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FEED MATERIALS PRODUCTION CENTER

FINAL PHASE-IN REPORT

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VOLUME 12 OF 15

PRODUCTIVITY RETENTION PROGRAM

(Period October 25, 1985 thru December 31, 1985)

TO: U. S. DEPARTMENT OF ENERGY

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12 - PRODUCTIVITY RETENTION PROGRAM

12.1 Background

12.1.1 Scope of the Transition Study

This transition task focused on a review of the Productivity & Radiological Improvements Line Item Program (Package 1) and the Productivity Retention Programs (Packages 2, 3 & 4). Specific objectives include:

- (1) Understanding the status of the programs (Subtasks 12A & 12B).
- (2) Identifying critical path projects (Subtask 12A):
- (3) Identifying current and potential problems (Subtask 12B).
- (4) Reviewing the process and procedures employed by NLO for Line Item projects, covering the planning, estimating, justifying, approving, and acquisition and construction of facilities (Subtask 12C).
- (5) Preparing recommendations (Subtask 12D).

For the balance of this report, the Productivity and Radiological Improvements Program and the Productivity Retention Programs will be referred to collectively as the PRP.

Primary effort in this study was focused on Packages 1 and 2, since this is where current NLO activity is concentrated. This allowed us to proceed with a minimum of interruptions to on-going work effort.

12.1.2 Current Situation

Package 1 All 13 sub-projects of Package 1 have been released for Title I and Title II Engineering to be accomplished by Jacobs Engineering.

Package 2 One sub-project of Package 2 (elevators) has been released for detailed engineering. The others are awaiting modifications of the design criteria.

Package 3 Design of Package 3 is scheduled to begin in the first quarter of fiscal 1987.

Package 4 The Conceptual Design effort for Package 4 is underway and is scheduled for completion in February, 1986. Design is scheduled to begin during the first quarter of fiscal 1988.

DOE Engineering Oak Ridge Operations Office (DOE-ORO) is currently managing these projects due to the fact that NLO does not have adequate personnel - either in quantity or with the specific skills required.

12.1.3 Desired Situation

The DOE desires that WMCO act as the integrating contractor for the PRP, as well as all other engineering and construction projects at FMPC (How we plan to achieve this was previously discussed in Section 8 of the report).

The DOE would like WMCO to prepare a project schedule that is achievable. Current PRP commitments should be completed on schedule where possible. In addition, priorities should be identified so that any program reductions can be done in a manner that will minimize adverse effects on the plant's short-term and long-term needs if future funding is reduced. Early completion of projects that most positively impact the environment, health & safety, and established production needs should be emphasized.

Construction activity must be carried out in an environmentally safe manner.

Projects, when completed, should achieve their programmatic objectives.

12.1.4 Scope of This Report

This report will cover findings and recommendations for all four subtasks of Task 12. However, the primary recommendation for Task 12A "Identify Critical Path Projects" is that this task should be continued into 1986. A follow-up report will be issued upon completion.

12.2 Findings

12.2.1 Status of the Programs

The status of each sub-project in Packages 1-4, is summarized in Tables 1-4. In the paragraphs that follow, important findings relative to the status are highlighted.

12.2.1.1 - Package 1

- (1) Scheduled starts on design have been missed by between 4 and 15 months and three projects have not yet been started. No delays in construction completion have yet been recognized by the project engineers involved and no catch-up plans have been implemented.
- (2) Development tasks have been identified during the review of Design Criteria rather than as an immediate follow-up of the Conceptual Design effort. As a result, development is being carried out in parallel with the detailed design. This could stretch out the design effort and increase engineering costs.
- (3) Jacobs was released to proceed with engineering on seven through eleven sub-projects without adequate Design Criteria. Jacobs and WMC0 will work on refining the criteria as a part of the engineering effort. Additional development tasks can be anticipated.
- (4) Engineering completion on the subtasks where engineering was started February, 1985 ranges from 35% on Sub-Project No.4 to 49% on Sub-Project No.5, based upon the revised engineering cost estimate.

