U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING

SUBJECT: YMP FISCAL YEAR 1993 BUDGET

PRESENTER: CARL P. GERTZ

PRESENTER'S TITLE AND ORGANIZATION:
PROJECT MANAGER
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
LAS VEGAS, NEVADA

PRESENTER'S TELEPHONE NUMBER: (702) 794-7900

PLAZA SUITE HOTEL • LAS VEGAS, NEVADA
OCTOBER 14 - 16, 1992

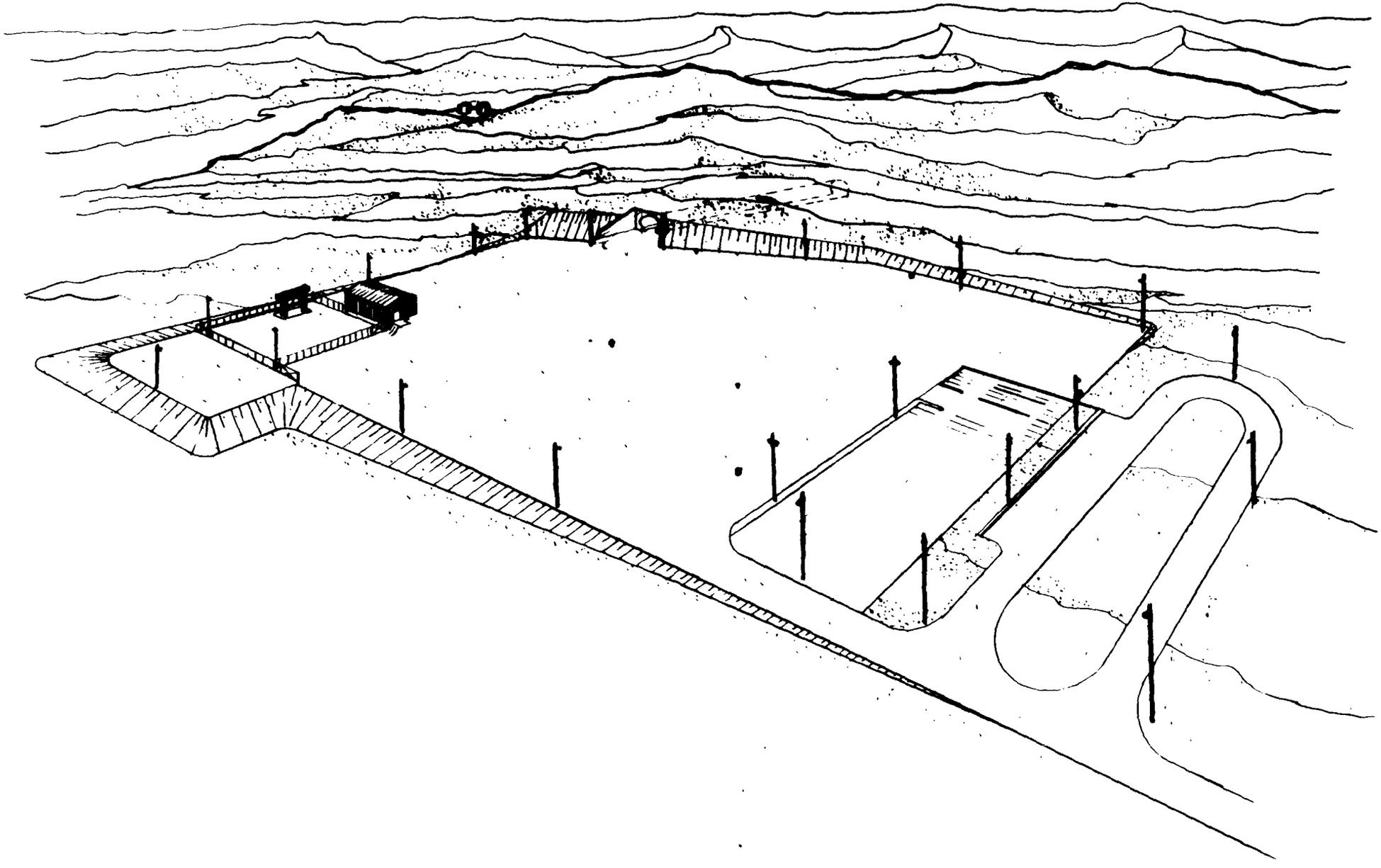
AGENDA

- Focus
- FY92 Accomplishments
- FY92 Budget
- FY93 Budget
- FY93 Activities
- Challenges/Issues

FOCUS OF YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT ACTIVITIES IN 1992

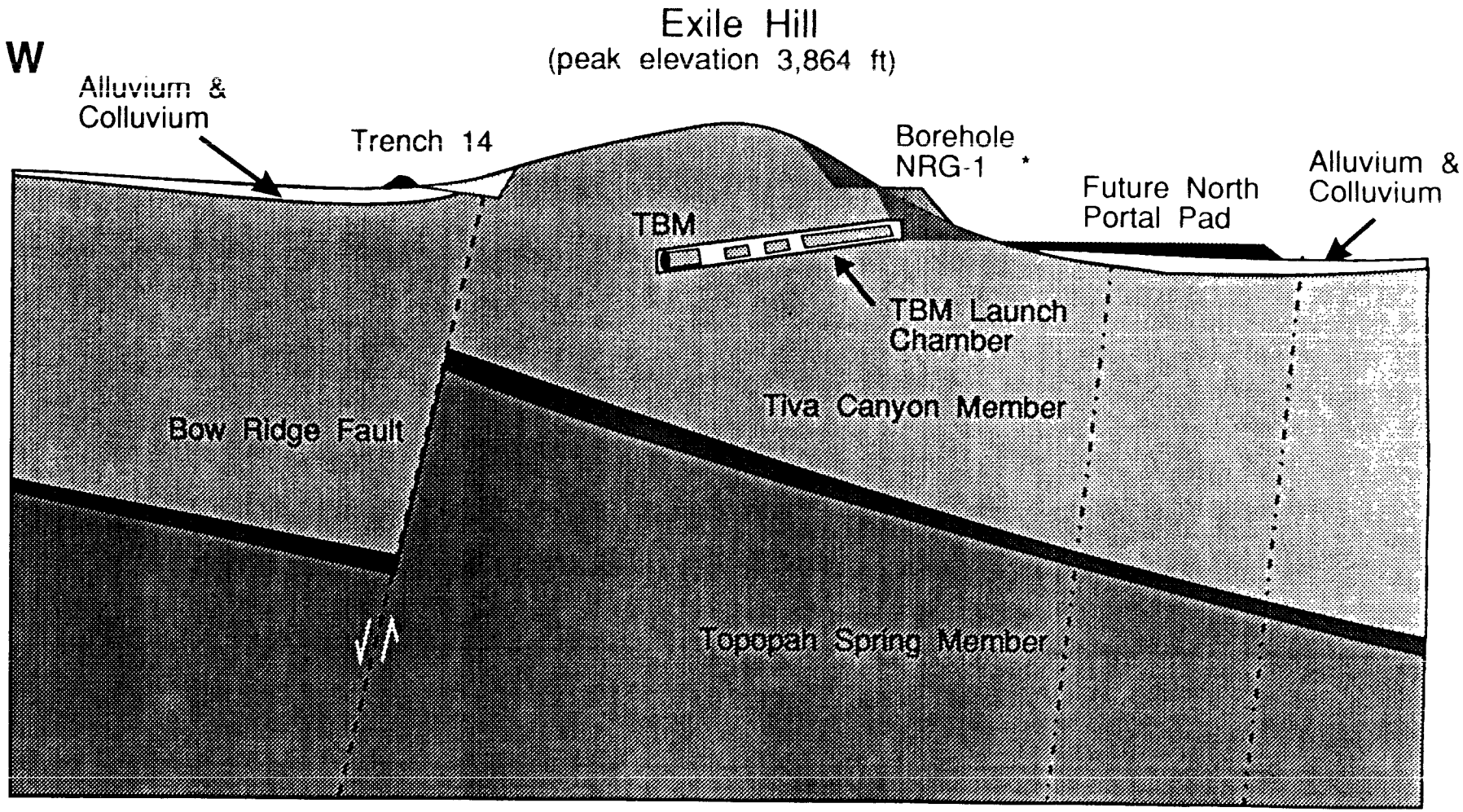
- Conduct the maximum amount of site geologic investigations
- Design the initial ESF surface facilities (pad, portal, starter tunnel)

ESF NORTH PORTAL DESIGN PACKAGE 1A




Extensive Field Work and
ESF Construction are
Focus for FY93
Yucca Mountain
INFORMATION OFFICE

CROSS SECTION OF EXILE HILL SHOWING TBM LAUNCH CHAMBER, NRG-1 AND FUTURE NORTH PORTAL PAD



* Note: drill pad to be removed prior to excavation of launch chamber.

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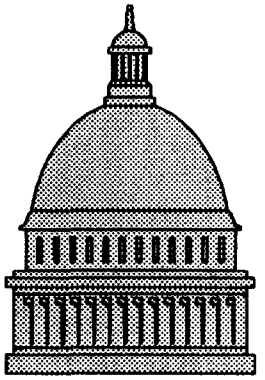
PROJECT ELEMENTS

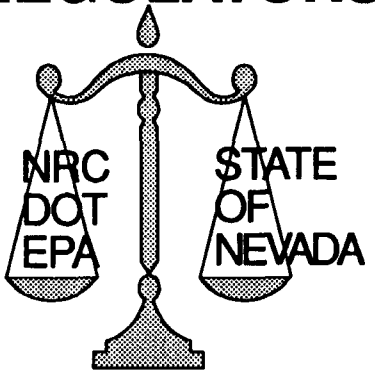


CONGRESS

U.S. DOE
Participants

- Lawrence Livermore
- Los Alamos
- M&O - TRW
- Raytheon
- REECo
- SAIC
- Sandia
- United States Geological Survey

REGULATORS



OVERSIGHT

- Federal Government (GAO, IG, OMB)
- State/Local Government
- Independent Groups (EEI, NARUC)
- National Academy of Sciences
- Nuclear Waste Technical Review Board

BENEFITS AVAILABLE

- Benefits Package
- Impact Assistance
- Work with Negotiator

PRGELEMP.GERTZ/4-16-92

PARTIAL LIST OF ORGANIZATIONS HAVING IMPORTANT REGULATORY AND/OR OVERSIGHT ROLES

- US Congress
- Nuclear Regulatory Commission (NRC)
- Nuclear Waste Technical Review Board (nominated by National Academy of Sciences, selected by President)
- Environmental Protection Agency (EPA)
- Office of Management & Budget (OMB)
- Edison Electric Institute (Utilities)
- Electric Power Research Institute (Utilities)
- National Association of Regulatory Utility Commissioners (NARUC)
- State of Nevada
  - Nuclear Waste Project Office
  - Commission on Nuclear Projects
  - Legislative Committee on High-Level Radioactive Waste
- Affected units of local government: Nye, Clark, Lincoln, Esmeralda, Mineral, Eureka, Churchill, White Pine, Lander Counties NV; and Inyo County, CA
- National Academy of Sciences
- U.S. General Accounting Office (GAO)
- DOE Inspector General (IG)
- Secretary of Energy's Advisory Board on Trust and Confidence
- Department of Interior
  - U.S. Fish and Wildlife Service (F&WS)
  - National Park Service (NPS)
  - Bureau of Land Management (BLM)

