7. What is the basis for the calculation of schedule? Was the schedule "backed-into," or developed from a "bottoms-up" approach? Were the elements of labor availability and safety to workers included in the utilization of the maximum number of work crews needed to perform the identified activities?

8. Were the institutional barriers of labor union agreements a major concern in the development of the crew size and productivity?

9. Has the cost estimating format been reviewed with respect to traceability of budget and schedule cost controls? Is there sufficient detailed breakdown to track each major task as to labor, materials, equipment and consumables?

10. What collateral costs are accounted for in the estimate, such as power, lighting HVAC, etc.

11. Is the data base used in the estimate based on historical data on-site, or on estimates and allowances judged "reasonable" by the estimating staff?

12. What has been the track record of the staff to meet budget and schedule commitments on prior major projects?

13. What management and planning issues have been identified to date? Does an adequate, justifiable plan exist for their resolution? What other emergent management issues may be an issue during the transition and shutdown phase?

14. What other management and planning limitations may impact the transition and shutdown?

D. Risk Management

1. What are the key risks associated with the clean-out and shutdown-storage? How was each risks defined/determined? What assumptions were required? How were the risks validated and prioritized?

2. What contingency planning has occurred in anticipation of waste treatment system problems? What is the cost of each contingency scenario?

3. What is management's track record on recognition and resolution of institutional, programmatic, and technical risk?

E. Management processes

1. How are the PUREX transition participant's roles, responsibilities, and accountabilities defined and implemented? What metrics are used to assess performance?

2. What are the formal and working relationship and communication channels among the program and project participants?

3. Within and across organizational activities, how are issues identified and addressed, decisions reached, and conflicts resolved?

4. Integration with down stream waste programs

5. Are clean-out process-engineering planning and activities integrated with Tank Farm operations and WRAP?

F. Operational procedures

1. Are day-to-day operations performed according to technically sound, practical, and monitored practices that ensure safe conditions at all times? Have engineering analysis been performed of what practices are required for shutdown?

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APPENDIX N

BENCHMARKING PROCEDURES*

N.1. Benchmarking Defined

There are several bases on which to define benchmarking as an activity. Benchmarking has a formal definition which has wide application to all business functions. Webster's definition is also informative. Perhaps even more important is the need for a working definition.

N.1.1. Formal Definition

The formal definition was derived from experience and successes of the earliest days of applying benchmarking techniques in the manufacturing area:

> *Benchmarking is the continuous process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders.* (David T. Kearns, chief executive officer, Xerox Corporation)

There are several considerations in this definition requiring further description.

Continuous process. Benchmarking is a self-improvement and management process that must be continuous to be effective. It cannot be performed once and disregarded thereafter on the belief that the task is done. It must be a continuous process because industry practices constantly change. Industry leaders constantly get stronger. Practices must be continually monitored to ensure that the best of them are uncovered. Only those firms that pursue benchmarking with discipline will successfully achieve superior performance. In an environment of constant change complacency is fatal.

Measuring. The term benchmarking implies measurement. Measurement can be accomplished in two forms. The internal and external practices can be

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* This text taken from Benchmarking: The Search for Industry Best Practices That Lead to Superior Performance, by Robert C. Camp (Xerox), ASQC Quality Press, ISBN: 0873890582, 1989, pgs. 10-21, with the permission of the publishers Quality Resources, White Plains, NY and ASQC Quality Press, Milwaukee, WI.

compared and a statement of significant differences can be documented. This is a word statement measurement of the industry best practices that must be implemented to achieve superiority, although qualitative in nature. It describes the opportunity for change to best practices.

The practices can be quantified to show an analytical measurement of the gap between practices. It quantifies the size of the opportunity. This metric is often the single-minded measurement that most managers want. While it is important and traditional to strive to obtain analytically derived benchmark metrics, it will become apparent that both must be pursued. Practices on which the metrics are based should be pursued first. Benchmarking is not just an investigation of the metrics of the external business function, but an investigation to determine what practices are being used to ensure effectiveness and eventually superiority and which practices achieve the metrics. Benchmarking is not just a study of competition but a process of determining the effectiveness of industry leaders by measuring their results.

Products, services, and practices. Benchmarking can be applied to all facets of a business. It can be applied to the basic products and services. It can be applied to the processes that go into manufacturing those products. It can be applied to all process practices and methods that are in support of getting those products and services effectively to customers and meeting their needs. Benchmarking goes beyond the traditional competitive analysis to not only reveal what the industry best practices are, but to also obtain a clear understanding of how best practices are used.

It will be the view here that most business activities can be analyzed as processes. Most business activities have a beginning, an end, and a main activity. There is an output from the process that is what the next customer wants, whether that customer is internal or an external, end user or consumer of the output or product. A study of business processes and their methods and practices will be the main objective of the benchmarking approach.

Companies renowned as industry leaders. Benchmarking should not be aimed solely at direct product competitors. In fact it could be a mistake to do so since they may have practices that are less than desirable. Benchmarking should be directed at those firms and business functions within firms that are recognized as the best or as industry leaders, such as banks for error-free document processing. The company serving as a benchmark partner is not always obvious. Careful investigation is needed to determine which firms to seek as benchmarking partners and why. Fortunately there are ways to uncover who and why they should be chosen.

In the formal sense benchmarking is an ongoing investigation and learning experience that ensures that best industry practices are uncovered, analyzed, adopted, and implemented. It focuses on what best practices are available. It ensures an understanding of how they are performed. Any finally, it determines the worth of the practices or how well they are performed.

N.1.2. Webster's Definition

The Webster's dictionary definition is also informative. It defines a benchmark as:

> *A surveyor's mark . . . of previously determined position . . . and used as a reference point . . . standard by which something can be measured or judged.*

Both definitions serve to reinforce the benchmark as being a standard for the comparison of other objects or activities. It is a reference point from which others are to be measured.

Outside of land surveying where a benchmark is well understood and accepted, there is only one other common use of the term. The computer industry has used the term to mean a standard process for measuring the performance capabilities of software and hardware systems from various vendors. The standard then serves as a basis of choice between the alternative offerings, each of which can be different features and functions, but meet the overall requirements by a different mix of capabilities.

Benchmarking used in the dictionary sense serves as a standard, but one which may change over time to reflect the real conditions of the business world, namely that business practices must change over time to remain competitive.

N.1.3. A Working Definition

The definition of benchmarking, as seen from the perspective of one who has been involved in the process over a number of years and exercised the process many times, incorporates the previous definitions. But it goes beyond to emphasize some important considerations not included in these definitions. The working definition preferred for benchmarking is:

> *Benchmarking is the search for industry best practices that lead to superior performance.*

This definition is preferred because it it understandable by operationally oriented business units and functions. If they know their operations thoroughly, then the search to ensure that the best of proven practices are incorporated is a clear objective. The definition covers all possible business endeavors whether a product, service, or support process. It is not necessary to include them by specific reference.

The focus is on practices. It is only the change of current practices or methods of performing the business processes that overall effectiveness will be achieved. It stresses practices and the understanding of practices before deriving a benchmarking metric. Benchmarking metrics are seen as a result of understanding best practices, not something that can be quantified first and understood later.

The definition concentrates on achieving superior performance. In this regard it pursues *dantotsu*, the best of the best practices, best of class, or best of breed. That is, those best practices that are to be pursued regardless of where they exist—in one's own company, industry, or outside one's industry. It is only this view that will ensure superiority rather than parity.

The definition is proactive. It is a positive endeavor. It is one calculated to obtain cooperation of benchmarking partners. There should be few professionals who would object to constantly seeking best practices. There should be a constant sharing of ideas and debating about how the industry is going to constantly improve itself. This will only occur if the search is open and seen as benefiting both benchmark partners.

Benchmarking should be approached on a partnership basis in which both parties should expect to gain from the information sharing. The discussion of practices and methods, especially among noncompetitors, can only result in both parties gaining from the investigation and discussions. Even competitors can gain in discussions that appropriately skirt proprietary and sensitive topics. The concentration solely on best practices permits that objective to be achieved.

Benchmarking as a term should motivate managers because it is a positive activity, perceived as a mechanism for improving operations to proactively search for best practices. It will be only through the test of finding the best of the best in industry that any manager will be able to justify his or her own operation and assure that he or she has performed to the ultimate standard.

Benchmarking is the most credible of all justifications for operations. There can be little argument about a manager's position if he or she has sought the best in industry and incorporated it it his or her plans and processes.

N.2. <u>What Is Benchmarking?</u>

There should be some understanding of what benchmarking is and is not, and its relationship to target setting. There are many misconceptions of what benchmarking is and these should be clearly understood and reinforced. What benchmarking is not should be quickly dispelled. Likewise, since benchmarking involves setting new directions, its relationship to targets should be understood also. These should give a better understanding of where benchmarking fits into the overall planning scheme.

N.2.1. What it is, What it is not

Benchmarking is not a mechanism for determining resource reductions. While that may occur because many operations do not emulate best industry practices, it does not necessarily mean a reduction. Resources will be redeployed to the most effective way of supporting customer requirements and obtaining customer satisfaction as a result of benchmarking activities. It may be that benchmarking will require a resource increase, both people and spending, as a result of more correctly determining true customer satisfaction levels and needs from benchmarking activities.