12.2.1.2 - Package 2

- (1) Jacobs has been released to proceed with engineering on only one sub-project.
- (2) Developmental tasks are being identified during the review of Design Criteria rather than as an immediate follow-up of the Conceptual Design effort. As a result, development may be carried out in parallel with the detailed design. This could stretch out the design effort and increase engineering costs.
- (3) Jacobs has been released to proceed with engineering on only two sub-projects.

12.2.1.3 - Package 3

- (1) The scheduled engineering start for these projects is October, 1986. The preparation of Design Criteria Documents does not have a high priority at present because of the need for engineering effort on Packages 1 and 2.

- (2) Very few development needs have been identified to date.

12.2.1.4 - Package 4

- (1) Conceptual Design was started September, 1985.
- (2) Completion of the CDR is scheduled for February, 1986.

12.2.2 Critical Path Projects

- (1) Priorities for each sub-project have been identified by NLO as indicated in Tables 1 thru 4. However, discussions with NLO representatives from Engineering, Production, and Planning did not yield detailed information on specific impacts (positive and negative) of each sub-project. Therefore, Westinghouse feels that new priorities should be established and a study to do so has been initiated.
- (2) In an earlier prioritization for Package 2, Furnace 93 was listed as the lowest priority. This did not appear consistent with the fact that melting capacity is expected to be limiting in the late 80's (see Section 1 of this report). This has since been moved up in priority and will be studied further in the next few weeks.
- (3) DOE requested in October, 1985 that NLO prepare an overview of all furnace projects. No response from NLO was found. WMCO anticipates following up with a response to that request, including a recommendation to improve the priority of the Furnace 93 project.

12.2.3 Current and Potential Problems

- (1) Lack of Integrated Planning

At present there is no plan that integrates the various engineering, construction, start-up and production activities associated with the various sub-projects of the four PRP packages. An overall plan must include the Environmental Line Item, as well as other Line Item Projects, GPP and Capital Projects.

Without that level of planning, it is impossible to properly identify critical path projects; establish priorities; forecast production disruptions and develop work around plans; avoid projects conflicting with one another; or make provisions to provide the required resources for the program.

(2) Organization and Staffing

The organization of the Project Engineering Department is inappropriate and the staffing inadequate to meet PRP goals in an effective manner. It is estimated that approximately 30 engineers and 4 project managers are required to properly carry out this program.

Currently the Production Projects Supervisor has responsibility for managing the Productivity Retention Program. He has 12 lead engineers working on 24 sub programs in Packages 1 and 2, yet only 3 report to him; 8 report to the Supervisor of Environmental Projects; and 1 reports to the Supervisor of Facilities Projects. Clearly the Manager of PRP is not, in fact, really managing the people and each lead engineer has at least two "bosses" (one directing his efforts - the other controlling his future).

The conflicts in priorities resulting from this matrix management leads to confusion and reductions in individual productivity.

(3) Inadequate Schedule Control

No reports were found that reflect progress against the original plan. No corrective action seems to be taken to get back on schedule. Further delays can be anticipated until decisive steps are taken to resolve organizational and manpower deficiencies and to institute reporting against fixed schedules and cost projections.

(4) Inadequate Cost Control

Project Engineers are not provided with adequate cost information for their projects and consequently are in no position to control expenditures.

The various elements of cost data are available in a number of NLO and DOE documents, but these need to be consolidated

into concise "project tailored" reports that provide information on total budget, expenditures to date, commitments and amounts remaining in each category of the work.

(5) Inefficient Meetings

Preparation for, and the conduct of project meetings leaves much to be desired. Agendas are abbreviated; leadership is not evident; action items are not specifically assigned; and agreements are not fully documented.

(6) Lack of Visits to AE's by NLO Project Engineers

This prevents the NLO Project Engineers from providing quick answers to AE questions regarding the intent of the design and also minimizes the Project Engineer's chances to control the costs of AE work.

(7) Non-Utilization of Appropriate Technology

Even though the DOE desires the use of advanced technology, time and manpower constraints in Package 1 precluded consideration of anything other than replacement of facilities with similar equipment.

(8) Lack of Design Criteria

As was previously mentioned, the Design Criteria for Package 1 were accepted by DOE with reservations, and have only been accepted for one sub-project in Package 2. There appears to be disagreement among the various DOE project engineers and NLO managers as to what constitutes good design criteria. Agreement on a good format and the degree of design freedom allowed the A/E is needed prior to beginning the preparation of Design Criteria for Package 3.