WE HAVE MOMENTUM

YES

- ☑ Field work is underway
- ☑ QA program in place
- ☑ Technical baseline in place and accepted by our regulator (NRC)
- ☑ Cost & schedule control system and baselines in place
- ☑ Public outreach and education programs in place
- ☑ Drilling equipment in place
- ☑ Construction management team on site
- ☑ Major permits in place and State continues to process applications in a timely manner
- ☑ Critical milestones met
- ☐ ✓Required funding

NWWRKMD26.GERTZ/9-3-92

FY92 ACCOMPLISHMENTS

WORK IS UNDERWAY AT SEVERAL LOCATIONS

Summary

- UZ-16 drill pad construction completed
- Drilling at borehole UZ-16 approximately 800 feet down
- 17 neutron access boreholes completed for natural infiltration studies. An additional 7 boreholes are planned
- 28 soil test pits and 4 trenches were excavated in Midway Valley study area
- 41 additional test pits excavated as part of Soil and Rock Properties investigations related to north area surface and subsurface access facilities

WORK IS UNDERWAY
(CONTINUED)

Summary (Continued)

- 6 trenches were excavated and 4 pavements cleared for Quaternary fault studies
- NRG-1 (north ramp geologic hole) access road and pad completed; drilling completed
- Drilling of JF-3 environmental monitoring well completed and monitoring equipment installed; fulfills commitment to National Park Service
- Volcanism studies - 45 excavations completed

OTHER FY92 MAJOR ACCOMPLISHMENTS

Regulatory/Licensing

- Oversight group interactions include
  - 16 with Nuclear Regulatory Commission (NRC)
  - 15 with Nuclear Waste Technical Review Board (NWTRB)
  - 15 with Advisory Committee on Nuclear Waste (ACNW)

- Prepared annotated outline for License Application and transmitted to NRC for review

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Performance Assessment

- Issued first Total System Performance Assessment
  - Modeled undisturbed conditions, volcanism, human intrusion and climate change
  - Reflect current uncertainty in conceptual models and data sparsity
  - A range of infiltration rates modeled; some higher than those expected to exist in repository
- Published Performance Assessment Calculational Exercise, 1991 (PACE 90) report
- Developed, enhanced and documented a number of performance assessment codes

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Issued Early Site Suitability Evaluation (ESSE) Report and Peer Review Report

- Evaluated the Yucca Mountain Site using DOE's siting guidelines (10CFR960)
- Same guidelines used in the 1986 EA to identify candidate sites for characterization
- For the disqualifying conditions of the guidelines the report concluded
  - 13 of 17 disqualifying conditions are not present and additional data is unlikely to change conclusion
  - 4 of 17 disqualifying conditions are not likely to be present, but additional data is needed

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Issued Early Site Suitability Evaluation (ESSE) Report and Peer Review Report

- For the qualifying conditions the report concluded
  - 13 of 32 qualifying conditions are present and additional data is unlikely to change this conclusion
  - 19 of 32 qualifying conditions are likely to be present but further information is needed
- ESSE report supports continuing site characterization studies to determine if Yucca Mountain is a safe site for a geologic repository

FY 1992 YMP ACTIVITIES REFLECT LIMITED FUNDING

- Complete initial, early site suitability evaluation draft report; continue ongoing suitability evaluation
- Initiate and continue new surface-disturbing (drilling) site characterization activities including:
  - Park Service monitoring borehole
  - Unsaturated zone boreholes
  - Geologic investigation boreholes
  - Field trenching
  - Test pits
- Continue ongoing surface-based site characterization activities

FY 1992 YMP ACTIVITIES REFLECT LIMITED FUNDING

(CONTINUED)

- Begin limited ESF Title II design in October 1991 (update repository design as appropriate)
- Quality Assurance program and planning
- Maintain a sound environmental program and provide support to field activities, as necessary
- Conduct performance assessment to support Project priorities/activities
- Continue to fully implement a YMP-wide cost/schedule planning and control system (PACS)

FY 1992 YMP ACTIVITIES REFLECT LIMITED FUNDING

(CONTINUED)

- Conduct a minimal waste package/EBS/near-field environment/waste form characterization program
- Maintain Project roads, buildings, records centers, etc.
- Conduct institutional/outreach programs
- Transition M&O (TRW) into Project activities

STATE CONTINUES TO PROCESS APPLICATIONS IN A TIMELY MANNER

Major Permits in Place:

Jan 1992	Received water permit waiver to drill UZ-16
Mar 1992	Received water appropriations permit for well J-13
May 1992	Permit modification issued for tracers to be used in 50 drillholes, including discharge
May 1992	Received free-use permit for 40 Mile Wash borrow pit
Jun 1992	Received air quality permit for gravel screen
Aug 1992	Received permit for additional groundwater appropriation (quantity increased by approximately 300%)
Sep 1992	Received stormwater discharge approval for ESF construction activities

CONGRESS IS CONCERNED ABOUT REDUCING OVERALL PROGRAM COSTS

Actions completed

- Phase II ICE completed
- YMP undertook Mission 2001 to validate cost estimate for meeting current schedule
- Early Site Suitability Report issued and suitability analyses are ongoing
- Scientific tests have been prioritized
- Formal issue closure process implemented

Actions planned

- Cost consciousness is responsibility of everyone on the program
  - Establish Mission 2001 baseline with M&O recommended cuts (Oct 92)
  - Implement tops down cost reduction with TPOs (Oct 92)
  - Formalize baseline after FY94 Passback, incorporating PO tops down reduction (Jan 93)
    -- Develop list of candidate activities for cost reduction

THE $6.3 BILLION ESAAB APPROVED COST BASELINE FOR THE YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT INCLUDED

- 20 years of activities from FY 1983 through FY 2002
- Total costs to determine site suitability, and if suitable, the costs to prepare License Application to NRC
- Actual costs from FY 1983 through FY 1992 — $ 1.3 B
- Future unescalated state payments from FY 1993 through FY 2002 — $ 0.8 B
- Escalations for all future activities from FY 1993 through FY 2002 — $ 0.6 B
- Unescalated cost to complete direct project activities through submission of a License Application — $ 3.6 B

$6.3 B

CSTESTP.GERTZ/6-5-92

THE UNESCALATED $3.6 BILLION ESTIMATE TO COMPLETE DIRECT PROJECT ACTIVITIES INCLUDED

• Site investigations, trenching, drilling and ESF testing	$ 0.8 B
• ESF and support facilities design, construction and operation	$ 1.0 B
• Waste package and repository design to support License Application	$ 0.5 B
• Systems engineering, technical data bases, performance assessment, environmental, and institutional support	$ 0.6 B
• Project management, training, records management, computer systems, administrative support, cost/schedule control, quality assurance	$ 0.7 B
	$3.6 B

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MAJOR PHASE II ICE RESULTS

- Phase II ICE report issued August, 1992
- YMP ESAAB approved baseline "represents a reasonable value for the currently planned work scope and an adequate baseline for the project"
- ICE believes LA in 2001 is an "achievable target, providing adequate funding is received"
  - ICE found no technical obstacles
  - ICE believes proposed staffing and capital equipment ramp-up can be accomplished

PHASE II ICE RESULTS

(CONTINUED)

- YMP and the OCRWM program could be more "success oriented" if taken "off budget"* in order to assure availability of adequate funding
- Transition to M&O should be reviewed to assure there is no duplication of effort
- PO and M&O need to clearly define scope and requirements for waste package and repository ACD and LAD

* Improve budgeting process

FY-92 BUDGET BY 3RD LEVEL WBS ($M)

1.2.1	Systems/PA/Technical Data	25.3
1.2.2	Waste Package/Near Field Environment	5.0
1.2.3	Site	47.4
1.2.4	Repository	4.3
1.2.5	Regulatory/ Institutional/Environmental	21.4
1.2.6	Exploratory Studies Facility	7.0
1.2.7	Test Facilities	7.0
1.2.8	Land Acquisition	0.2
1.2.9	Project Management	
	- Management	6.7
	- Administrative Services	22.0
	- Project Control	7.2
	- Quality Assurance	12.5
1.2.10	Financial & Technical Assistance	16.0
	Total	182.0

YBUDCG5P28.125.NWTRB/9-14-92

Yucca Mountain Site Characterization Project Budget Details
(Year of Expenditure $M)

WBS		Prior	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	Total
1.2.1	Systems	103.9	25.9	43.6	51.2	53.9	55.1	56.4	55.6	47.6	41.9	535.3
1.2.2	Waste Package	88.4	10.2	31.9	37.5	39.3	36.9	31.5	23.1	17.7	14.0	330.5
1.2.3	Site	337.2	68.3	153.1	161.8	155.3	156.6	111.3	47.1	28.2	16.1	1235.0
1.2.4	Respoitory	95.5	11.4	24.9	40.8	47.8	72.9	138.0	129.6	85.5	60.9	707.3
1.2.5	Regulatory & Inst.	107.6	23.6	37.1	42.3	43.0	44.9	46.7	46.5	38.3	51.9	481.9
1.2.6	ESF	111.7	71.8	171.0	154.3	129.5	46.2	40.3	21.8	19.9	19.4	785.9
1.2.7	Test Facilities	30.0	18.6	59.8	45.5	42.3	39.6	36.4	30.1	25.9	25.7	354.0
1.2.8	Land Acquisition	1.3	0.2	0.2	0.2	0.2	0.6	0.5	0.5	0.6	0.6	5.0
1.2.9	Project Mgmt.	293.3	56.8	80.2	79.7	85.2	87.2	87.5	78.9	75.2	71.7	995.8
1.2.10	F&TA	86.5	35.0	83.0	83.6	79.6	72.3	71.7	60.8	52.4	48.9	672.7
Total		1255.5	321.9	685.0	695.8	676.2	612.4	620.1	494.0	391.3	351.0	6103.3
ICE funding profile		1241.9	331.2	644.4	602.3	684.8	655.5	635.7	525.7	509.9	447.9	6279.3

- This funding profile is based upon completion of the current work scope. The 2001 completion date can be maintained by replanning work in FY93 for funding above $240M.
- Funding scenario presented includes budget reductions of approximately $220M which has not yet been planned by the appropriate participant.
- Staffing ramp-up from FY93 to FY94 is high risk but funding at full value is critical to support large capital commitments as well as maintenance of project momentum.
- Estimate to Complete FY93 to 2001 (less F&TA) is $4261.6M.