Benchmarking is not a panacea or program. It must be an ongoing management process that requires constant updating—the collection and sifting of external best practices and performance into the decision making and communications functions at all levels of the business. Benchmarking must have a structured methodology to ensure successful completion of thorough and accurate investigations. However, it must be flexible to incorporate new and innovative ways of assembling difficult-to-obtain information. The benchmarking process steps can be applied repetitively, yet be adaptable. The benchmarking process must keep those conducting the studies aware of new avenues of approach and information sources while accomplishing the basic task.

Benchmarking is not a cookbook process that requires only looking up ingredients and using them for success. Benchmarking is a discovery process and a learning experience. It requires observing what the best practices are and projecting what performance should be in the future. Through it, information can be gathered that will permit setting performance goals which are realistic in the context of the external business environment by ensuring that best, feasible, proven practices are incorporated into business operations.

Benchmarking is not a fad, but a winning business strategy. It assists managers in identifying practices that can be adapted to build winning, credible, defensible plans and strategies, and complement new initiatives to achieve the highest performance goals—namely, superior performance.

Benchmarking is a new way of doing business. It forces an external view to ensure correctness of objective setting. It is a new management approach. It forces constant testing of internal actions against external standards of industry practices. It promotes teamwork by directing attention on business practices to remain competitive rather than personal, individual interest. It removes the subjectivity from decision making.

N.2.2. Benchmarking and Targets

Benchmarking is basically an objective-setting process. Benchmarks, when best practices are translated into operational units of measure, are a projection of a future state or endpoint. In that regard their achievement may take a number of years to attain. The benchmarks may most importantly indicate the direction that must be pursued rather than specific operationally quantifiable metrics that are immediately achievable. A benchmarking study may indicate that costs must be reduced and customer satisfaction levels increased or return on assets increased. In addition, the concentration on best practices supports the general direction that must be pursued with specific insights into how the benchmarks can or should be attained. The conversion of benchmarks to operational targets translates the long-term actions into specifics.

Targets are more precise although their quantification should be based on achievement of a benchmark. Furthermore, a target incorporates in it what realistically can be accomplished within a given time frame, usually one yearly budget cycle or business plan horizon. Considerations of available resources, business priorities, and other operational considerations convert benchmark findings to a target, yet steadily show progress toward benchmark practices and metrics. The significant difference between a complete benchmark definition and a target is that a carefully conducted benchmark investigation will not only show what the benchmark metric is but also how it will be achieved.

N.3. Key Process Steps

The benchmarking process is displayed in Figure N.3 - 1. The individual steps will be covered in more detail in later chapters. The L. L. Bean case study in Chapters 3 through 12 takes readers through each step in a real-life applications. The key ways of conducting a benchmarking investigation through to successful conclusion will also be detailed.

It is important, however, to have a general understanding of the generic phases and some understanding their rationale. The benchmarking process consists of five phases. The process starts with a planning phase and proceeds through analysis, integration, action, and finally maturity.

N.3.1. Planning Phase

The objective of this phase is to plan for the benchmarking investigations. The essential steps are those of any plan development—what, who, and how.

What is to be benchmarked? Every function of a business has or delivers a product. The product is the output of the business process of the function, whether a physical good, an order, a shipment, an invoice, a service, or a report. Benchmarking is appropriate for these and all other outputs. The products therefore must first be determined.

To whom or what will we compare? There are business to business, direct product competitors. These are certainly prime candidates to benchmark. But they are not enough. Benchmarking must be conducted against leadership companies and business functions regardless of where they exist. Only in this fashion will superiority be ensured.

How will the data be collected? There is no one way to conduct benchmarking investigations. There is a process. There are an infinite variety of ways to obtain required data, and most data are readily and publicly available. A certain level of inquisitiveness and ingenuity is required, but a combination of methods that best meets the study needs will most often be productive. Sources of information are limited only by one's imagination.

What will be important is to recognize that benchmarking is a process not only to derive quantifiable metric goals and targets but more importantly to investigate and document those best industry practices which permit achievement of the goals and targets. A benchmarking study should concentrate on practices and methods. Their effect can always be quantified. (See the L. L. Bean case study in Chapters 3 through 5.)

N.3.2. Analysis Phase

After determining what, how, and who is to be benchmarked, actual data gathering and analysis must be accomplished.

The analysis phase must involve a careful understanding of current process practices as well as those of benchmarking partners. The benchmarking process is, after all, a comparative analysis. What is desired is an understanding of internal performance on which to assess strengths and weaknesses. Is the benchmarking partner better? Why are they better? By how much? What best practices are being used now or anticipated? How can their practices be incorporated or adapted for implementation?

Answers to these questions will be the dimensions of any performance gap: negative, positive, or parity. The gap provides an objective basis on which to act—to close the gap or capitalize on a positive one. The gap, however, is a projection of performance and therefore will be one which changes as industry practices change. What is needed is not only an understanding of today's practices but where performance will be in the future. It is important that benchmarking be a continuing process so that performance is constantly recalibrated to ensure superiority. (See the L. L. Bean case study in Chapters 6 and 7.)

N.3.3. Integration

Integration is the process of using benchmark findings to set operational targets for change. It involves careful planning to incorporate new practices in the operation and to ensure benchmark findings are incorporated in all formal planning processes.

The first step is to gain operational and management acceptance of benchmark findings. Findings must be clearly and convincingly demonstrated as being correct and based on substantive data. Credible data can be supported by deriving data and information from several sources to support the findings. Based on the findings action plans can then be developed.

Benchmark findings must be communicated to all organizational levels to obtain support, commitment, and ownership. This essential step can usually be accomplished through a variety of communications approaches. The key to the process will be the conversion of benchmark findings into a statement of operational principles to which the organization can subscribe and by which actions for change will be judged. These principles place the organization on notice that they are the rules by which the organization will improve itself to meet customer needs and eventually to attain superiority. (See the L. L. Bean case study in Chapters 8 and 9.)

N.3.4. Action

Benchmarking findings and operational principles based on them must be converted to action. They must be converted to specific implementation actions and a periodic measurement and assessment of achievement must be put in place. People who actually perform the work tasks are most capable of determining how the findings can be incorporated into the work process. Their creative talents should be used to perform this essential step.

In addition, any plan for change should also contain milestones for updating the benchmark findings themselves, since the external practices are constantly changing. Therefore provision should be made for recalibration. Also, an ongoing reporting mechanism is needed. Progress toward benchmark findings must be reported to all employees. This feedback is especially necessary to those who assist with the implementation. They will want to know how they are doing. (See the L. L. Bean case study in Chapters 10 and 11.)

N.3.5. Maturity

Maturity will be reached when best industry practices are incorporated in all business processes, thus ensuring superiority. Superiority can be tested in several ways. In some instances services are sold to external customers in addition to serving the internal customer. If the now-changed process were to be made available to others would a knowledgeable businessperson prefer it? That becomes a powerful confirmation of a benchmark. Needless to say if other companies benchmark your own internal operations that also would be confirmation.

Maturity also is achieved when it becomes an ongoing, essential, and self-initiated facet of the management process. It becomes institutionalized. It is done at all appropriate levels of the organization, and not by specialists. While knowledgeable specialists may exist to consult on the most productive approaches for benchmarking, only when the focus on external practices becomes the responsibility of the entire organization will benchmarking truly have achieved its objectives of ensuring superiority through incorporation of best industry practices.

N.4. How to Get Started in Benchmarking

Those who initially are exposed to the subject of benchmarking often ask how they can get started. The author's preferred way is to have them read this text completely and implement and practice the 10-step benchmarking process. But for those who cannot spare the initial time and want a quick primer, Quick Reference Guide 1.1 is provided. It is broken down into two sections. The first section covers initial and somewhat general information gathering, but sound steps in the investigation process. The second section discusses information gathering in the unit's own functional area or area of interest.

To get started in the process of benchmarking there are some proven first steps. One must determine what to benchmark, assuming there is agreement that the next steps will be directed to gathering available data. This may come from library research and contacting internal personnel and sources. Those shown in Quick Reference Guide 1.1 are easily initiated approaches and should be done early in any benchmarking investigation. The guide gives initial target areas to turn to in these starting steps.

The focus of the second area of investigation is more external and on a specific function or area of interest. The information comes from periodicals about the function, associations that represent the function, service bureaus that offer services surrounding the function, and consultants who are knowledgeable about the function. Initial contact with these external sources starts the process of ensuring that all available public information is covered and relevant information is documented. These require a higher level of effort to get underway and should be approached based on sound planning and careful understanding of the scope of the investigations. It also includes two unique sources: industry experts and software vendors. The reason for these will become evident with descriptions in later chapters.

While the guide is not to be inclusive, it does give quick reference to the initial steps found to be productive. A more thorough approach can be tailored following in-depth study of the text and time to define a careful benchmarking investigation. Starting with the guide will provide a faster start and nothing will be lost in the process. The guide is, however, only a guide. It cannot substitute for exercising the full 10-step process. *Caveat emptor* benchmarkers!