(9) Lack of Involvement in Conceptual Design

Operating Contractor involvement in the Conceptual Design effort is limited primarily to design review. This results in uncertainty on the part of the project engineer and production engineers as to the basis for the design selected. As a result, there seems very little ownership of the CDR design and recommendations on the part of NLO. This may be, at least in part, the reason why there is so much difficulty in developing good Design Criteria.

(10) Delays in Performing Development Work

The development work specified in the Conceptual Design Reports is not completed prior to initiating preparation of the Design Criteria. Instead, development work is currently being proposed by Martin Marietta -- for the kiln project in Package 1 and the sump projects in Package 2 -- based upon their reviews of the Design Criteria. This practice will lead to increased engineering costs and project delays.

12.2.4 Process and Procedures for Carrying Out Line Item Projects

- (1) The process described in the NLO Operations Manual for the Project Engineering Department calls for over 70 steps to be followed from NLO initiation to completion of a Line Item Project. When the work is initiated by DOE, these are reduced by 14 if the work is started with a Feasibility Study, or reduced by 23 if started with Conceptual Design.

An outline of the process as defined in the above document is provided as Attachment 2.

- (2) The content of the "Operations Manual for the Project Engineering Department - Dated July 1/85" is provided in the manual's table of contents Attachment 1.

A. The following strengths were noted:

1. The manual contains a great deal of valuable information regarding internal/external interfaces and departmental functions.

2. It also describes the content of various documents and is quite specific on certain individual responsibilities for the completion of documents.
 3. It describes the function activities of many individuals throughout the project management process.
- B. The following weaknesses were noted
1. The sequence of steps in the project management process are not obvious in the manual and require study by the user to determine the relationship between activities and the next action needed after completing the one being worked upon. This is not a healthy situation for a person using the manual to get work accomplished. (See Corrective Action 12.3.4 - 3A)
 2. Several steps are not identified or are inadequately described - particularly final design reviews, release of "Certified for Construction" documents, construction activities and acceptance of constructed facilities.
 3. Functional activities and organizational reporting requirements for individuals are mixed throughout the text, ie., page III 15, paragraphs 2.2 and 2.3, describe who directs what the engineer works upon and then who directs how it shall be done and his performance.

12.3 Recommendations

12.3.1 General

- (1) Prepare and implement training plans for Technical Services personnel with emphasis on training current project engineers and those hired during the coming year. (Subtask 12B)
- (2) Provide training for project engineers in the preparation for, conduction of, and follow-up of their meetings on sub-projects, i.e.,

advance agenda; content and chairmanship; agreements and commitments; minutes, etc.
(Subtask 12C)

- (3) Complete the Engineering Management and Control System (EMICS) as soon as possible in order to provide needed information with less manpower using additional computer terminals placed under the control of project managers.
(Subtask 12B)

12.3.2 Relative to Organization and Staffing

- (1) Implement the Major Projects organization recommended in Volume 8 of this report. In that organization, there will be a separate Project Manager for each Package, each with a team of Project Engineers, Process Engineers, a Scheduler, and an Instrumentation and Control Engineer. Approximately 24 WMCO employees should be included in the organization and an additional 12 people will be obtained from outside contractors as "Consultants".
- (2) The Package 1 and Package 2 teams should be made up of engineers and managers currently on board at FMPC with a few engineers from outside contractors and new hires providing specific skills not currently available.
- (3) The Package 3 and Package 4 teams will, of necessity, be made up primarily of new hires and "Consultants", with only a few current employees to provide continuity.
- (4) First priority should be given to hiring the Manager of Major Projects and the needed program managers. These persons, in turn should play the lead role in selecting the new engineers and the organizations that will supply the contract personnel.