ALYMPP38.GERTZ/10-13-92

DESIGN AND TEST PROGRAM BASED ON FIRM FOUNDATION

	FY92	FY93
Other		
• SITE	33%	44%
- Drilling and trenching	$ 16.0	$ 17.7
- Non-surface-disturbing	$ 27.3	$ 27.9
• TESTS/STUDIES		
- Waste package	$ 5.4	$ 8.3
- Repository	$ 3.7	$ 4.5
- Exploratory Studies Facilities	$ 7.1	$ 49.0
Required		
• TEST FACILITIES	67%	56%
- Sample Management Facility	$ 3.5	$ 4.0
- Support facilities and equipment	$ 6.6	$ 6.2
• SYSTEMS	$ 8.5	$ 12.1
• REGULATORY & INSTITUTIONAL/ PERFORMANCE ASSESSMENT	$ 28.2	$ 27.5
• PROJECT MANAGEMENT		
- Management & administration	$ 36.1	$ 42.1
- Compliance & regulatory support	$ 23.1	$ 23.8
• FINANCIAL & TECHNICAL ASSISTANCE	$ 15.5	$ 17.6
• NTS Allowance	$ 1.0	$ 4.0
TOTAL	$182.0	$244.7

Preliminary

SCIENTIFIC AND TECHNICAL ACTIVIES ARE FUNDED AFTER REQUIRED FIXED COSTS

TOTAL YMP FY92 BUDGET	**182.0**
SAMPLE MANAGEMENT FACILITY	-3.5
FIELD OPERATIONS CENTER	-6.6
INFORMATION RESOURCE MANAGEMENT	-3.5
OFFICE FACILITIES	-2.4
MOTOR POOL	-0.4
QUALITY ASSURANCE	-12.5
SYSTEMS ENGINEERING	-5.7
CONFIGURATION MANAGEMENT	-2.8
TECHNICAL DATA BASE MANAGEMENT	-3.3
PERFORMANCE ASSESSMENT	-12.5
SITE CHARACTERIZATION PLANNING & REPORTING	-7.0
NRC/NWTRB INTERACTION & REGULATORY	-3.8
ENVIRONMENTAL COMPLIANCE & STUDIES	-8.4
TRANSPORTATION (WITHIN NEVADA)	-0.1
SOCIOECONOMICS/PETT SUPPORT	-1.2
PUBLIC OUTREACH	-2.3
LAND ACQUISITION	-0.2
RECORDS MANAGEMENT	-5.4
TRAINING	-2.9
PROJECT CONTROL	-7.8
PARTICIPANTS GENERAL MANAGEMENT	-6.4
ADMINISTRATIVE SERVICES	-7.3
STATE AND LOCAL GOVERNMENTS	-9.0
PAYMENTS-EQUAL-TO-TAXES (PETT)	-3.0
UNIVERSITY FUNDING	-3.5
NTS	-1.0
AVAILABLE FUNDS FOR SCIENTIFIC & TECHNICAL ACTIVITIES	**59.5**

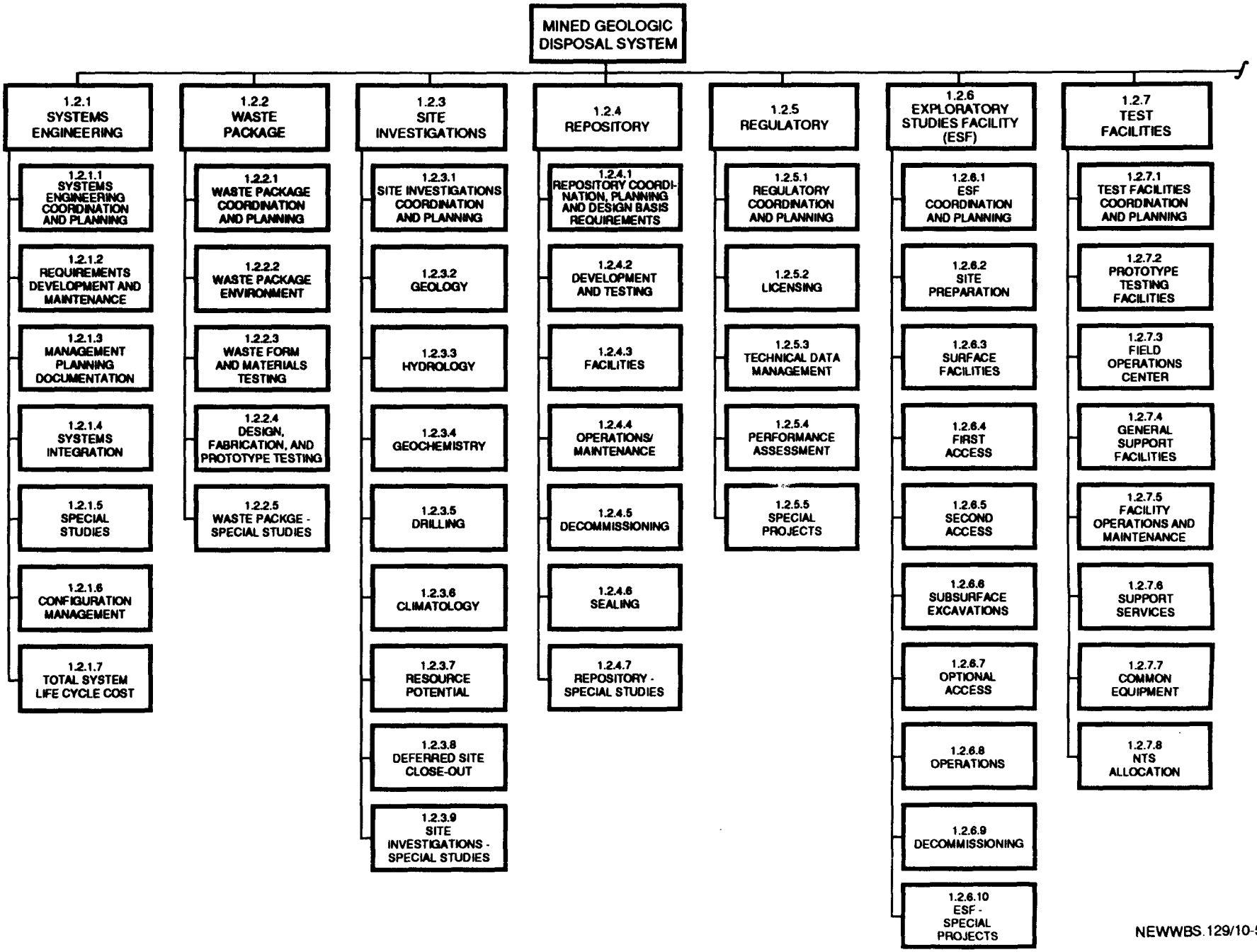
STAFAR1.129/10-13-92

SCIENTIFIC AND TECHNICAL ACTIVIES ARE FUNDED AFTER REQUIRED FIXED COSTS

	Preliminary
TOTAL YMP FY93 BUDGET	**244.7**
SAMPLE MANAGEMENT FACILITY	-4.0
FIELD OPERATIONS CENTER	-6.2
INFORMATION RESOURCE MANAGEMENT	-5.5
OFFICE FACILITIES	-2.1
MOTOR POOL	-0.5
QUALITY ASSURANCE	-10.0
SYSTEMS ENGINEERING	-7.9
CONFIGURATION MANAGEMENT	-2.1
PERFORMANCE ASSESSMENT	-10.0
TECHNICAL DATA BASE MANAGEMENT	-3.5
SITE CHARACTERIZATION PLANNING & REPORTING	-9.4
NRC/NWTRB INTERACTION & REGULATORY	-4.9
ENVIRONMENTAL COMPLIANCE & STUDIES	-7.8
TRANSPORTATION (WITHIN NEVADA)	-0.1
SOCIOECONOMICS/PETT SUPPORT	-1.3
PUBLIC OUTREACH	-3.5
LAND ACQUISITION	-0.2
RECORDS MANAGEMENT	-5.5
TRAINING	-3.5
PROJECT CONTROL	-9.0
PARTICIPANTS GENERAL MANAGEMENT	-4.2
ADMINISTRATIVE SERVICES	-10.2
FINANCIAL & TECHNICAL ASSISTANCE	-17.6
NTS ALLOCATION	-4.0
SAFETY & HEALTH	-0.7
CHANGE CONTROL	-2.1
TECHNICAL SUPPORT	-1.5
AVAILABLE FUNDS FOR SCIENTIFIC & TECHNICAL ACTIVITIES	**107.4**

STAFAR2.129/10-13-92

YMP WORK BREAKDOWN STRUCTURE



NEWWBS.129/10-5-92

YMP WORK BREAKDOWN STRUCTURE

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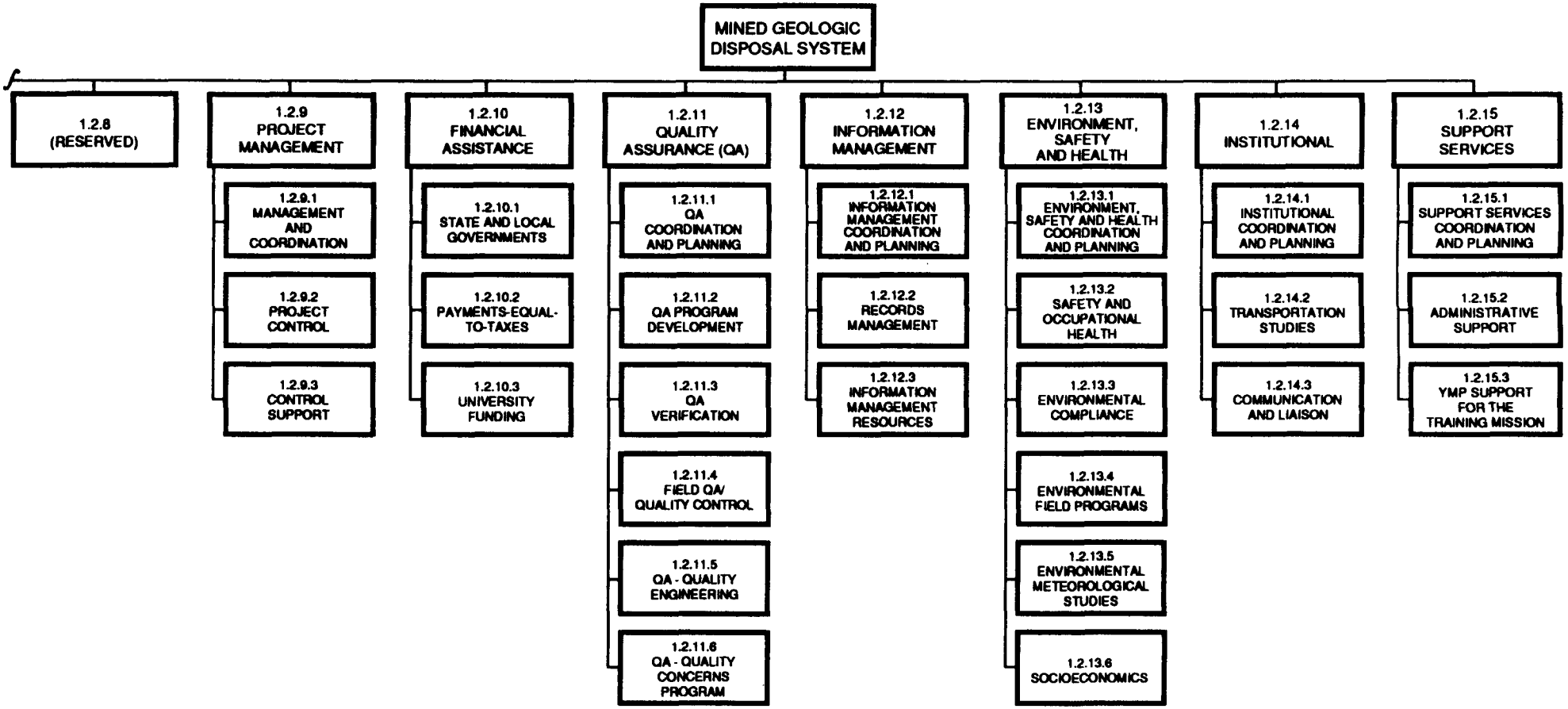
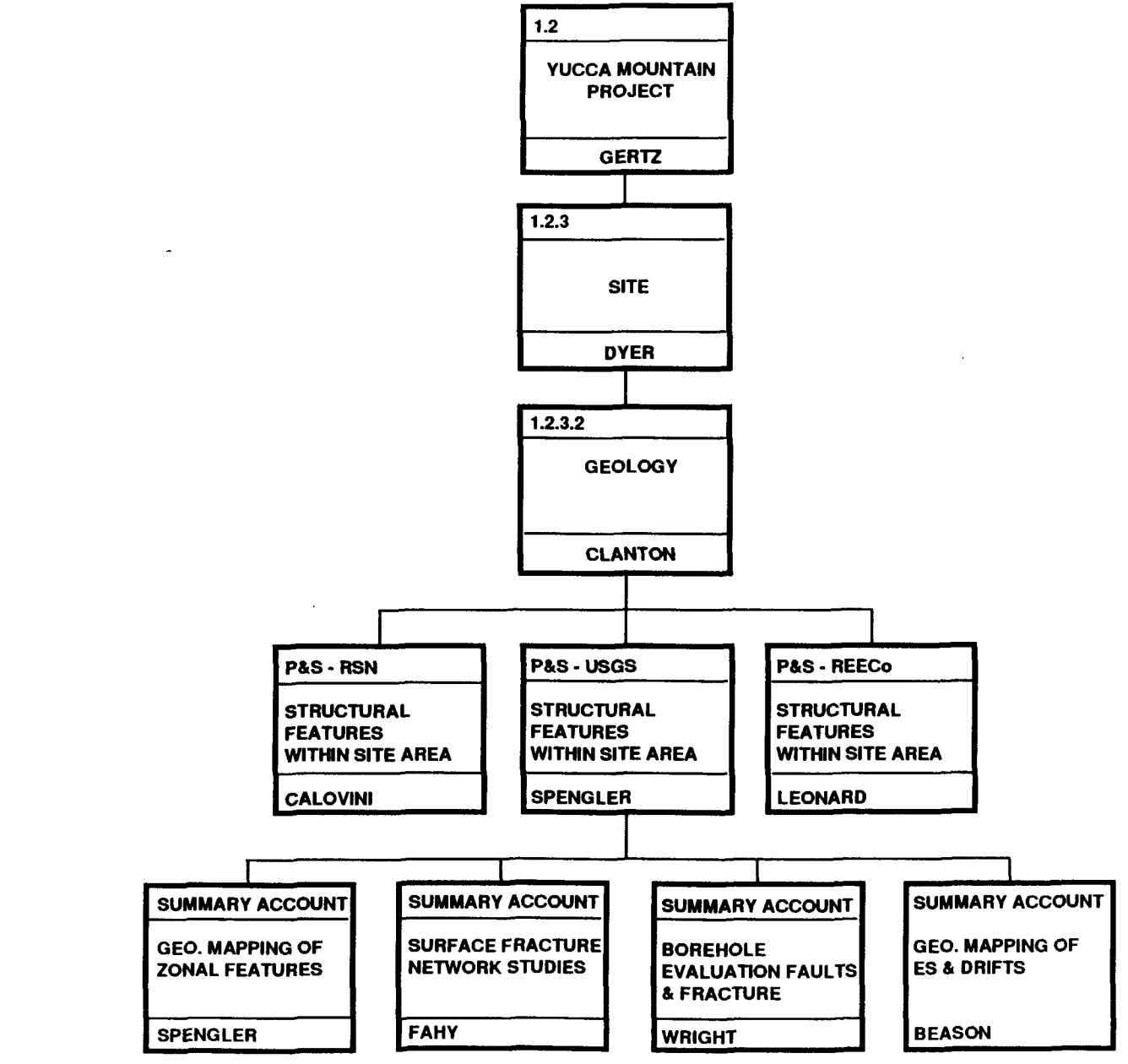