N.5. Summary

Successful benchmarking is based on achieving several important factors and management behaviors. It requires management commitment to make tough decisions to base operational goals on a concerted view of the external environment. There must be a willingness on the part of those performing benchmarking to learn from others. There needs to be a realization that internal operations cannot always have the best answer for every problem. They can and should learn from others and constantly measure themselves against the best in the industry. This text describes the necessary skills to conduct successful benchmarking activities. Creativity in extending the basic process will enhance what is covered here to achieve truly superior benchmarking results.

Benchmarking is a continuous process of measuring against the best. Goals are based on the benchmark findings to achieve superiority. Progress is measured periodically to update the organization's position toward achieving the benchmarks. Benchmarking results in process practices and measurable goals based on what the best in the industry is doing and is expected to do. The approach contrasts sharply with the rather imprecise, intuitive estimates of what needs to be done to characterize current searches for productivity. Benchmarking is the rational way of ensuring the organization is satisfying customer requirements and will continue to do so as customer requirements change over time. Benchmarking ultimately reflects an attitude to strive for excellence in every business endeavor.

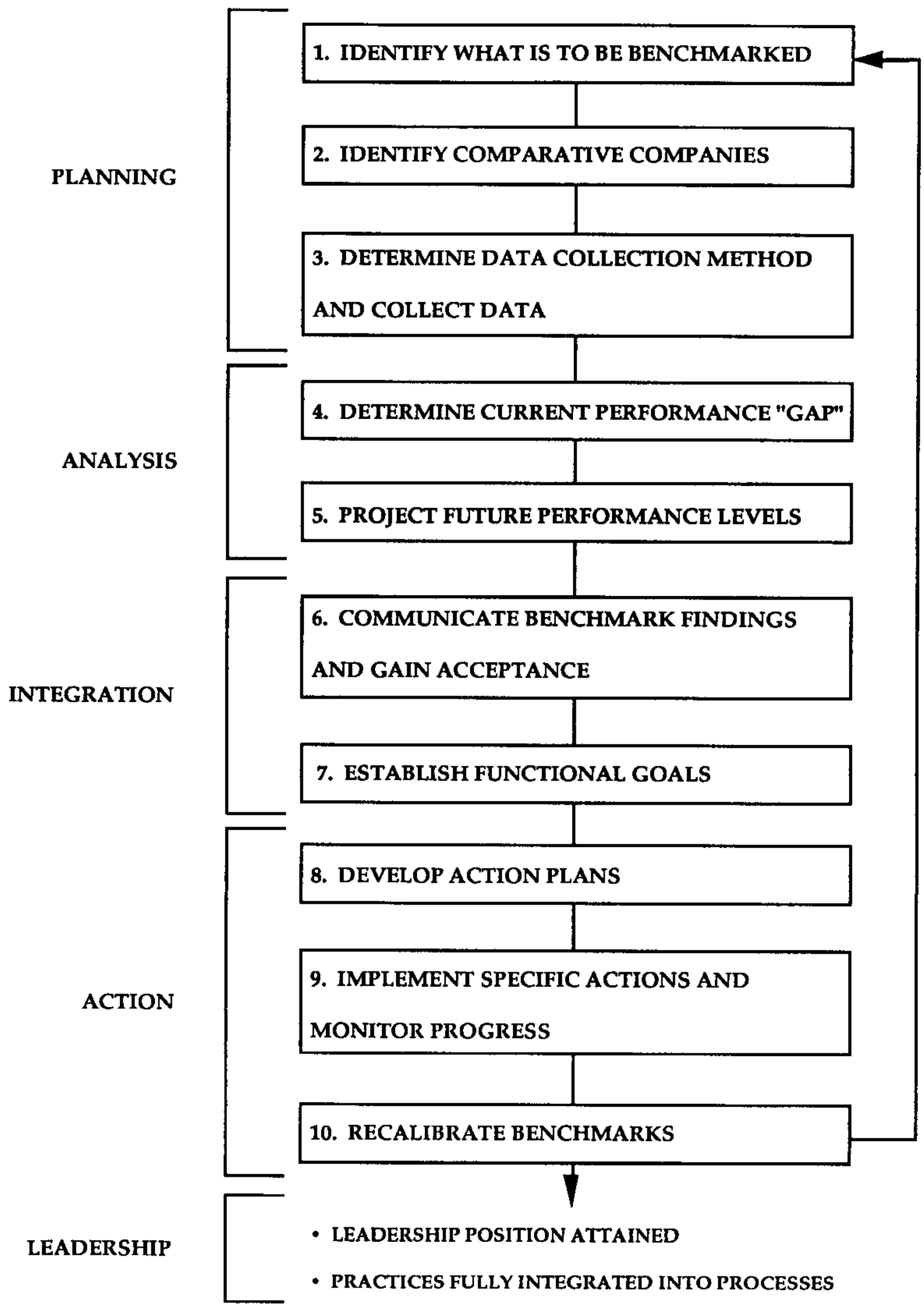

Figure N.3 - 1. Benchmarking Process Steps

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APPENDIX O

AGENDA FOR A TOB

REVIEW PLAN CRITIQUE

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APPENDIX P

AGENDA FOR THE

OVERVIEW ON-SITE ASSESSMENT

P.1. Review Plan Function

Day 1- 3

Introductions	Team Leader
Assessment Objectives	Team Leader
Background of the program, project, or capability	Site Management

- Objectives
- Assumptions
- Plans
- Requirements
- Documentation Structure

Background of "system" in which the assessment progam, project or capability nests	Site Management

- Objectives
- Assumptions
- Plans
- Requirements
- Documentation Structure

Review of Key Source Documents	Site Mgt

- Justification/Authorization memos
- Multi-year customer validated plans

Subpanel Leader - Counterparts Assessment Planning Mtg.

Technical Overview of the Program, Project, or Capability	Engineering
Technical Overview of the System	Engineering
Phenomenology Overview	Engineering

Process Overview	Engineering
Facilities Overview	Engineering
Regulatory Overview	Engineering
Management and Control Overview	Engineering

Day 3- 4

Detailed Presentations by Subpanel Per Planning Mtg.

P.2. Schedule

• Day 1	Assessment Team Mtg.1	7 - 9 AM
	Presentations	9 - 12 AM
	Presentations	1 - 5 PM
• Day 2	Presentations	8 - 12 AM
	Presentations	1 - 5 PM
	Assessment Team Mtg. 2	7 - 9 PM
• Day 3	Presentations	8 - 12 AM
	Presentations	1 - 5 PM
• Day 4	Assessment Team Mtg. 3	7 - 9 AM
	Presentations	9 - 12 AM
	Subgroup Presentations	1 - 5 PM
• Day 5	Subgroup Presentations	8 - 12 AM
	Assessment Team Mtg. 4	1 - 4 PM
	Subpanels Meet With Counterparts	4 - 5 PM
	Team Leader Meets With On-Site Management	

P.3. Assessment Team Meetings

Mtg. 1 - Appendix F Presentation by Team Leader

Mtg. 2 - Subpanels meet to discuss presentations

- Team Leader/Subpanel Leaders discussions

Mtg. 3 - Subpanel meet to discuss presentations

- Team Leader/Subpanel Leaders discussions

Mtg. 4 - Subpanels meet to draft interim findings and concerns report

- Subpanels prepare list of additional documents presentations, and interviews

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APPENDIX Q

SAMPLE AGENDA FOR THE DETAILED ON-SITE ASSESSMENT

Day 1

Team Meeting	7 - 9 AM
- Subpanel leaders present draft strengths, deficiencies, root cause assessments, and concerns	
- Team leader presents feedback from TOB and customer	
Subpanel Meeting With Counterparts	9 - 10 AM
- Receive documents requested and schedule for additional presentations and interviews	
Subpanel Meeting	10 - 5 PM
- Review Documents	

Day 2

Subpanel Investigations	8 - 5 PM
Team Leader - Subpanel Leader Discussions	7 - 9 PM

Day 3

Subpanel Investigations	8 - 5 PM

Day 4

Team Leader - Subpanel Leader Discussions	7 - 9 AM
Subpanel Investigations	9 - 5 PM

Day 5

Subpanels Meet to Draft Executive Summary	9 - 2 PM
Team Meeting	2 - 4 PM
- Subpanel Leaders Present Executive Summary Conclusions	
- Discussion	
Subpanels Meet With Counterparts	4 - 5 PM
- Informal Feedback of Assessment Results	
Team Leader Meets With On-Site Management	4 - 5 PM
- Informal feedback of Assessment Results	

APPENDIX R

ASSESSMENT STATEMENT

FORMAT AND EXAMPLES

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ASSESSMENT STATEMENT

A cogent, unambiguous statement having import to senior DOE officials and substantiated with detailed issues, findings, and observations.