12.3.3 Relative to Prioritization of Projects and of Project Efforts

- (1) Develop plans and schedules for PRP projects consistent with the overall FMPC needs. These must be integrated with other planned General Plant and Capital Projects. This effort should be led by the Program Control and Integration Department. (Subtask 12A)
- (2) Review in detail the Conceptual Design Reports for Package 3 and determine if the approach is

still valid and consistent with the overall plan for FMPC. (Subtask 12A)

- (3) Establish definitive development programs for Packages 2 and 3. (Subtask 12A)
- (4) Apply more WMCO engineering effort on Package 4 under a full time manager. Consider delaying the CDR for Package 4 until 1987. (Subtask 12A)
- (5) Apply appropriate technology at FMPC by assigning resources to research applicable processes that are currently used or are under development elsewhere. Assign specific individuals and investigate developments at other DOE facilities, R&D institutions, Universities, Westinghouse R&D Center, etc. (Subtask 12B)
- (6) Reach agreement on the content of Design Criteria Documents with DOE. (Subtask 12C)
- (7) Initiate Furnace 93 construction work in 1986. (Subtask 12B)
- (8) Ensure that project engineers travel to AE's to improve coordination of efforts and place resident engineers at Jacobs. (Subtask 12C)

12.3.4 Relating to Process and Procedures for Carrying Out Line Items

- (1) Rework the Project Engineering Manual in its entirety, ensuring that input is solicited from WMCO engineers, DOE-FMPC and DOE-ORO (Subtask 12C).
- (2) Make changes required as a result of Rust becoming the on-site construction contractor for FMPC. Steps 59 through 70 (Attachment 3) will be completely eliminated and replaced by the "WMCO-Rust Interfacing Procedures at FMPC".
- (3) Revise the text to improve its readability/usability and streamline the process of getting the work accomplished by:
 - A. Providing a listing of all steps in the process with references to specific appendices that completely describe the "why, who, what, how and when" of step actions.

- B. Eliminating of "Rough Drafts" - we will strive to do it right the first time.
- C. Consolidate documents such as Project Authorizations and Feasibility Studies into a single document when they both serve similar purposes, i.e., justifying future work to evaluate a project.

12.4 Short Term Corrective Actions

<u>No.</u>	<u>Milestone Description</u>	<u>Milestone Schedule Date</u>
1	Provide acceptable design criteria documents for Package IIA of productivity retention	6/86
2	Establish and initiate necessary development program for PRP Package II	4/86
3	Establish and initiate necessary development program for PRP Package III	4/86
4.	Revise PRP Package I criteria to achieve first quality	6/86
5	Initiate procurement of kiln package	7/86
6	Initiate construction on Tank Farm	7/86
7	Revise PRP schedule and funding notes based upon Westinghouse evaluation based upon WMCO evaluation of priorities and status	8/86
8	Identify method for identifying "appropriate technology" for plant upgrade projects	6/86
9	Rewrite Project Engineering Procedures Manual	6/86
10	Visit major engineering sub-contractors	5/86

12.5 Longer Term Corrective Actions

It is anticipated that most of the long term corrective actions will be identified in the first half of 1986 and included in the 1987 Work Plan. Some that have been identified now are:

<u>No.</u>	<u>Description</u>
1	Provide high quality Design Criteria Documents for Packages 3 & 4
2	Ensure that appropriate technology is utilized in Packages 3 & 4
3	Provide training in the use of the Project Engineering Manual
4	Develop methods to better estimate and control engineering costs