SAMPLE WBS SLICE TO SUMMARY ACCOUNT LEVEL



FY92 10 Act $521K 14 Act $100K 7 Act $125K 7 Act $140K

PLANNING & CONTROL SYSTEM DETAILS

Planning & Scheduling Accounts	816
Summary Accounts	3875
Major Participants	8
Minor Participants	44
Schedule Activities	6750

PRELIMINARY ALLOCATION OF FY93 FUNDING

Preliminary

WBS		M$
1.2.1	Systems Engineering	5.9
1.2.2	Waste Package	8.3
1.2.3	Site Investigations	50.0
1.2.4	Repository	4.5
1.2.5	Regulatory	23.0
1.2.6	Exploratory Studies Facility	49.0
1.2.7	Test Facilities	10.2
1.2.9	Project Management	17.4
1.2.10	Financial Assistance	17.6
1.2.11	Quality Assistance	10.0
1.2.12	Information Management	11.0
1.2.13	Environment, Safety and Health	12.4
1.2.14	Institutional	3.5
1.2.15	Support Services	16.2
YMP Support to OGD Analysis and Verification Division		1.5
NTS Allocation		4.2
Total		244.7

OVESSED81.GERTZ/10-14-92

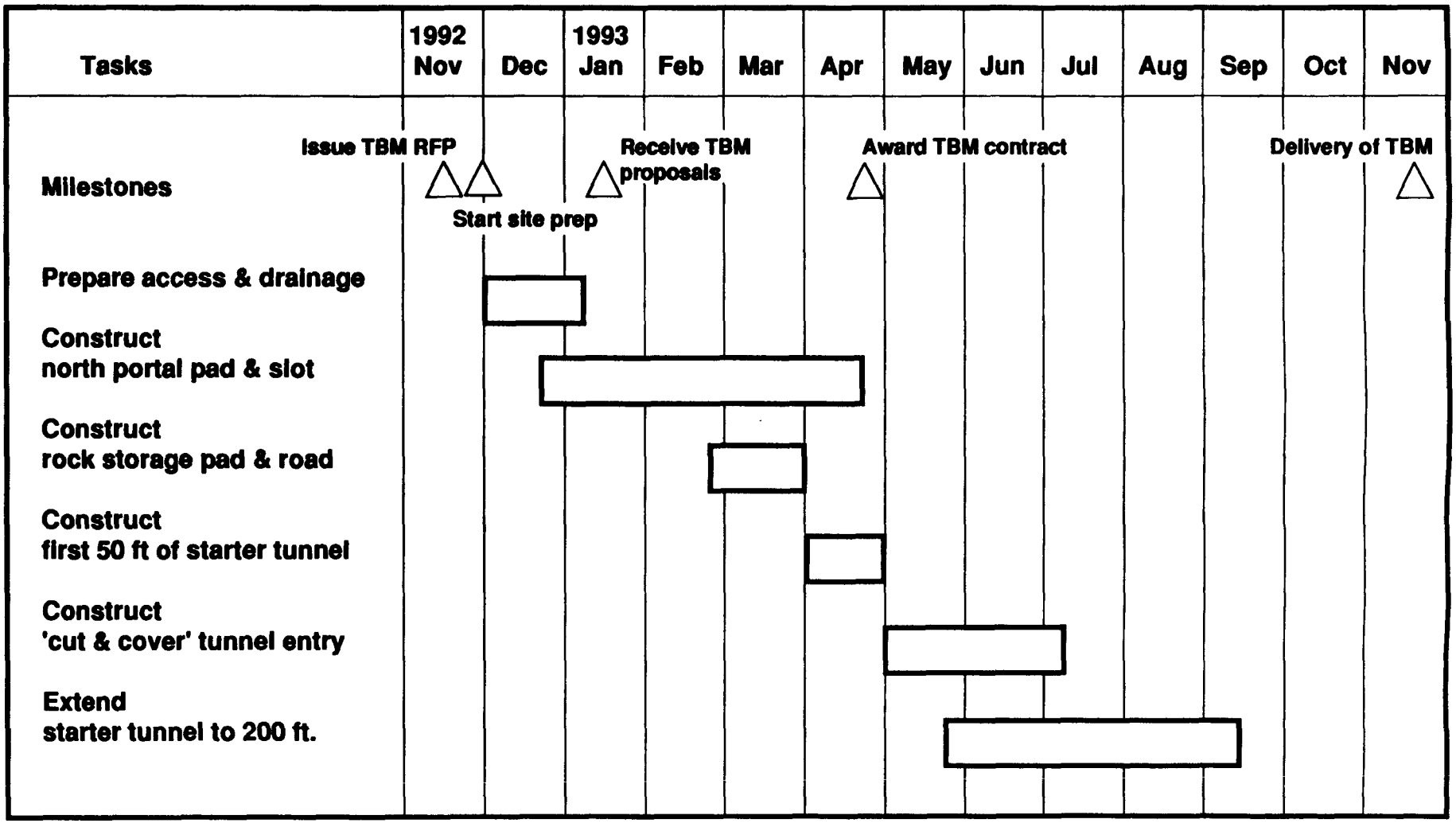
FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.6 Exploratory Studies Facility ($49M)

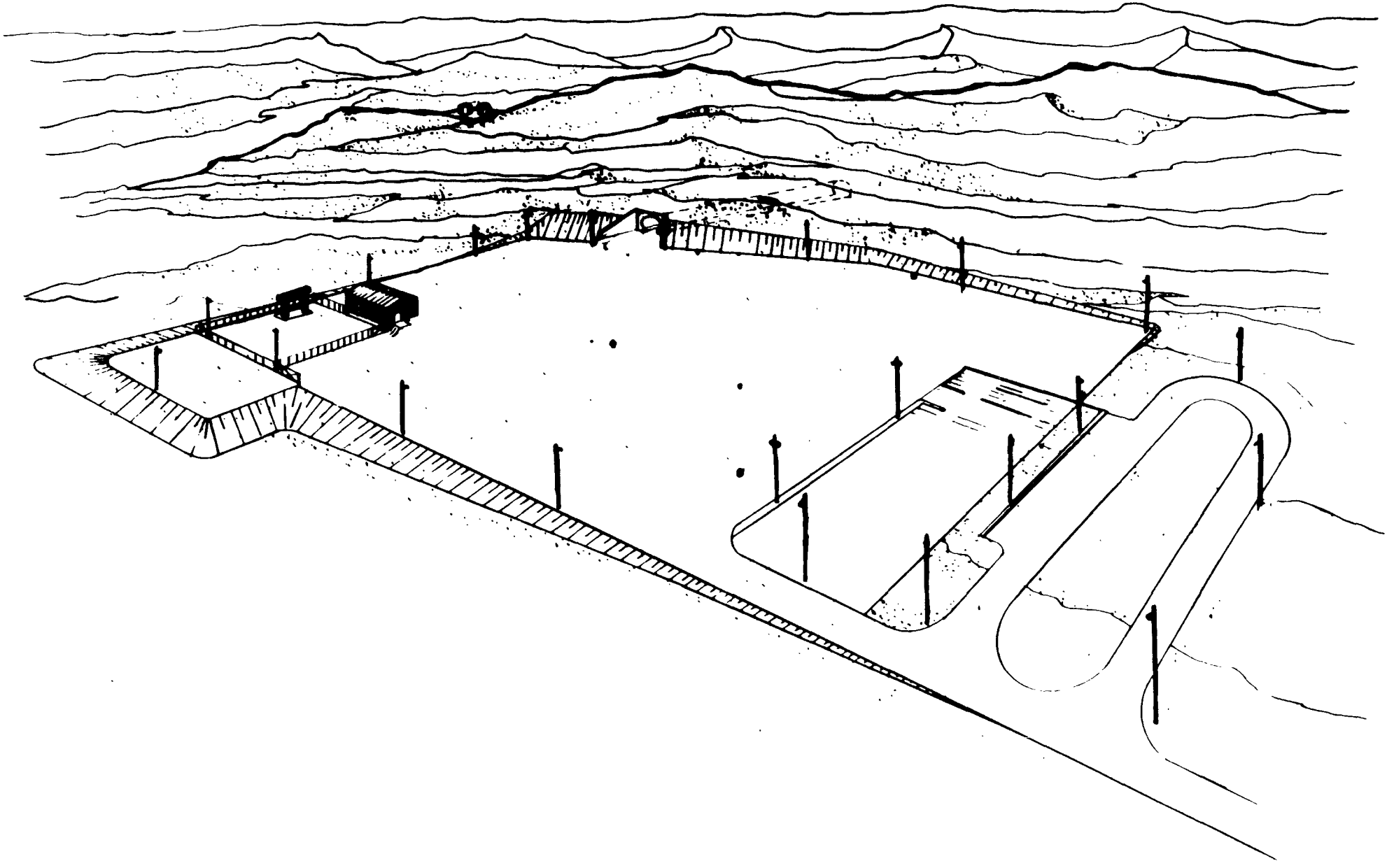
- Start ESF site preparation and construct first 200' of north portal and ramp
- Continue ESF Title II Design
- Prepare facilities for ESF testing
- Award subcontract for underground construction
- Issue RFP, receive proposals, and ward contract for first large TBM and support equipment
- Upgrade power supply for ESF construction