ASSESSMENT STATEMENT CONTENT

You get on an elevator with the DOE-HQs Customer

He recognizes you as a member of this ITR Team

He asks what the team has concluded

You have 30 seconds to answer before he arrives at his floor

Summarize the main points and why they are important

Use terms which are self-explanatory

Address only issues which the customer needs to
- be aware of in his busy day
- take action on

What you must formulate are "Assessment Statements"

ASSESSMENT STATEMENT EXAMPLES

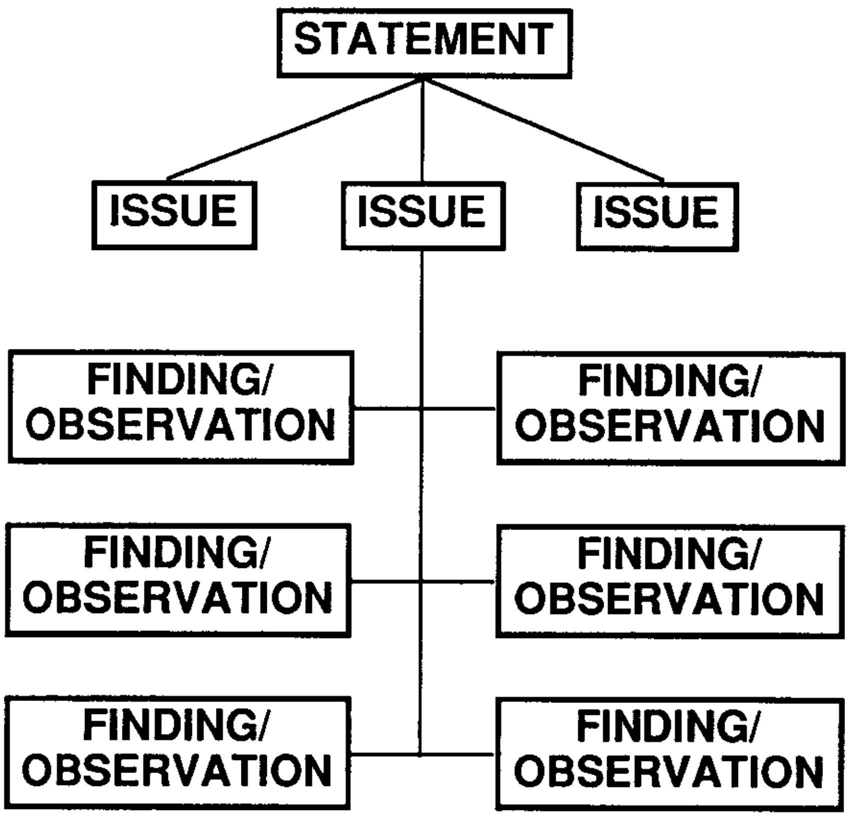
- Multiplicity of concurrent open technology issues indicate detailed design of HWVP is premature
- Programmatic logic and baseline assumptions are being altered by changing conditions
- Significant HWVP/HWVS management issues are not adequately addressed
- Major HWVS/HWVP reevaluation is required

- DWPF can make glass if ammonium nitrate and H2 safety issues are addressed
- Start-up without reference process chemistry modifications, per the schedule, will reduce uncertainties
- Significant system and process engineering is required if the DWPF glass production rate and quality are to be acceptable

- The tank farm infrastructure is in poor condition and deteriorating due to a multiplicity of problems
- Despite recent commendable efforts, Westinghouse Hanford Management has not yet reversed the decline in the condition of the tank farm
- Strict compliance with DOE orders, rather than thoughtful, graded application, has created artificial barriers to improving tank-farm conditions

Independent Technical Review

ASSESSMENT STATEMENT STRUCTURE



Significant HWVP/HWVS Management Issues Are Not Adequately Addressed

HWVP and HWVS Are Managed As Separate Entities With Little Integration

An Integrated Management Structure Is Not In Existence

Fragmentation Of Scientific, Engineering, and Production Activities Is Prevalent

Objectives, Assumptions, Plans, and Detailed Requirements Have Not Been Formally Documented

Resources For HWVP and HWVS Are Allocated On Two Different Priority Scales

Independent Technical Review

APPENDIX S

SUBPANEL REPORT

STRUCTURE AND FORMAT

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APPENDIX T

ASSESSMENT REPORT

STRUCTURE AND FORMAT

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APPENDIX U

RESUME FORMAT

Name:

Position:

Education:

Affiliation:

Experience:

U.1. ITR Member Credentials Examples

Name: Philip Thullen

Position: PUREX ITR Team Leader

Education: B.S., Mechanical Engineering, Purdue University, 1965
M.S., Mechanical Engineering, MIT, 1967
Sc.D., MIT, 1969

Affiliation: LANL, N-DO/RT

Experience: From 1969 through 1976, prior to joining the Los Alamos National Laboratory, Dr. Thullen was Associate Professor of Mechanical Engineering at MIT. He was a member of the Thermal and Fluid Sciences Division performing research on the application of superconductors to electrical power equipment, and teaching classical thermodynamics, cryogenic engineering and related subjects. Since 1976 he has been at Los Alamos where he has been a staff member, Deputy Group Leader and Program Manager working principally in energy related fields. He continued to work on engineering applications of superconductivity and the design of electromagnetic systems for plasma fusion applications. From 1985 to 1991 he was the Program Manager for Construction of the Confinement Physics Research Facility (CPRF), an $80M, seven year construction project employing 70 FTEs. This experience has given Dr. Thullen a depth of experience in both applied research and in the organization and management of R&D facility construction. From January to June 1991 he was a member of the Los Alamos New Production Reactor, Safety Project Office working in the area of system integration. Since June 1991 he has been the Los Alamos Program Manager for Red Team Reviews and Hanford Support. His principle activity is management of Independent Technical Reviews for DOE-EM.

Name: Deborah R. Bennett

Position: PUREX ITR Team Coordinator

Education: B.S., Mechanical Engineering, University of New Mexico, 1978
Coursework for M.S. M.E., University of New Mexico

Affiliation: LANL, N-DO/RT

Experience: Ms. Bennett was, until recently, the Resident Engineer between LANL and the New Production Reactor program in WDC, supporting the independent safety evaluations of the proposed NPR concepts. Prior to that, she managed a team evaluating the technical capabilities of the nuclear subsystems in the SP-100 Space Nuclear Power program. Experience with space nuclear power systems was based on the technical assistance provided to DOE/NE on the general development of Space Reactor Power System (SRPS) programs, and specifically the Thermionic Fuel Element Verification Program. Other previous nuclear-related experiences at LANL have included: providing technical assistance to NRC on technical issues associated with gas-cooled reactor systems, carbide fuel experiments; and experimental evaluations of fuel/cladding relocation phenomena during decay heat modes for the Gas-Cooled Fast Reactor program. Since January 1992, Ms. Bennett has been a member of the Los Alamos Program Office for Red Team Reviews and Hanford Support where she manages Independent Technical Reviews.

Name: <u>Fred N. Carlson</u>

Position: PUREX ITR Regulatory Subgroup

Education: B.S., Mechanical Engineering, University of Idaho, 1962.
M.S., Mechanical Engineering, University of Idaho, 1967.
Doctor of Philosophy, Mechanical Engineering, University of Idaho/Pacific Western University, 1988.

Affiliation: Consultant

Experience: Mr. Carlson is an independent consultant with thirty-one years of operation, engineering, management, and consulting experience in commercial, DOE, and Naval Nuclear Power Plants and DOE production and test facilities. His expertise in Management, Engineering, Quality Assurance, Safety, Health Physics, Security and Safeguards, Emergency Preparedness, Training, and Operations has bee utilized at DOE test and production facilities, and at over thirty commercial nuclear power plants. He has been involved with: the preparation of DOE Orders for emergency planning and preparedness for operational emergencies; the preparation of specialized training courses and subsequent instruction; the Post-Three Mile Island Emergency Preparedness Program for the NRC and FEMA; Tiger Team course preparation, instruction and participation; review of unusual event reporting, various problems, facility shutdown and tampering investigations; and the review of QA practices. In the past, Mr. Carlson has been involved with LOFT facility activities, the Naval Reactors Facility at INEL, has experience as a qualified reactor operator and fuel handler, and was at one time responsible for unique materials development programs associated with advanced rocket designs.

Mr. Carlson currently consults with DOE in reviewing waste management activities and operations, non-reactor nuclear facilities, and performs special investigations.

Name: Pete R. Davis

Position: PUREX ITR Technical Subgroup

Education: Associate of Arts, Sheridan College, 1959
B.S., Physics, University of Wyoming, 1961

Affiliation: President, PRD Consulting

Experience: Mr. Davis has over 30 years experience in various analytical and experimental activities related to reactor safety, covering virtually all aspects of reactor accidents. He has performed probabilistic and deterministic evaluations of reactor and nuclear facility safety, and has analyzed and interpreted experimental reactor safety programs. As Vice-President and Manager of Risk and Safety Analysis at Intermountain Technologies, Inc. in Idaho Falls, Mr. Davis was responsible for the probabilistic risk assessment activities and related severe accident analyses, including review of several full scope PRA studies, planning and analysis of severe accident experiments, and review of PRA methodology and applications.

As founder and president of PRD Consulting, Mr. Davis's most current activities are primarily focused on risk and safety assessments for reactors, nonreactor nuclear facilities and test, research, and production reactors. These activities have included development of risk and safety goals for nuclear facilities.

Name: <u>Robert B. Keel</u>

Position: PUREX ITR Technical Subgroup

Education: B.S., Engineering Mechanics, Virginia Polytechnic Institute, Blacksburg, VA, June 1963

Affiliation: West Valley Nuclear Services Co., Inc., Westinghouse Electric Corporation

Experience: Mr. Keel has managed functional areas such as waste operations, maintenance, warehousing and administrative support, and radiological and nuclear safety. As Manager of D&D Engineering, Mr. Keel was responsible for the engineering direction and control of the site's D&D activities, including the remote dismantling and disassembly of all components and material from the highly radioactive Chemical Process Cell. Earlier employment experience included radiation production manager at the Indian Point Station, manager of the Radiological Engineering Division at the Norfolk Naval Shipyard, and refueling activities performed at Pearl Harbor Naval Shipyard, Naval Reactor's Facility (INEL) and Mare Island Naval Shipyard.