Table 1

Package 1 - Productivity and Radiological Improvements

Issued: 21 January 1986

Sub - project description	NLO Priority	Projected Costs (\$ K)	Spent to Date (\$ K) Thru 11/85	Development Work Defined	Development Work Completed	Design Basis Prepared	Design Basis Accepted	Sch. Eng. Start date	Act. Eng. Start date	% Eng Completed Thru 11/85	Sch. Con. Start (1)	Sch. Con. Completion (1)
Replace Rotary Kiln, Plant 8	1	\$5,225	\$352	Yes	IP	Yes	Yes	Oct-84	Feb-85	37%	Sep-85	Mar-88
Upgrade HF off-gas system, P.4	2	\$1,395	\$231	Yes	IP	Yes	Yes	Oct-84	Feb-85	39%	Dec-84	Mar-86
Tank Farm Restoration	3	\$15,650	\$511	Yes	Yes	Yes	Yes	Oct-84	Feb-85	36%	Sep-85	Dec-88
Sump System, Plant 6	4	\$5,190	\$284	Yes	Yes	Yes	Yes	Oct-84	Feb-85	35%	Feb-85	Sep-87
Feed & Vent.- metal diss., P.2	5	\$370	\$20	NR	---	Yes	Yes	Oct-84	Feb-85	49%	Dec-85	Oct-86
Stack Monitoring, plant wide	6	\$875	\$0	Yes	Yes	Yes	Yes	Oct-84	---	0%	Mar-86	Dec-86
Uranium control pad, plant 1	7	\$450	\$0	NR	---	Yes	Yes	Oct-84	Jan-86	0%	Jan-86	Jun-87
Upgrade UO ₂ gulping system, P.3	8	\$1,250	\$0	Yes	NR	Yes	Yes	Oct-84	Jan-86	0%	Mar-86	Mar-87
Upgrade "F" machines, plant 5	9	\$1,750	\$0	NR	---	Yes	Yes	Oct-84	Jan-86	0%	Jun-86	Sep-87
Replace slag leach system, P3	10	\$4,300	\$0	Yes	IP	Yes	Yes	Oct-84	Jan-86	0%	Jun-86	Sep-88
Replace drum recond. system	11	\$7,050	\$0	Yes	Yes	Yes	Yes	Oct-84	Jan-86	0%	Mar-86	Sep-88
Replace box furnace, plant 8	12	\$1,070	\$0	Yes	IP	Yes	Yes	Oct-84	---	0%	Jun-86	Sep-87
Upgrade oxidation furnace no.2	13	\$1,600	\$0	Yes	IP	Yes	Yes	Oct-84	---	0%	Jun-86	Dec-87

Notes : 1) Basis is CDR information

2) NR = None Required

3) IP = In Progress

Table 2

Package 2 - Productivity Retention Program

Issued: 21 January 1986

Sub - project description	NLO	Projected	Spent to	Development	Development	Design Basis	Design Basis	Sch. Eng.	Act. Eng.	% Eng	Sch. Con.	Sch. Con.
	Priority	Costs(\$ K)	Date (\$ K)	Work Defined	Work Completed	Prepared	Accepted	Start date	Start date	Completed	(1)	(1)
Install. NOx Scrubbers	1	\$2,620	\$0	Yes	Yes	Yes	No	Oct-85	---	---	Dec-86	Sep-89
Elevators, plants 4 & 8	2	\$1,820	\$0	Yes	IP	Yes	Yes	Oct-85	Jan-86	0%	Jun-86	Jun-88
Modernize Nitrogen Gen. Sys.	3	\$2,500	\$0	NR	---	Yes	No	Oct-85	---	---	Sep-86	Sep-89
Improve derby handling equip.	4	\$6,360	\$0	Yes	IP	Yes	No	Oct-85	---	---	Mar-86	Dec-89
Enrich. Uran. Red. Slag Mill	5	\$4,960	\$0	Yes	IP	Yes	Yes	Oct-85	---	---	Mar-86	Jun-89
Furnace No.93, plant 9	6	\$4,500	\$0	NR	---	Yes	No	Oct-85	Jan-83	80%	Jun-86	Oct-87
Refinery Sump Sys.- Automate	7	\$3,340	\$0	Yes	IP	Yes	No	Oct-85	---	---	Feb-87	Dec-89
Plant 8 Sump Sys.- Automate	8	\$4,720	\$0	Yes	IP	Yes	No	Oct-85	---	---	Jun-86	Dec-89
Reject Core Declad. Facility	9	\$4,230	\$0	Yes	NR	Yes	No	Oct-85	---	---	Dec-86	Dec-89
Improve Gen.Process Eff.Treat.	10	\$5,480	\$0	Yes	Yes	Yes	No	Oct-85	---	---	Oct-86	Dec-89
Enrich Uran.Scrap Process.Furn	11	\$3,060	\$0	Yes	IP	Yes	No	Oct-85	---	---	Jul-86	Jun-89
Modernize Hydrogen Gener. Sys.	12	\$2,420	\$0	NR	---	Yes	No	Oct-85	---	---	Sep-86	Sep-89