PRELIMINARY ESF CONSTRUCTION SUMMARY SCHEDULE

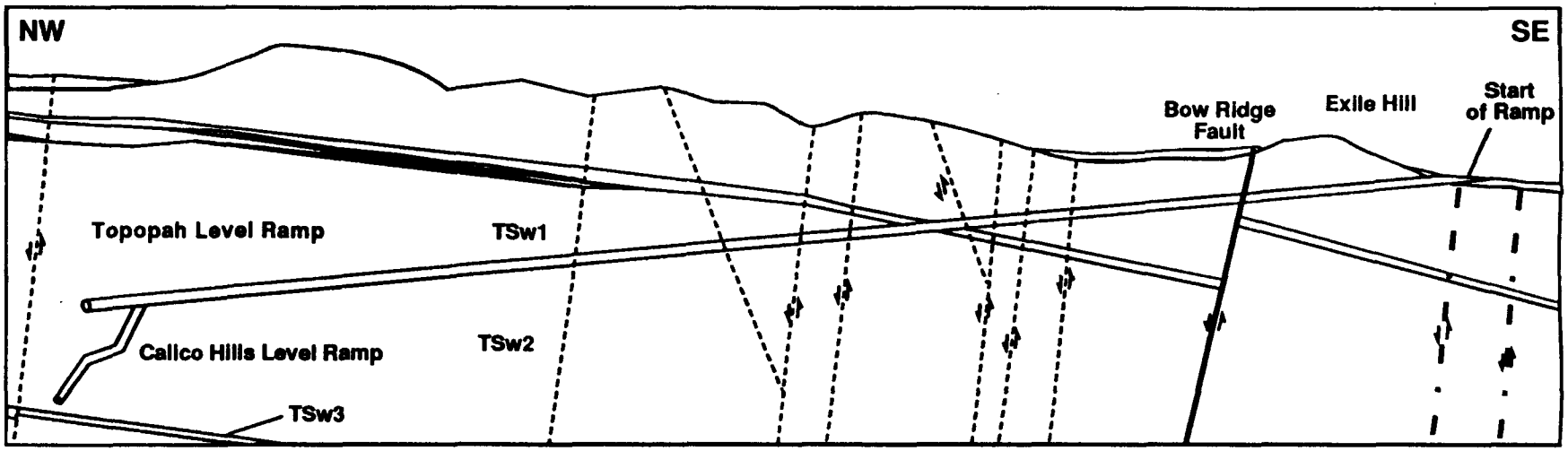


ESFCHT.CPG/10-15-92

ESF NORTH PORTAL DESIGN PACKAGE 1A



NORTH RAMP



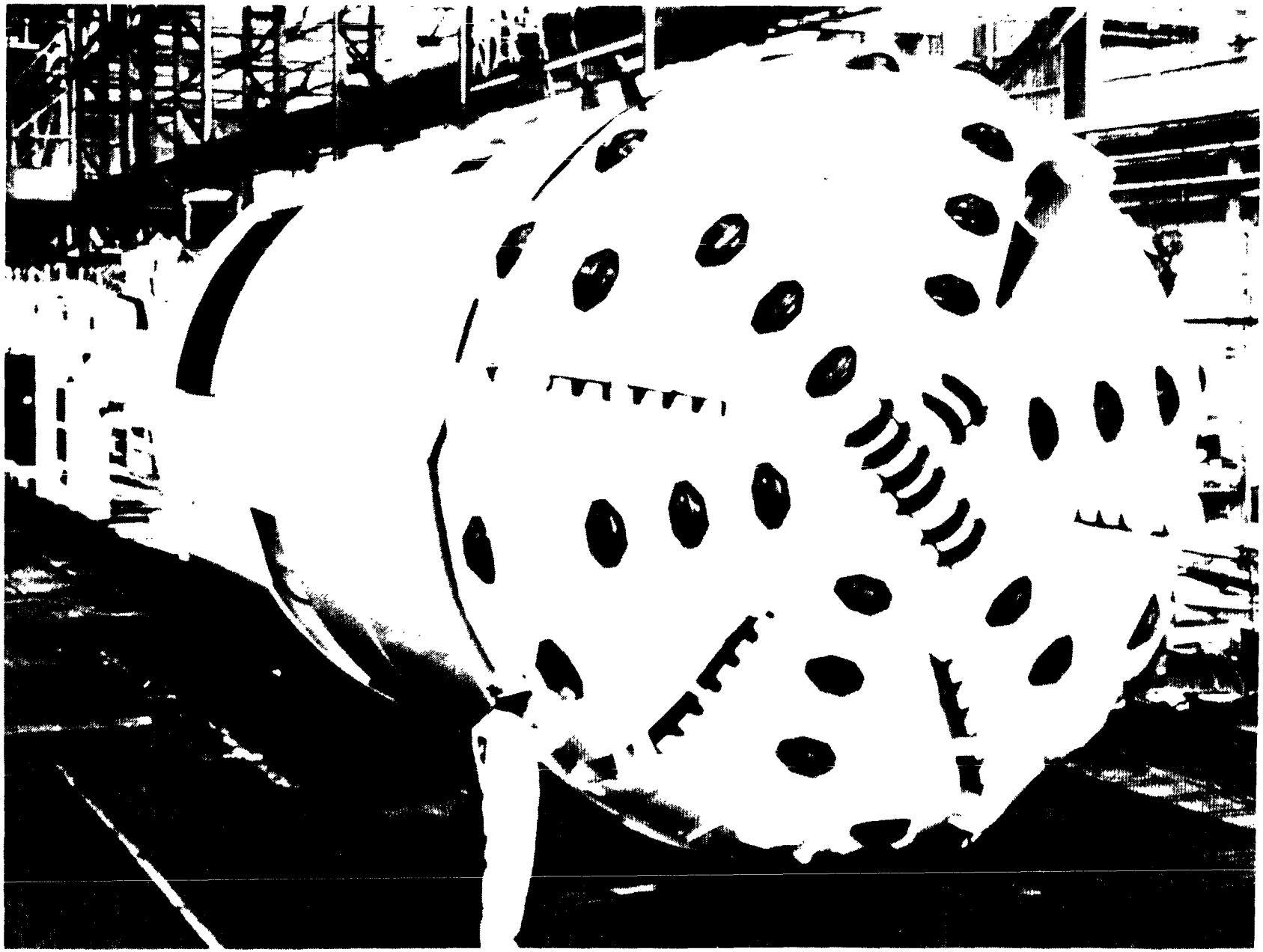
Thermal/Mechanical Units

Tcw		Tiva Canyon Member
PTn		Yucca Mountain Member Pah Canyon Member
TSw1 TSw2		Topopah Spring Member
TSw3		Topopah Spring Member
CHn		Tuffaceous Beds of Calico Hills
TZZ	— —	Zeolite-Vitric Contact in Calico Hills (TZZ) (Not Present on This Selection)