Mr. Keel is currently the Manager of Waste and Maintenance Operations at WVNS, and has just recently returned from a temporary assignment at DOE/HQ where he assisted in the planning and preparation for site-specific transition of surplus facilities from current missions through to deactivation.

Name: <u>Tom LaGuardia</u>

Position: PUREX ITR Management Subgroup

Education: B.S., Mechanical Engineering, Polytechnic Institute of Brooklyn, 1962
M.S., Mechanical Engineering, University of Connecticut, 1968
P.E., Connecticut
P.E., New York

Affiliation: TLG Engineering, Inc.

Experience: Mr. LaGuardia has extensive experience in the following functional areas: planning and management of decontamination and decommissioning programs; planning and development of the design of low-level waste facility projects; heat transfer and fluid flow systems analysis of nuclear and conventional power plant operation and process equipment; development, implementation and audit of quality assurance programs; organization, management and supervision of engineering personnel. He has gained an intimate familiarity with approaches, methodologies and regulatory requirements associated with handling, packaging and storage of decommissioning feasibility and cost studies for over 50 nuclear and fossil plants. He has prepared reactor decommissioning feasibility/cost estimates, and testified in licensing ad rate-making hearings, and has prepared decommissioning conceptual study for the Shippingport Reactor and West Valley Nuclear Fuel Service Center.

Mr. LaGuardia is currently responsible for the operation of TLG Engineering, Inc., a consulting engineering company whose principal objective is to provide planning and management of decontamination and decommissioning projects, and to support nuclear power plant utilities in estimating and funding the costs of decommissioning.

Name: Boris Rosev

Position: PUREX ITR Technical Subgroup

Education: M.S. Electrical and Mechanical Engineering University, Europe, July, 1967. (NOTE: Evaluated and accepted by Columbia University of N.Y.C., March 1970.)

Affiliation: LANL, N-DO/RT

Experience: Mr. Rosev has extensive design experience with the design and management of complex engineering projects in nuclear and fossil power plants. He has supervised the installation and commissioning of fossil power units in Europe and the United States, and has extensive supervisory experience with the installation and commissioning of PWR and BWR nuclear plants for Con Edison Co., Bechtel Power Co. and Ebasco Services. He was then involved with the Power Division of American Arabian Oil Company (ARAMCO) in managing complex engineering projects that ensure the reliability and availability of power plants within the ARAMCO System, and maintenance projects associated with offshore oil producing platforms.

Mr. Rosev has worked at Los Alamos National Laboratory since 1987 on the design, procurement installation, and commissioning of systems to provide pulsed power for the Nuclear Fusion Research Experiment, and performing accident and system analyses on proposed New Production Reactors. Since January 1992, Mr. Rosev has been a member of the Los Alamos Program Office for Red Team Reviews and Hanford Support, and has participated in a number of technical reviews.

Name: <u>George Toto</u>

Position: PUREX ITR Regulatory Subgroup

Education: B.S., Electrical Engineering and Special Studies, Mechanical Engineering, University of Pennsylvania, 1953
Various Advance Studies at University of Pittsburgh, Pennsylvania State University and Westinghouse Graduate Schools.
P.E., Ohio
P.E., Pennsylvania
P.E., Tennessee

Affiliation: Principal and Head of Inglewood Group Inc.

Experience: Mr. Toto has 38 years of quality performance and achievement in management, engineering including analysis, design, licensing, construction, decontaminating & decommissioning, testing, start up, operation, maintenance, quality assurance, training, technical sales, marketing and project program management of complex facilities. He has directed the design of mechanical, fluid, and electrical systems and components for plant operation, maintenance, and decontamination and decommissioning. Mr. Toto has provided his special skills in turning around troubled facilities and poor management performance at facilities such as at both Sequoyah Units, Browns Ferry Unit 2, Watts Bar Nuclear Station. Based on his previous extensive experience with naval nuclear reactors in terms of shipyard construction, testing, refueling and maintenance activities, and based on a knowledge of the differences in design and operating philosophies between Naval Reactors and commercial reactor methodologies, he was able to improve field tooling, procedures, personnel qualification and job execution for Westinghouse Nuclear Services.

Mr. Toto has most recently been a senior consultant to the Department of Energy (DOE) in matters of operations and training, has published case studies and programs for teaching Management, Operations, Maintenance and support elements in performing in a safe, efficient and cost effective manner, and is a leader in implementing formality in operations including RCRA and CERCLA programs for waste and site remedial actions.

Name: <u>Douglas Weaver</u>

Position: PUREX ITR Management Subgroup

Education: BSET, DeVry Technical Institute, 1966

Affiliation: Sandia National Laboratory (SNL)

Experience: Mr. Weaver has been employed by the Sandia National Laboratory since 1967. During that time he has held a number of technical and supervisory positions. From 1984 to 1986 he was supervisor of the radiation hardened Integrated Circuit II Development Division. In this capacity he was responsible for developing the microelectronics technology and process clean room, and facility concepts for the 167, 000 sq. ft., $67M RHIC II facility. Most recently he has been the Department Manager of Microelectronics Component Development, including technology and process development, prototyping, DoD and industry reimbursable projects, and advanced microelectronics packaging development. He has been responsible for the activities of over 100 Ph.D, M.S., and B.S. engineers, technicians, and hourly personnel with an annual budget of $15m. Since June 1991, Mr. Weaver has worked in collaboration with the Los Alamos Program Office for Red Team Reviews and Hanford support in preparing, managing and performing Independent Technical Reviews and associated activities. He is presently Manager of the Capability Assessment Program Office at Sandia National Laboratories.

Name: <u>Steve Wiegman</u>

Position: PUREX ITR Regulatory Subgroup

Education: B.S., Civil Engineering, California Polytechnic University

Affiliation: SAIC, Science Application International Corporation

Experience: Mr. Wiegman has 21 years experience in the application of safety and environmental regulatory requirements to energy facilities, nuclear material production and waste management. His scope has included long range planning, project development, siting, licensing, construction inspection and startup. His career has included technical staff and various levels of management in line and matrix organizations with extensive experience interfacing with decision makers, regulatory agencies, general public and media. While in the employ of Rockwell Hanford Operations, Mr. Wiegman was responsible for multiple technical safety activities, and for all company activities associated with long-term nuclear and mixed waste disposal planning. Mr. Wiegman has worked with Southern California Edison Company as a senior engineer and then a Supervisor, responsible for futures research and strategic planning to deal with new environmental issues, and was responsible for environmental licensing of San Onofre, Units 2 and 3.

Mr. Wiegman is now with SAIC providing environmental compliance and waste management consultation.

Name: Lyle Zahn

Position: PUREX ITR Technical Subgroup

Education: B.S., Chemical Engineering, Clarkson University, Potsdam, NY, 1947
Professional Engineer, Washington (Chemical)
Professional Engineer, California (Nuclear)

Affiliation: Independent Consultant

Experience: Mr. Zahn has a proven history of executive management ability with a record of success in nuclear and chemical fields. He has an extensive background in chemical processing technology, systems design, project management, and plant operations. Mr. Zahn was responsible for restarting the Hanford PUREX Plant after 11 years of downtime, an effort which included extensive upgrades of facilities, preparation of engineering, safety, and environmental documentation, staffing and training of personnel, and extensive preoperational testing of the plant. Much of the success of this effort was based on his plant manager experience at the PUREX and UO3 facilities in the mid-1960's when production fuel, N reactor fuel, irradiated thoria, and specialty reactor fuels were processed. At other times in his career, Mr. Zahn consulted on the safety of the Idaho Chemical Processing Plant, and on processing commercial nuclear waste. Mr. Zahn has been responsible for commercial spent nuclear fuel disposition business areas at General Electric, and for total engineering services for new and modified facilities within ARCO Chemical.

Mr. Zahn has most recently interacted with the Rocky Flats Plant on plutonium processing, consulted on the DOE Modernization Program and on the Hanford Liquid Effluent Retention Facility, and developed the Technical Basis Document for establishing the Operational Safety Requirements for the Hanford LERF and source plants.

APPENDIX V

TECHNICAL OVERSIGHT BOARD

MEETING AGENDA EXAMPLE

PROPOSED AGENDA

ITR TECHNICAL OVERSIGHT BOARD

Salt Lake City, Utah

October 14, 1993

Welcome and TOB Charter	**Thullen**	**8:00 a.m.**
Ongoing ITR Work	**Thullen**	**8:30 a.m.**
Isotope Facilities Shutdown Program	**Weaver**	**9:00 a.m.**
WIPP ITR Assessment		**11:00 a.m.**
• **Activities to Date**	**Thullen/Bennett**	
• **DOE/HQ Presentation**	**Brocoum**	
• **Assessment Report**	**Thullen/Bennett**	
Closeout Actions	**TOB**	**2:30 p.m.**
Adjourn		**3:15 p.m.**

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APPENDIX W

CUSTOMER PRESENTATION FORMAT

- Get to the key couple of points quickly.
- Use a minimum of background information foils.
- State the objective of the review and the time window.
- Provide an assessment statement summary.
- Have a details foil for each assessment statement.
- Have back-up viewgraphs available, but not in the handout, to explain key details.
- Provide recommendations only if requested to do so in the charter.
- Provide other key points for consideration, outside of the charter, if appropriate.
- Be prepared to talk from either foils or handouts.
- You may not get beyond the first couple of foils - so get to the point quickly!
- Use simple black and white foils.
- For a one hour presentation - plan on 12 to 18 foils.