Note : 1) Basis is CDR information

2) NR = None Required

3) IP = In Progress

Table 3

Package 3 - Productivity Retention Program

Issued: 21 January 1986

Sub - project description	NLO	Projected	Spent to	Development	Development	Design Basis	Design Basis	Sch. Eng.	Act. Eng.	% Eng	Sch. Con.	Sch. Con.
	Priority	Costs(\$ K)	Date (\$ K)	Work Defined	Work Completed	Prepared	Accepted	Start date	Start date	Completed	Start	Completion
											(1)	(1)
Improve UF4 packaging station	1	\$10,130	\$0	Yes	IP	IP	No	Oct-86	---	---	Oct-88	Dec-90
Improve metal spill brkup procl	2	\$3,070	\$0	Yes	No	IP	No	Oct-86	---	---	Jun-87	Dec-89
Improve depleted slag milling	3	\$2,910	\$0	NR	---	IP	No	Oct-86	---	---	Mar-88	Mar-90
Improve digester feed system	4	\$1,780	\$0	NR	---	IP	No	Oct-86	---	---	Jan-88	Jun-89
Improve nitric acid recov.sys.	5	\$2,480	\$0	NR	---	IP	No	Oct-86	---	---	Oct-89	Sep-90
Improve water treatment plant	6	\$1,950	\$0	NR	---	IP	No	Oct-86	---	---	Apr-89	Jun-90
Crusher system, plant 8	7	\$950	\$0	Yes	NR	IP	No	Oct-86	---	---	Oct-88	Jun-89
Improve solvent extrac.process	8	\$5,110	\$0	Yes	IP	IP	No	Oct-86	---	---	Oct-87	Mar-89
Nosal heat treat.furnace-modern	9	\$3,200	\$0	NR	---	IP	No	Oct-86	---	---	Jul-87	Jun-89
Crane modernization	10	\$1,390	\$0	NR	---	IP	No	Oct-86	---	---	Jul-88	Dec-89
Milling sys.,modernize,plant 1	11	\$3,930	\$0	Yes	IP	IP	No	Oct-86	---	---	Jul-87	Dec-88
Oxida. furnace #1,pt.8,upgradell	12	\$2,070	\$0	Yes	No	IP	No	Oct-86	---	---	Jan-89	Dec-89

Note : 1) Basis is CDR information

2) NR = None Required

3) IP = In Progress

Table 4

Package 4 - Productivity Retention Program

Issued: 21 January 1986

Sub - project description	NLO	Projected	Spent to	Development	Development	Design Basis	Design Basis	Sch. Eng.	Act. Eng.	% Eng.	Sch. Con.	Sch. Con.
	Priority	Costs(\$ K)	Date (\$ K)	Work Defined	Work Completed	Prepared	Accepted	Start date	Start date	Completed	(1)	(1)
Utilities Upgrade	1	\$15,130	\$0	No	—	No	—	Oct-87	—	0%	Jun-88	Dec-91
E. Bank vacuum induction melt casting furnace modernize,pt.5	2	\$14,360	\$0	No	—	No	—	Oct-87	—	0%	Jun-88	Dec-91

Note : 1) Basis is discussion with NLO

2) NR = None Required

3) IP = In Progress

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ENGINEERING DIVISION
Project Engineering Department
OPERATIONS MANUAL

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ENGINEERING DIVISION
Project Engineering Department
OPERATIONS MANUAL

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NLO PROCEDURE FOR MANAGEMENT
OF LINE ITEM PROJECTS

<u>No.</u>	<u>Description</u>	<u>Responsibility</u>
1.	Identify Project	-
	A. If DOE directive proceed to Step 15	
	B. If NLO proceed to Step 2	
2.	Prepare Idea Letter	NLO Initiating Division
3.	Present to Project Authorization Committee (PAC)	NLO Initiating Division
4.	Approval by PAC	PAC
5.	Prepare PA	Project Engineering
6.	Route "Rough Draft" of PA for Comments	Project Engineering
7.	Provide Comments	PAC and Other Divisions
8.	Resolve Comments and Prepare Final PA	Project Engineering
9.	Transmit to Initiating Division Director and NLO Site Manager	Project Engineering
10.	Present to PAC	?
11.	Recommend Approval by NLO Site Manager	PAC
12.	Approval for NLO	NLO Site Manager
13.	Transmit to DOE for Approval	Project Engineering
14.	Approval of PA by Directive	DOE
Note: <u>This must be done 3 years prior to project start</u>		
15.	Include Project in Long Range Plan	Program Control
16.	Include Project in Budget Years Proposal	Program Control