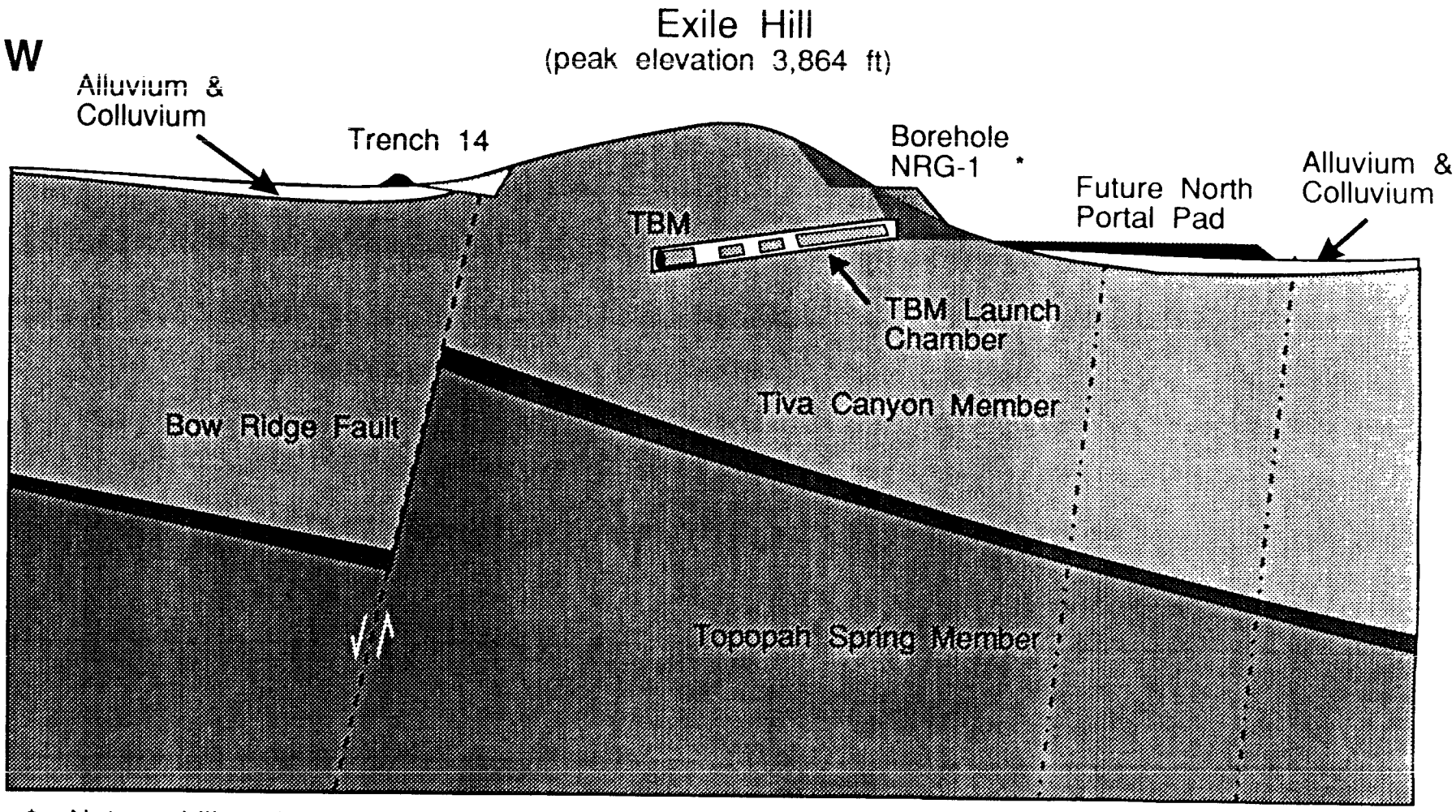
Conceptual Illustration
Not To Scale

NRAMPBW.XSECT/7-10-92

TUNNEL BORING MACHINE

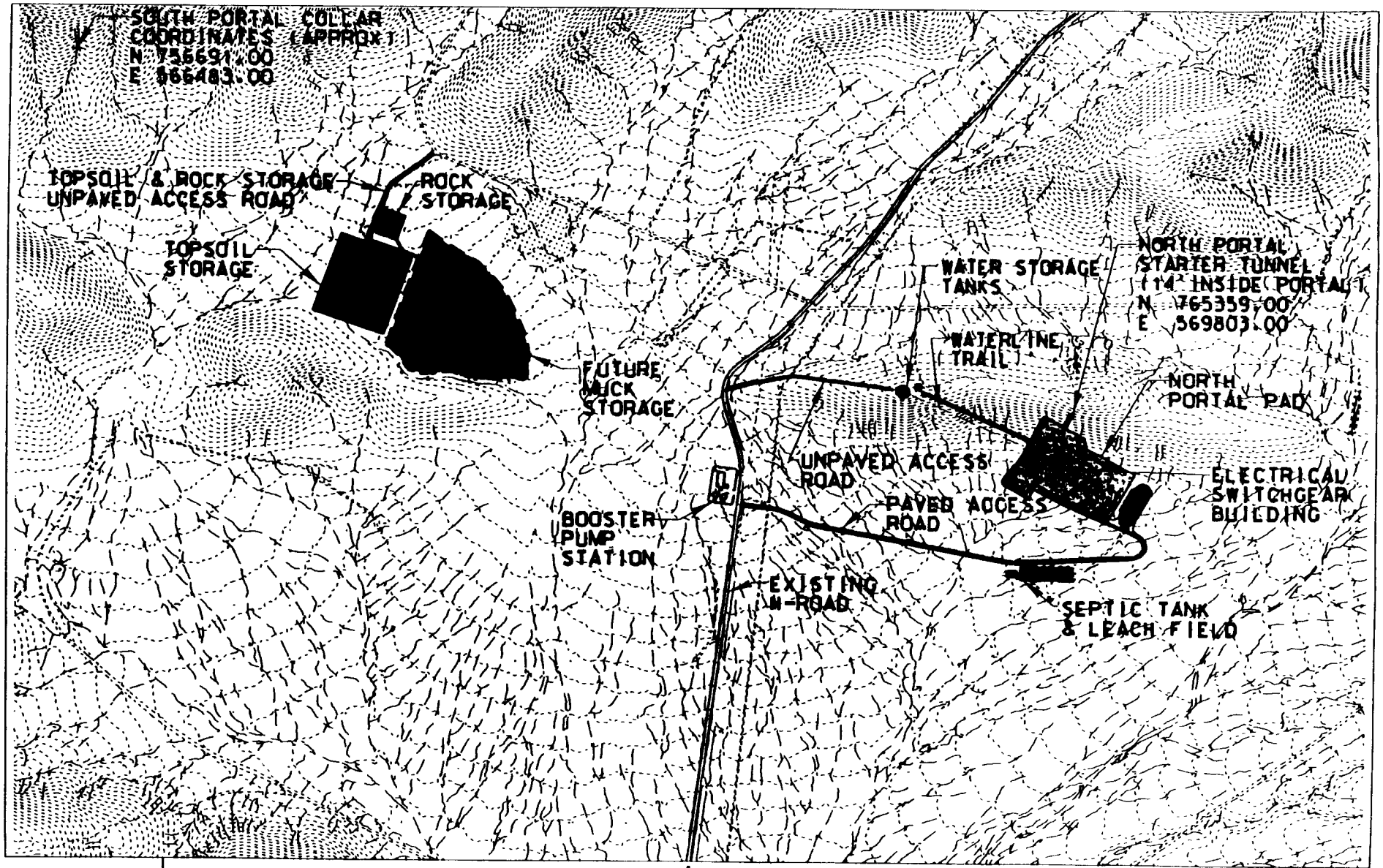


CROSS SECTION OF EXILE HILL SHOWING TBM LAUNCH CHAMBER, NRG-1 AND FUTURE NORTH PORTAL PAD



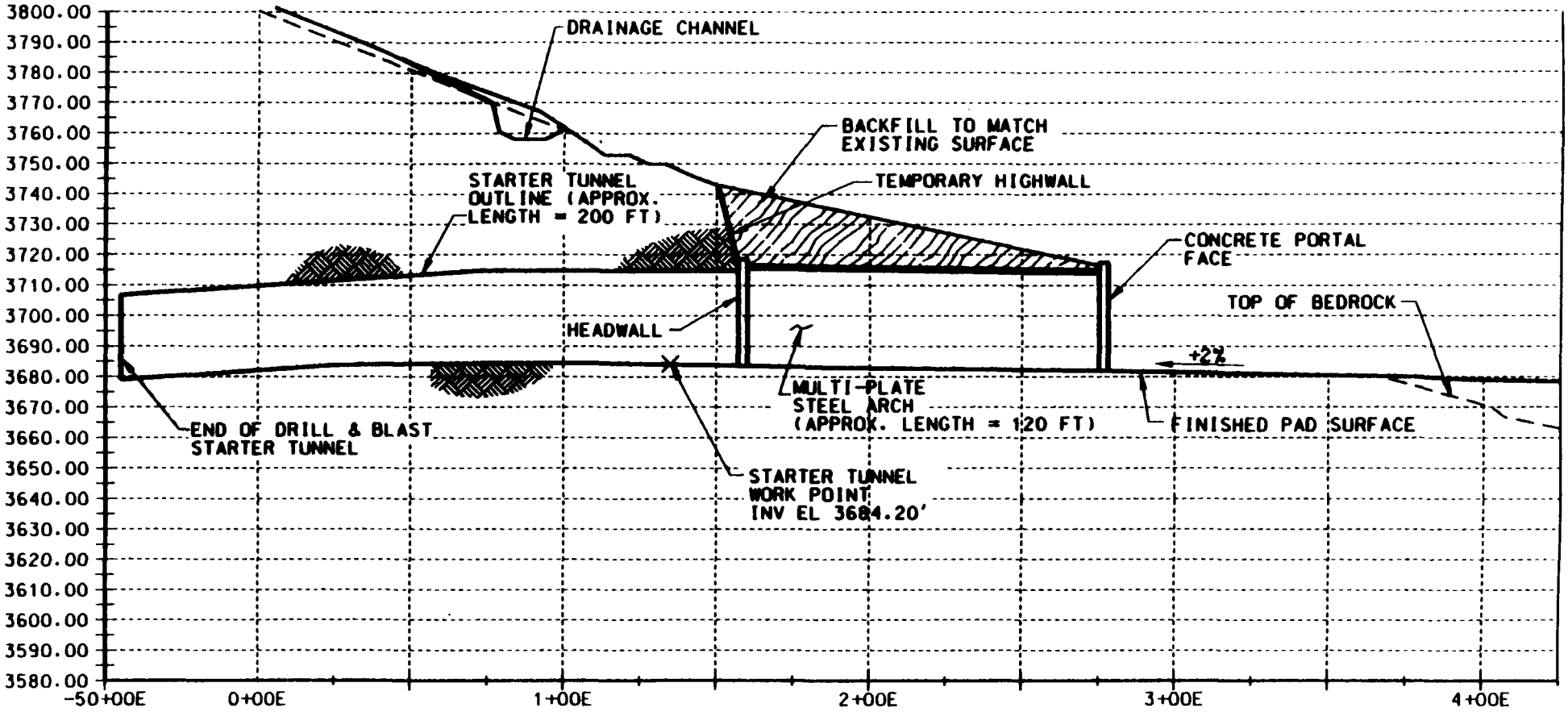
* Note: drill pad to be removed prior to excavation of launch chamber.

Not to scale

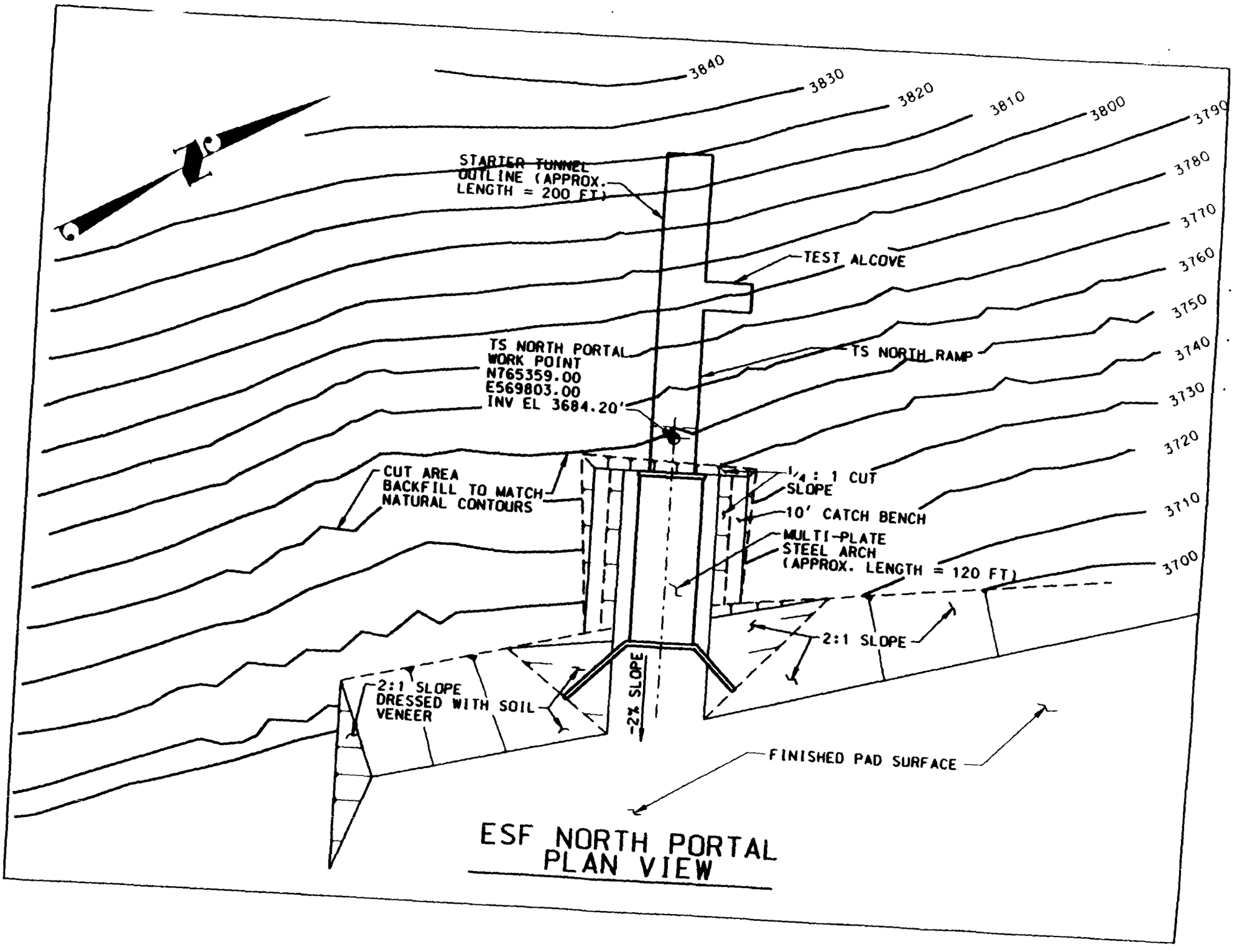


ESF PACKAGE 1A
OVERALL SITE
PLAN
REFERENCE
YMP-025-1-CIVL-PL111

cgulford /usr2/jgilmour/ymp0624a.dgn 05-AUG-1992



ESF NORTH PORTAL CROSS SECTION



ESF NORTH PORTAL PLAN VIEW

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.3 Site Investigations ($50M)