PUREX
TRANSITION to DEACTIVATION
CONCEPTUAL PLAN

Presented To

Leo Duffy

Assistant Secretary for Environmental Management
EM-1

By
P. Thullen, LANL
November 19, 1992

D. Bennett	LANL	**B. Rosev**	LANL
F. Carlson	Consultant	**G. Toto**	Inglewood
P. Davis	PRD	**D. Weaver**	SNL
R. Keel	Westinghouse	**S. Wiegman**	SAIC
T. LaGuardia	TLG Eng.	**L. Zahn**	Consultant

OUTLINE

- Purex Plan Summary
- Conceptual Plan Elements
- Managing Competing Requirements
- Graded Compliance
- Defining, Communicating, and Managing Program Risk

ITR CHARTER

Review of the planning, technical basis, and issues related to the transition of the PUREX plant status from standby to safe deactivation, with minimum surveillance

- Provide recommendations on a strategy to achieve minimum cost, safe transition to a minimum maintenance-cost, safe deactivation state.
- Provide recommendations, methods, activities, criteria, and potential changes to requirements applicable to PUREX and other DOE facilities.
- On-site Between July 13th and August 7th

PUREX BACKGROUND

- Constructed between 1953 and 1956
- Plutonium solvent extraction from reactor fuel rods
- Operations carried out 1956 to 1972 and 1983 to 1988
- Stabilization run in Oct., 1990
- Standby guidance in Oct., 1990
- Transferred from DP to EM in July, 1991
- Achieved cold standby by August, 1992

NO TECHNICAL BARRIERS

The PUREX Plant (canyon and tunnels) is in a safe, stable, high mortgage standby condition with no technical barriers to a timely transition to safe deactivation.

- The Plant Manager has taken prudent steps during standby which reduce risk and help prepare for deactivation.
- The deactivation planning elements which were the focus of this review were not found.
- If DOE plans to continue the present standby status, planning and actions different from this presentation will be required

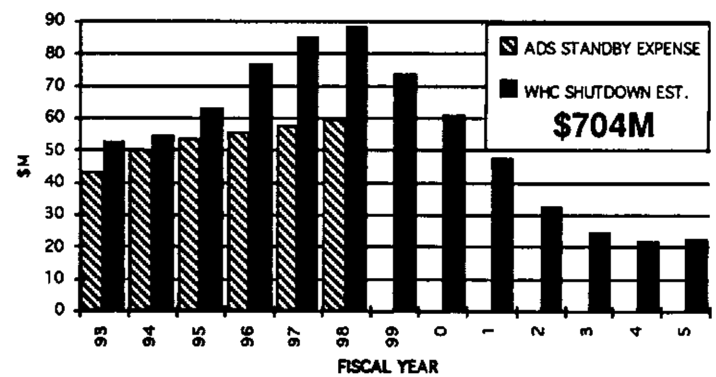
TRANSITION TO DEACTIVATION CONVENTIONAL APPROACH

KEY FEATURES

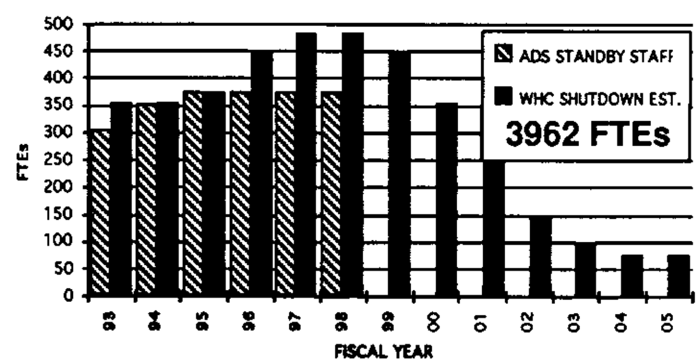
(Based on the transition to standby)

- **Level-of-Effort Program**
  - Incremental change to historical operations approach
  - End state undefined
  - No meaningful objectives, milestones, and metrics
  - Transition rate limited by sustenance of operations organization and methods
  - Budget change w/o scope and schedule change
- **A complex intertwined system of real and perceived institutional/site barriers to cost effective management and innovation**
  - Lack of leadership, trust, teamwork, efficient communications and logistics
  - No program level incentives for cost effective management
  - Glacial decision process
  - Zero risk regulatory and order compliance
  - Individual manager span of control is narrow

PUREX/UO3 OPERATING EXPENSE



PUREX/UO3 OPERATING STAFF

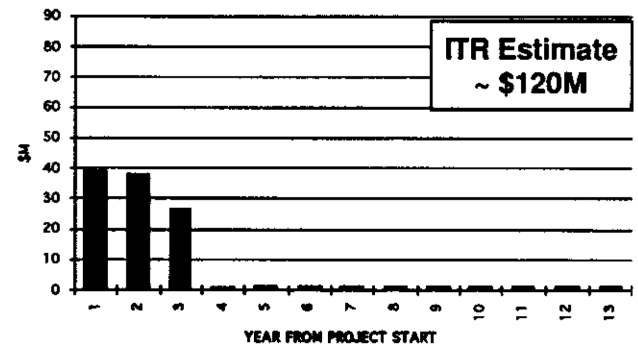


TRANSITION TO DEACTIVATION CONCEPTUAL APPROACH

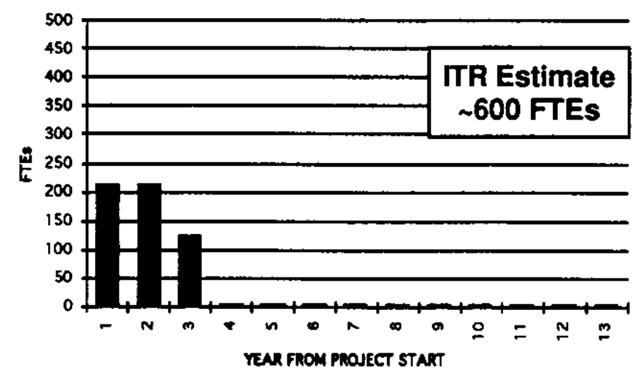
KEY FEATURES

- **Integrated, systems approach**
- **Construction transition analog**
- **Chunked Project**
  - Transition Project Management Plan (TPMP)
  - Criteria, objectives, milestones, metrics
  - Scope, schedule, and cost baselines w/change control
  - Institutional environment for the project and the project management structure proposed
    - Roles and responsibilities
  - Risk based graded application of regulations and orders
  - Mobilization
  - Scheduled oversight reviews
- **Locked, empty deactivation storage**
  - Decade to D&D planning horizon