17.	Provide DOE with Information Needed for AE Selection	Project Manager
18.	AE Selection	DOE
19A.	Provide AE with all Data Necessary to Do Feasibility Study & Produce Report	Project Engineering
	OR	
19B.	<u>NLO</u> Perform Feasibility Study	Project Engineering
20.	Prepare "Short Form" Construction Project Data Sheet (Schedule 1-B-7)	Project Manager
21.	Edit "Short Form" (Schedule 1-B-7)	Project Engineering Administration
22.	Submit Schedule 1-B-7 to DOE/ORO as "Draft"	Project Manager
23.	Submit Schedule 1-B-7 "Final" to DOE/ORO
<u>Requesting Funds to Perform Conceptual Design in Next Fiscal Year</u>	Project Manager
Note: <u>This must be done 2&1/2 years prior to project start.</u>		
24.	Approval to Proceed with Conceptual Design - by Directive	DOE
25.	Provide DOE with Data Necessary for AE Selection	Project Manager
26.	Provide AE (via DOE) with all Support Necessary to do Conceptual Design and Produce Report	Project Manager
	OR	
27.	NLO Perform Conceptual Design	Project Engineering
28.	Review of Conceptual Design Report	NLO Management
DOE-FMPC
Project Engineering
and Other Divisions
29.	Prepare Construction Project Data Sheet (Schedule 1-B-7)	Project Manager
30.	Submit Schedule 1-B-7 and CDR to DOE-ORO	Project Manager

Note: This must be done 2 years prior to project start

31.	DOE-ORO Review and Approval & Transmittal To DOE-HQ	DOE-ORO
32.	DOE-HQ Review and Approval and Transmittal to OMB	DOE-HQ
33.	OMB Approval and Inclusion in Budget	OMB
34.	DOE Requests Project Management Plan	DOE
35.	Prepare Project Management Plan (PMP)	Project Manager
36.	Initiate Development Work	Technical Services
37.	Detailed Schedule and Budget	-
38.	Congressional Approval	-
39.	DOE Directive to Start Project	DOE
40.	Provide DOE with Data Needed for AE Selection	Project Manager
41.	Provide DOE (for AE) Design Criteria for Title I	Project Manager

Note: This assumes that work will be done by an outside AE

42.	Review and Approval of RFP "Package" by DOE	DOE-ORO
43.	Prepare Final Criteria Document for DOE-ORO	Project Manager
44.	RFP Distributed by DOE to AE's	DOE-ORO
45.	Proposals Received by DOE	DOE-ORO
46.	Review Proposals	DOE-ORO
47.	Select AE and Award Title I	DOE-ORO
48.	Orientate AE	Project Manager
49.	Liaison with AE (through DOE-ORO)	Project Manager
50.	Design Reviews	Project Manager and DOE

51. Final Design Review	Project Manager and DOE
52. Approval of Title I	DOE
53. Release for Title II	DOE
Note: <u>Assuming the same AE does Title II, 54 thru 56 are essentially the same as 49 thru 51</u>	
57. Approval of Title II	DOE
58. Certified for Construction Documents	Transmitted to DOE AE
59. Release for Construction	DOE
60. Preparation of Bid Packages	DOE
61. Request for Quotation	DOE
62. Receive and Evaluate Quotations	DOE
63. Place Contracts	DOE
64. Release for Construction	DOE
65. Pre-Construction Conference with Constructor	Construction Project Engineer
66. Construction Follow	Project Manager
67. Completion of Construction	Construction Contractor
68. Acceptance Testing	Project Manager
69. Acceptance for FMPC	NLO
70. Pre-Operational & Operational Testing	NLO
71. Acceptance for Production	NLO
72. Project Close-out	PE Administration