- Complete UZ-16 borehole, install instrumentation and begin testing
- Complete boreholes NRG-2 through NRG-6 and SRG-5; provide ESF ramp design data
- Complete drilling/continue data collection to support study of shallow UZ infiltration (neutron boreholes)
- Complete/revise prerequisite study plans and job packages for ESF tests in starter tunnel
- Complete trenching program in Midway Valley; complete most of trenching program for Quaternary faults in the site area
- Continue collection of data (hydrologic, meteorologic, geochemical, seismic) that would otherwise be lost
- Carry out C-well pump test
- Start UZ-14 borehole drilling

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.5 Regulatory ($23M)

Regulatory and Licensing

- Support monthly interactions with NRC/NWTRB/ACNW
- Prepare and issue documents
  - ESSE comment responses
  - 40 CFR 191 reviews and white paper
  - Two semi-annual progress reports
  - One revision of the MGDS annotated outline
  - Topical reports on erosion and seismic hazard methods
- Revise YMP Regulatory Compliance Plan
  - Include YMP responsibilities for LA/EIS/Site Suitability
  - Add annotated and issue resolution initiatives
- Revise or issue ESF and SBT study plans, as needed to support site characterization activities

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.5 Regulatory (Continued)

Technical Data Management

- Release first version of parameter dictionary
- Revise technical data handbook
- Other products include technical data catalog and special projects

Performance Assessment

- Support to Surface-Based Testing
- Thermal loading analysis
- Problem definition for Total System Performance Assessment (TSPA II)
- Specification of next generation EBS Model
- Revise or issue ESF and SBT study plans, as needed to support site characterization activities

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.1 Systems Engineering ($5.9M)

- Support new technical document hierarchy documents for both program and project
- Develop, review, and issue Mined Geologic Disposal System (MGDS)- program element interface specifications: MGDS-Monitored Retrievable Storage, MGDS-Transportation, MGDS-Waste Acceptance
- Perform Change Control Board (CCB) impact reviews & baseline revised technical document hierarchy
- Conduct conformance reviews of ESF Design to ESF Design Requirements (ESFDR)
- Develop specialty engineering plan in support of the ESF design and Advanced Conceptual Designs (ACD)
- Conduct required value engineering cost saving studies
- Perform and review special studies and tradeoff analyses for ESF and Repository/Engineered Barrier System (EBS) Design activities
- Support the required program development of the Total System Life Cycle Cost (TSLCC)

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.2 Waste Package ($8.3M)

- Conduct Waste Package Advanced Conceptual Design
  - Mechanical, thermal, shielding, criticality calculations
  - Develop concepts to include operability and cost studies
- Conduct analyses of thermal loading options
- Start laboratory large block tests
- Develop plans for testing in ESF
- Continue long-term testing of spent fuel
- Continue some survey/testing of metal barriers
- Continue radionuclide release modeling

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.4 Repository ($4.5M)

- Complete engineering plan for repository ACD
- Complete basis for Design Document for FY93
- Revise study plans for ESF testing
- Continue ESF design analysis
- Continue laboratory rock mechanics tests
- Complete preliminary drawings of shafts/ramps and repository layouts, and selected surface facilities
- Initiate conceptual drawings of waste emplacement equipment
- Update Borehole Sealing Requirements Documents
- Investigate grouts for borehole sealing

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.7 Test Facilities ($10.2M)

- Maintain support to field site characterization activities
- Support tours and outreach
- Develop a conceptual design for Area 25 infrastructure improvements
- Improve fire protection in the site office
- Construct hazardous materials storage area
- Begin design of the Central Area Complex (J13)
- Mobilize surplus facilities from Tonopah Test Range

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.9 Program Management ($17.4M)

- Implement cost effective procedures and techniques
- Emphasize cost/schedule analysis in Program Management decision process
- Continue efforts to streamline plans and procedures and eliminate duplication
- Develop standardized Change Control Board procedures for the project and program
- Conduct compliance reviews for procurement, safety & health, and other appropriate functional areas
- Develop standardized training programs for PACS, and continue outreach assistance to participants
- Develop software to allow Division Directors to get status information interactively with PACS

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.10 Financial Assistance ($17.6M)

- Direct payments to State of Nevada of $5.0M
- Direct payments to affected counties of $6.0M
- Cooperative agreements with universities of $3.7M
- Payments-Equal-To-Taxes of $2.9M

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.11 Quality Assurance ($10M)

- Provide required Quality Assurance (QA) support to all design and construction efforts for the Exploratory Studies Facility and for all drilling and field activities
- Maintain the approved QA program and implement the revised QA Requirements Document (QARD) which allows YMP participants to supersede their QA Program Documents (QAPD) by using Yucca Mountain Quality Assurance Division (YMQAD) administered program matrices
- Perform procurement document reviews and establish a consolidated Quality Suppliers List
- Conduct QA verification activities through audits and surveillances for YMPO and YMP participants
- Provide QA coordination, planning, and training

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.12 Information Management ($11M)

- Provide Records Management System support for Project Office, site and seven participants
- Operate the Project Document Control and site Document and Records Centers
- Provide Project-wide software development and maintenance
- Operate and maintain the Project computer center (VAX cluster)
- Accomplish vital VAXcluster hardware upgrades
- Support InfoSTREAMS implementation
- Support OCRWM information management improvement activities (e.g., interim Records Inventory & Disposition Schedule (RIDS), records capture, duplicate check)

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.13 Environment, Safety & Health ($12.4M)

Environmental Programs

- Continue pre-activity surveys at the FY92 level with emphasis on ESF (including the seismic line)
- Continue all environmental monitoring programs (radiological, air quality, meteorological, water resources, terrestrial ecosystem, archaeological)
- Continue environmental permitting and compliance activities with respect to ESF and other program elements as appropriate
- Continue environmental audits and surveillance program
- Partially implement the hazardous materials management, control and handling program (including waste minimization)

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.13 Environment, Safety & Health (Continued)

Environmental Programs

- The DOE Radiation Control Manual requirements will be partially implemented
- Continue interaction with the Native American component of the Cultural Resource Program
- The socioeconomic and regional studies program will continue
- Continue compliance review of H&S requirements
- Maintain H&S documents
- Establish protocols for functional appraisals and significantly increase number of functional appraisals

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

1.2.14 Institutional ($3.5M)

- Support YMPO interactions with the State of Nevada, public interest groups, the Nevada business community, and local government agencies
- Continue operation of information offices in Las Vegas, Beatty, and Pahrump
- Continue outreach programs including speakers bureau, tours and exhibit programs
- Educational programs will continue to be developed and implemented
- Support DOE/YMP media relations
- Develop and update various publications, technical papers, audiovisuals, and exhibits

FY93 PLANNED ACCOMPLISHMENTS

Preliminary

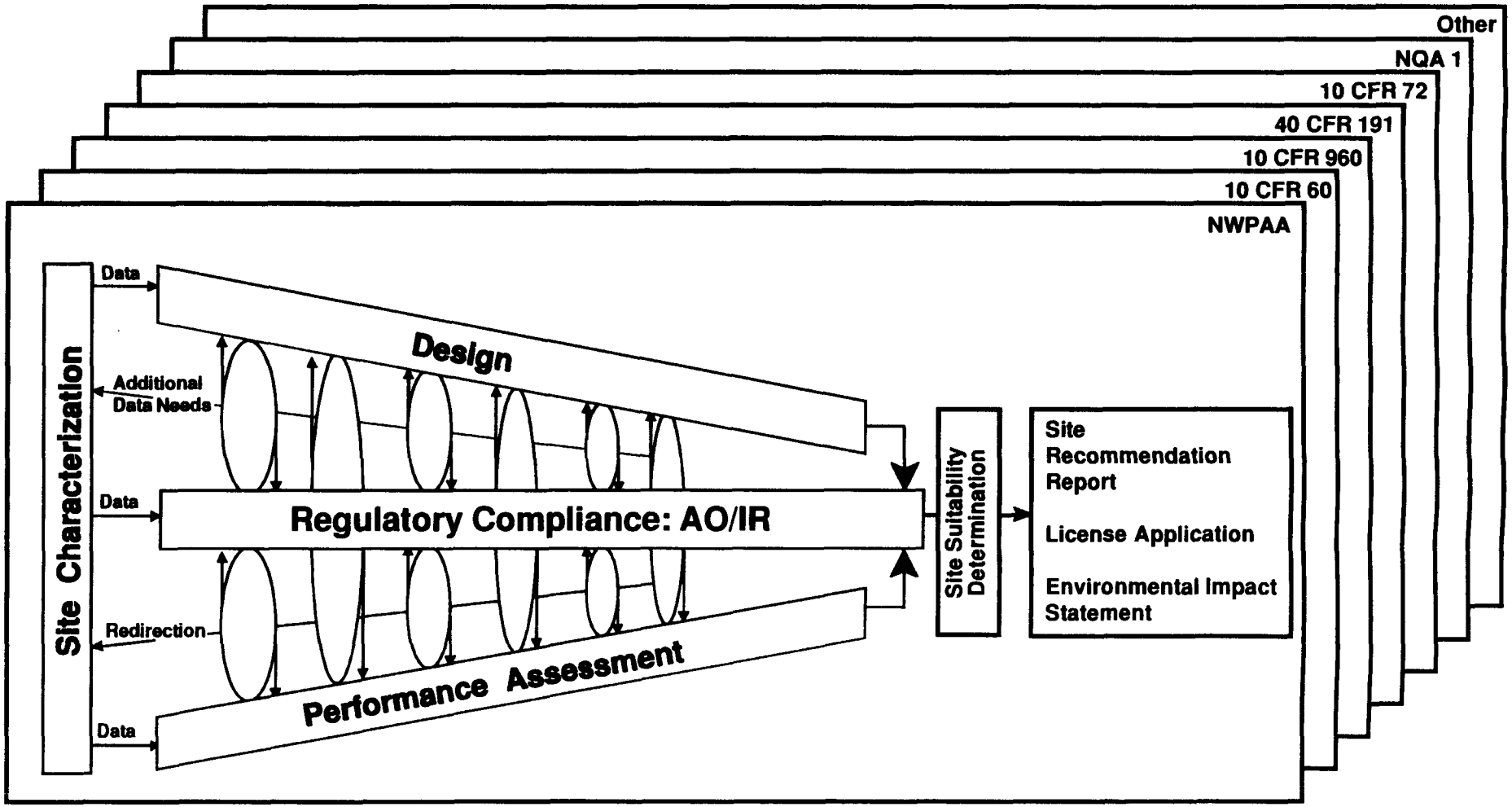
1.2.15 Support Services ($16.2M)

- Continue logistical support
  - Rent on office space in Las Vegas and public information offices
  - Maintain motor pool
  - Maintain telecommunications system
  - Continue graphics and presentation support
  - Continue clerical support to YMP
- Continue Training
  - YMP orientation
  - General employee training
  - Instructor qualification
  - QA requirements
  - Participant support
  - Site visitor safety orientation

CHALLENGES/ISSUES

- Modify program as appropriate to be consistent with new energy legislation
- Adamant state opposition
- Intense media attention
- Complex science/10,000 year question?
- Adequate funding
  - Revolving account
- Detailed procedures and record-keeping
- Transition from planning to execution
  - Including changes in contractor roles
- Issue resolution
- Focus of Program

CONVERGENCE OF SITE CHARACTERIZATION WILL CONTINUE



TO DEMONSTRATE FEDERAL RESOLVE DOE NEEDS ASSISTANCE

YES

- ☑ **Litigation and/or legislation to assure permits can be obtained**
- ☑ **Administration (OMB) and departmental (DOE) support to obtain adequate resources**
- ☑ **Congressional support of full funding**
- ☑ **Regulatory compliance is reasonable with a cost effective basis in accordance with new Energy Bill**

Without all of the above, the repository program will become stalled and the nuclear power option will become less viable as part of the National Energy Strategy.