INDEPENDENT TECHNICAL REVIEW PROJECT CASE



INDEPENDENT TECHNICAL REVIEW PROJECT CASE



CONCEPTUAL PLAN ELEMENTS

INTEGRATED SYSTEMS APPROACH

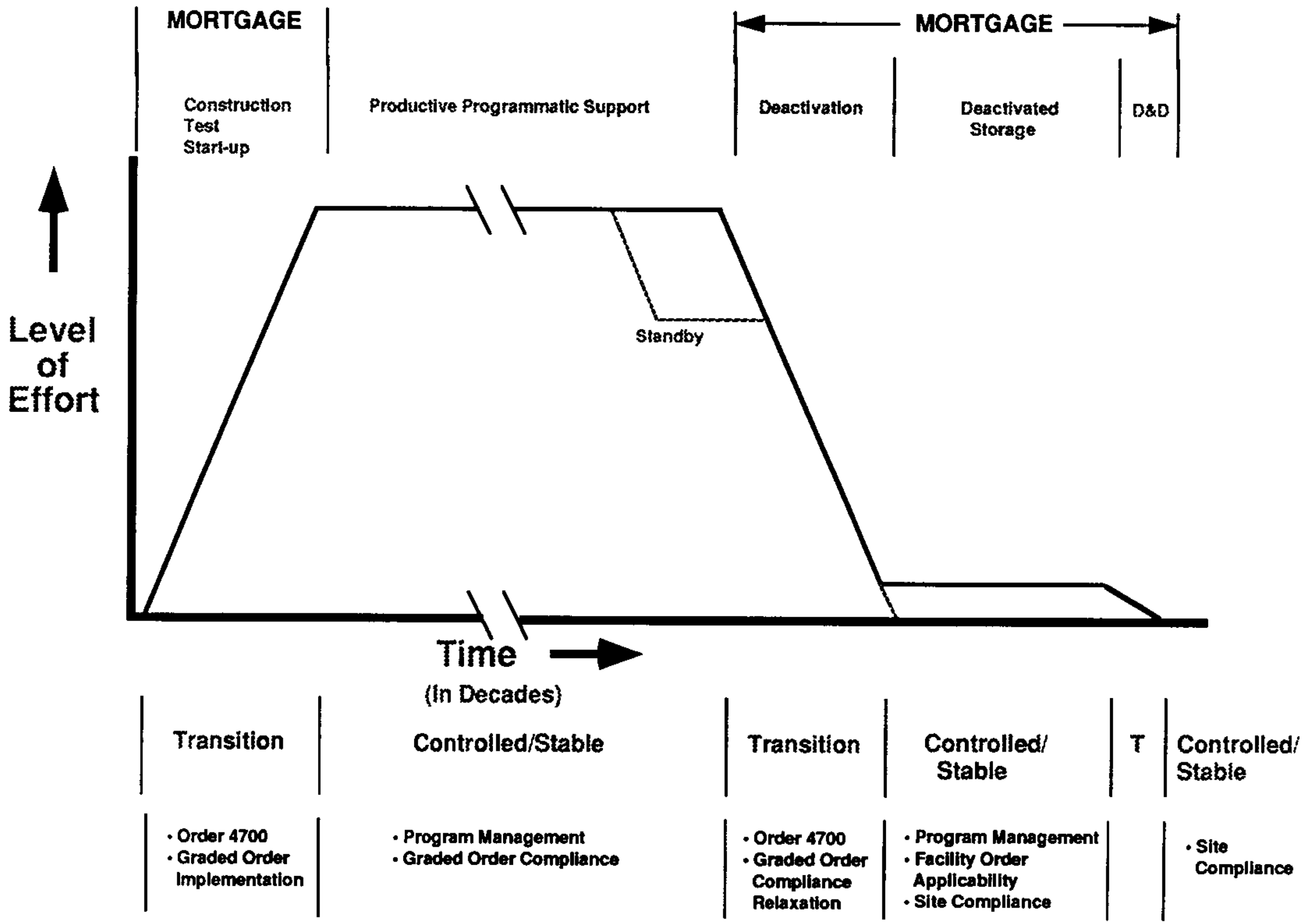
- **DON'T SWEEP ISSUES/WASTES TO THE PUREX BOUNDARIES**

- **INTEGRATE THE TECHNICAL, REGULATORY, AND MANAGEMENT APPROACH**

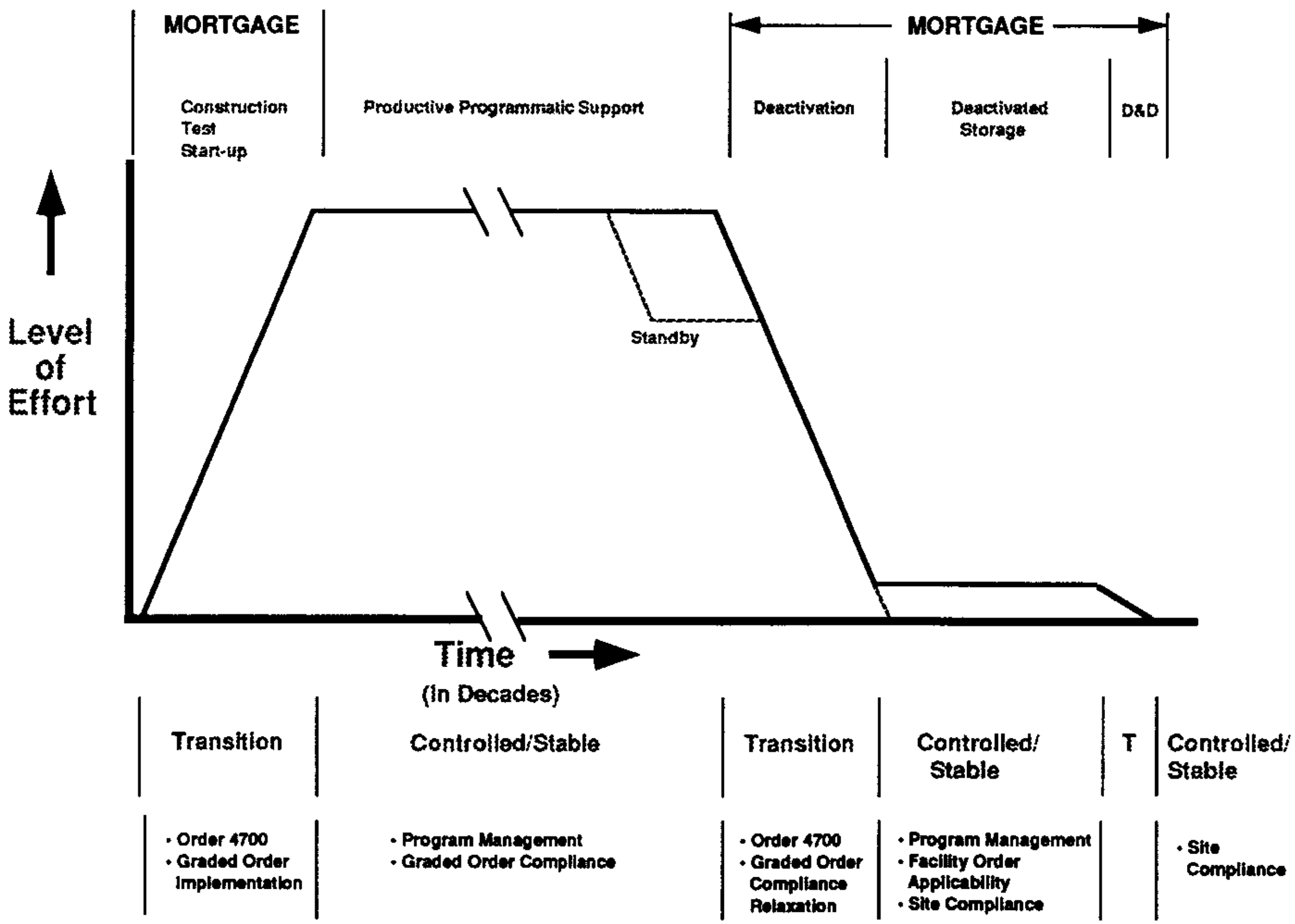
- **PROVIDE A PATH TO FINAL D&D END STATE**

  - D&D Technical and Regulatory Issues White Paper
  - Level 1 Plan for Resolving The D&D Issues

CONSTRUCTION TRANSITION ANALOG



CONSTRUCTION TRANSITION ANALOG



TRANSITION PROJECT MANAGEMENT PLAN

- **Defines all requirements and activities; Integrates plans and documents**
  - Project management
  - Technical
  - Regulatory
  - Order compliance
  - Closure Plan
  - Shutdown plan
  - Risk assessment
  - Stakeholder participation
  - Waste disposition
  - Critical skills inventory/maintenance
  - Personnel redeployment
  - Deactivation maintenance

- **Basis for transition project review, approval, and oversight**
  - DOE and the State
  - Monthly plan development reviews
  - Quarterly project implementation reviews

DEACTIVATION DECISION CRITERIA

IN ORDER OF APPLICATION

1. Eliminate or stabilize environmental and safety risks as defined by regulations, NRC codes and standards, and industry practice (NRC RG 1.86)
2. Leave in place equipment, systems, and materials for which an end state is not yet defined or available (NRC RG 1.86)
3. Complete activities dependent on plant-specific process, operating, and facilities engineering expertise
4. Complete activities dependent on existing, functional, facility specific equipment which will be inoperable following a decade deactivation period
5. Configure the facility for and limit access to quarterly assessment entry. (NRC RG 1.86)
6. Establish and archive records and drawings for:
   - Reactivating D&D essential systems
   - D&D meaningful characterization
7. Leave the facility in an orderly condition

MINIMIZE DEACTIVATION MORTGAGE

- Unoccupied, locked facility
  - Facility-specific, risk- based graded Order compliance implementation
  - Access only for quarterly surveillance and repair
    - Deactivation support equipment relocated externally
    - Essential interior alarms and sensors remotely monitored
    - Small, multi-facility surveillance and maintenance group
  - Deactivated facility not available for offices and labs but could be used for long term material storage

- "Decade to D&D Start" moving maintenance horizon
  - Quarterly assessment of facility condition
  - Funding source identified for:
    - Preemptive building shell maintenance
    - Resolution of emergent issues

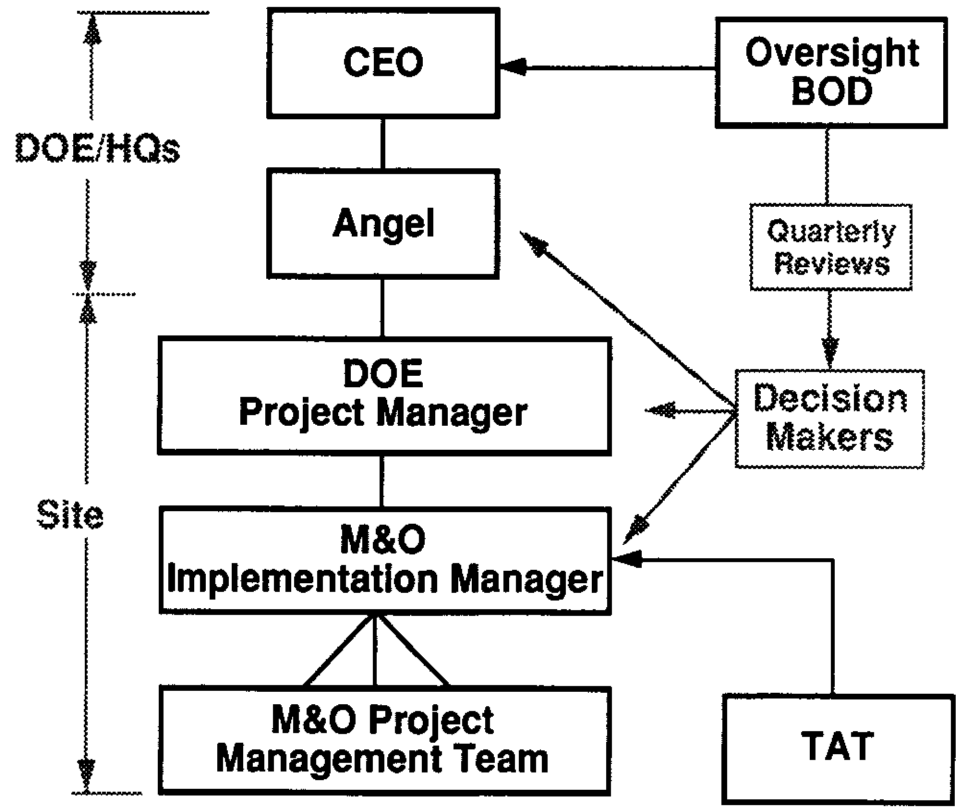
INSTITUTIONAL ENVIRONMENT
and
PROJECT MANAGEMENT FRAMEWORK

Board of Directors (BOD)
- Focus on Successful Project Completion
- Senior business and project management
- Support multiple projects
- Accountability + Dutch Uncle

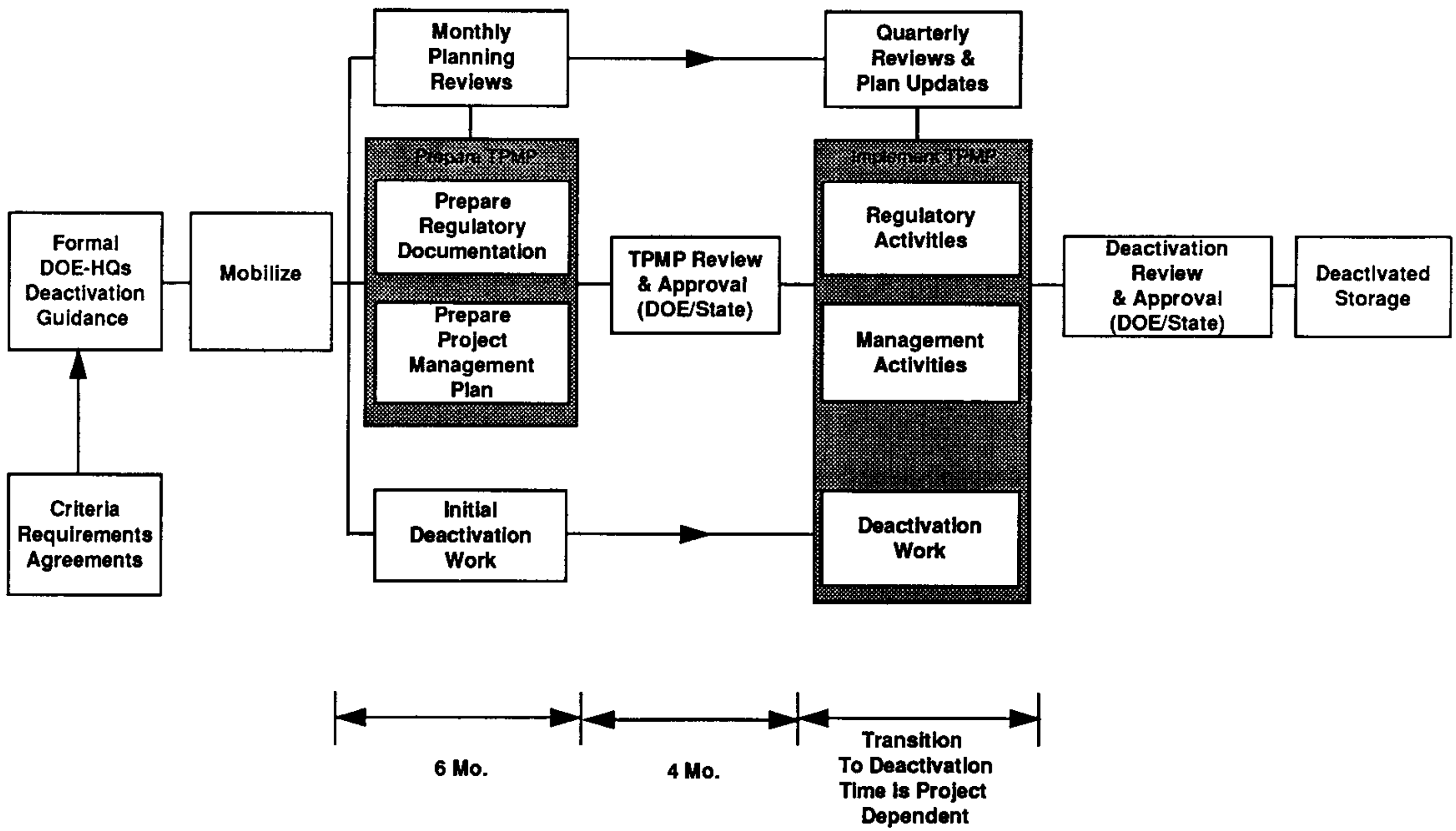
Angel
- CEO vision, implementation trust, and access
- >25% of job
- Spends time at site
- Can work institutional issues/system
- Understands project principles
- Facilitates TPMP review and approval

Project Management
- Major project credentials

Transition Advisory Team (TAT)
- Practical, results-oriented experience
- Provide planning jump start
- One month at site
- Beams and girders - not nuts and bolts



TRANSITION LOGIC

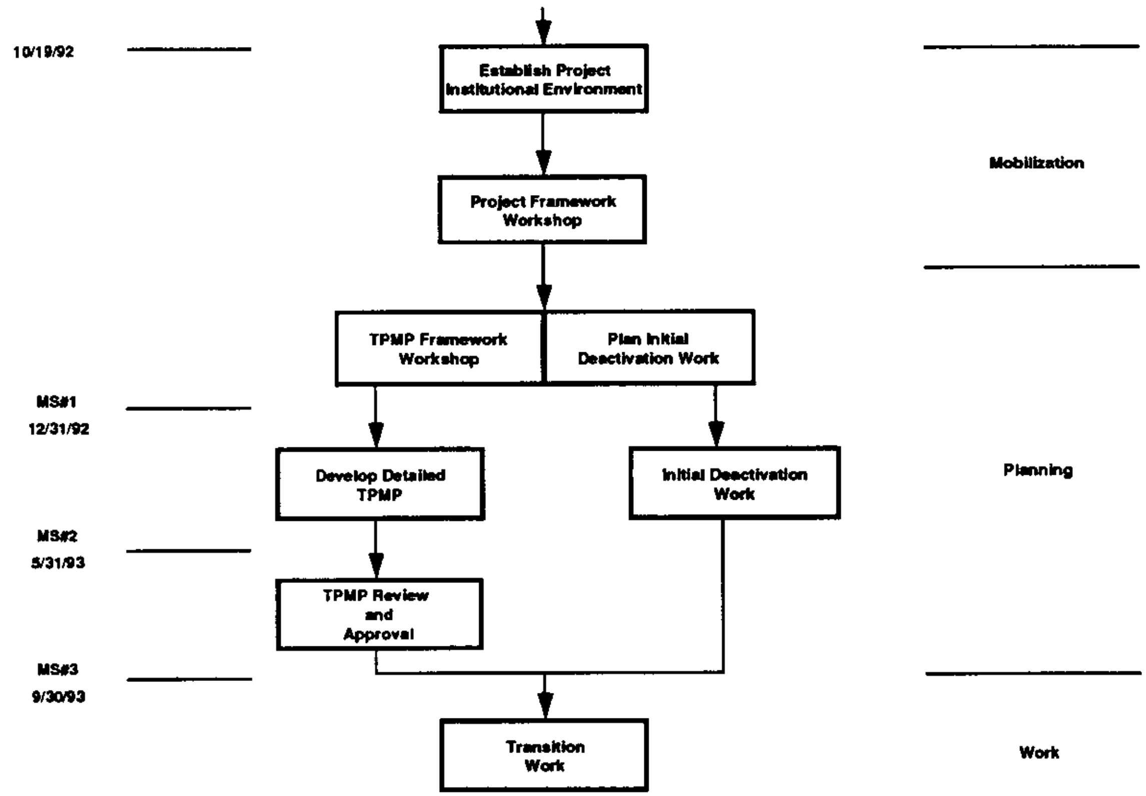


NEW TRANSITION PLANS

- DOE/EM-60, DOE-RL, WHC, and ITR team have a common understanding of the conceptual transition plan

- The conceptual plan is the basis for an emerging site plan

NEAR TERM ROAD MAP



MANAGING
COMPETING REQUIREMENTS

MANAGING COMPETING REQUIREMENTS