BACKUP

COMPARISON OF YMP TOTAL PROJECT COST ESTIMATES

UNESCALATED $M (Except as noted)

WBS		ESAAB 01/92	ICE PHASE II 08/92	MISSION 2001 FINAL REPORT 09/92
1.2.1	SYSTEMS	440	421	470
1.2.2	WASTE PACKAGE	273	285	297
1.2.3	SITE	1,113	1,006	1,127
1.2.4	REPOSITORY	451	649	600
1.2.5	REGULATORY AND INSTITUTIONAL	382	385	424
1.2.6	ESF	728	693	698
1.2.7	TEST FACILITIES	313	308	297
1.2.8	LAND ACQUISITION	4	3	4
1.2.9	PROJECT MANAGEMENT	1,003	796	892
1.2.10	F&TA (WITHOUT BENEFITS)	453	453	458
SUBTOTAL		**5,160**	**5,000**	**5,267**
	BENEFITS	450	0	200
SUBTOTAL		**5,610**	**5,000**	**5,467**
	* CONTINGENCY	75	526	0
TOTAL PROJECT COST	**UNESCALATED**	**5,685**	**5,526**	**5,467**
TOTAL PROJECT COST	**ESCALATED**	**6,319**	**6,279**	**6,103**
	ESTIMATE TO COMPLETE FY93 – LA LESS F&TA	** 3,590	** 3,924	3,640

Estimated costs include capital, operating and prior spending.

* ESAAB contingency is for ESF Construction only; ICE contingency is for all 3rd level cost elements; 2001 includes implicit contingency; explicit contingency analysis not yet completed.

Estimate To Compete is FY93 through LA less F&TA (unescalated)

F&TA and Benefits –

ESAAB – Includes: 10% for grants, cooperative agreements, and impact assistance; PETT; and $50M (93–2001) for benefits agreement.

ICE PHASE II – 94–2001 includes 10% for grants, cooperative agreements, and impact assistance; PETT; excludes $200M benefits agreement.
FY93 includes $8.5M for county grants; 2.5% for state grant; PETT; excludes 2% impact assistance.

MISSION 2001 FINAL REPORT – Includes: 10% for grants, cooperative agreements, and impact assistance; PETT; and $25M (94–2001) for benefits agreement.

** Adjusted to reflect difference between FY92 estimate and FY92 funding. Non–funded FY92 work was shifted to outyears.

WORK UNDERWAY

Borehole UZ-16

- Planned Depth - 1663 feet or approximately 40 feet below the water table
- Planned diameter
  - 16-inch surface casing presently set at 52 feet
  - 12-3/8" borehole will be drilled to Total Depth (TD)
- Start date - drilling/coring initiated May 27th
  - Present depth ~800 ft
- Estimated completion date
  - Drilling/coring: March 1993
  - Borehole testing: March 1994
- Drill Rig LM-300

WORK UNDERWAY

Borehole UZ-16 (Continued)

Use of data:

- **The structural, stratigraphic, hydrologic, mechanical and geochemical information obtained from the cores will benefit many studies to help understand if the natural barriers at Yucca Mountain can isolate nuclear waste**
  - **Information on rate of infiltration of surface waters at depth**
  - **In-situ tests of the bulk rock mass**
  - **Borehole-to-borehole correlation data**
  - **Provides a means for improved understanding of subsurface structural features and stratigraphic correlation**

WORK UNDERWAY

Neutron Access Boreholes

Purpose:

- **Investigate the present-day precipitation infiltration processes**

- **Measure precipitation infiltration rates within site surficial materials at the site**

WORK UNDERWAY

Neutron Access Boreholes - Phase I

	Borehole Identified	Depth, Feet	Diameter, Inches	Percent Core Recovered	Date Completed
1.	USW UZ N-55	255.3	6	96.1	13 NOV 91
2.	USW UZ N-54	244.7	6	89.3	11 DEC 91
3.	USW UZ N-37	270.4	6	74.6	31 JAN 92
4.	USW UZ N-11	84.4	6	98.5	25 FEB 92
5.	USW UZ N-36	59.8	6	98.2	4 MAR 92
6.	USW UZ N-17	59.8	6	97.5	19 MAR 92
7.	USW UZ N-15	59.8	6	92.1	25 MAR 92
8.	USW UZ N-16	60.0	6	78.5	30 MAR 92
9.	USW UZ N-38	89.6	6	99.2	13 APR 92

Weighted average percent recovery all completed holes: 88.3

WORK UNDERWAY

Neutron Access Boreholes - Phase I (continued)

	Borehole Identified	Depth, Feet	Diameter, Inches	Percent Core Recovered	Date Completed
10.	USW UZ N-64	60.0	6	84.7	17 APR 92
11.	USW UZ N-27	202.4	6	83.7	29 APR 92
12.	USW UZ N-53	234.5	6	TBD	12 JUN 92
13.	USW UZ N-63	60.0	6	84.2	10 AUG 92
14.	USW UZ N-33	75.01	6	99.3	17 AUG 92
15.	USW UZ N-34	84.08	6	63.3	24 AUG 92
16.	USW UZ N-31	192.59	6	96.6	22 SEP 92
17.	USW UZ N-32	207.4	6	93.0	9 OCT 92

Weighted average percent recovery all completed holes: 88.3

WORK UNDERWAY

Neutron Access Boreholes (Continued)

Future Drilling Activities

- Phase I drilling completed
- 12 additional neutron-access boreholes to be drilled during Phase II
- Phase II drilling footage expected to total about 1200 feet
- Phase II began in August
  - 5 of 12 boreholes completed

FY92 SHALLOW NEUTRON HOLE DRILLING PROGRAM

- **The purpose of the shallow neutron hole drilling program is to provide access to a variety of hydrologically active topographic settings (i.e., washes, hill slopes, ridgetops) to evaluate the most dynamic part of Yucca Mountain, the near surface**
- **Profiles of saturations and physical properties measured on core samples have provided understanding about shallow infiltration processes:**
  - **The top of the nonwelded base of the Tiva Canyon flow unit is nearly saturated, which supports the expectation, from the conceptual model, of capillary barriers**
  - **This nearly saturated zone is likely a zone where fracture flow terminates, below which matrix flow dominates. (This zone is also a likely barrier to gas flow between the Tiva Canyon and Topopah Spring units)**

FY92 SHALLOW NEUTRON HOLE DRILLING PROGRAM

(CONTINUED)

- **The new boreholes have provided a dataset for INTRAVAL (an international model validation program) which will be used to develop flow transport models**
  - **Preliminary modeling by the USGS indicates that the system has been in a long term drying trend (>1000 years). In order to produce current saturation profiles seen in the deeper neutron holes there is a net water loss from Yucca Mountain under the current arid conditions. The system is not steady state**
- **Future information will help in many ways to characterize Yucca Mountain:**
  - **Data from geochemical analysis will help to identify fast pathways which may be critical in determining the suitability of Yucca Mountain**
  - **Continued neutron moisture meter logging will help characterize changes in water content over the variety of topographic settings thought to be hydrologically active**

WORK UNDERWAY

Soil and Rock Property Investigations in Midway Valley - Test Pits

Phase II test pits consists of 41 excavations
Size: 3 ft. wide by 10 ft. long by 5 ft. deep

Purpose:

- **Examine bedrock and in-situ soil conditions**
- **Determine soil gradation characteristics**
- **Test in-place soil density**

Use of Data:

- **Support Design Package 1B**

WORK UNDERWAY

Soil and Rock Property Investigations - Pavements and Test Excavations

2 pavements cleared
- **Exile Hill ~30 ft x ~100 ft**
- **Fran Ridge pavement ~100 ft x ~ 100 ft**

1 20 ft deep test excavation in bedrock (Topopah Spring formation) at Fran Ridge

Purpose:
- **Map and interpret fracture patterns**

Use of data:
- **Support portal and ramp design (Exile Hill)**
- **Develop shaft and ramp mapping procedures (Fran Ridge pavement and test excavation)**

WORK UNDERWAY

Midway Valley Investigations

Purpose: To prepare a detailed geologic map of Midway Valley and to evaluate the potential for faulting (earthquake activity) at the prospective surface facilities

June 1992

- 1100 ft long, 10 ft deep trench MWV-T5 was excavated in the area of the prospective surface facilities to determine if faults are present
- Final map of trench is complete
- ~ 400 ft portion of trench will be back filled prior to November 30, 1992 - start ESF construction

WORK UNDERWAY

Midway Valley Investigations (Continued)

July 1992

- Trench 14D on the Bow Ridge fault was excavated; preliminary mapping is complete
- Trench MWV-T4 (Trench 17) re-excavated; preliminary trench mapping is complete
- 10 additional test pits were excavated; mapping in progress

September 1992

- NRC site visit to trenches

October 1992

- Trench MWV-T7 to be excavated at North access site area

WORK UNDERWAY

Quaternary Faulting Investigations

Purpose:

- To characterize Quaternary faults in the site area

Progress:

August and September 1992

- 4 pavements cleared exposing the Paintbrush Canyon Fault on the west side of Busted Butte
- 3 trenches excavated in Crater Flat; trench 8, trench SCF-T1, trench CF-1 (~ 100 ft long, ~ 10 ft deep)
- 3 trenches excavated on Stage Coach Road Fault; trench SCR-T1, SCR-T2, SCR-T3

WORK UNDERWAY

Groundwater Monitoring Well JF-3

Purpose:

- Well JF-3 has been developed by DOE as an early warning monitoring well to protect against potential impacts of water withdrawals from wells J-12 and J-13 on water rights, sensitive wildlife habitats and other beneficial uses of groundwater in Amargosa Valley, Ash Meadows and Death Valley

- Well JF-3, is part of the well and spring groundwater monitoring program accepted by the National Park Service and the Nevada State Engineer

Well data

- Depth of hole	1298 feet
- Date started	November 26, 1991
- Date completed	April 20, 1992
- Diameter of hole (cased)	8-5/8 inches

WORK UNDERWAY

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WORK UNDERWAY

Volcanism Investigations

Purpose

- Test alternative models of the eruptive history of the volcano
- Examine soil development to test chronology results
- Collect samples for petrology

Progress to Date:

- NRC video conference held in August 1992 on Issue Resolution/Study Plans
- Since July 1991:
  - 36 trenches completed at the Lathrop Wells Volcanic Center
  - 9 trenches completed in the Cima Volcanic Field
- Estimate 10 more trenches to complete Lathrop Wells studies
- Starting other Quaternary centers
- Increasing level of effort in effects of volcanism - NWTRB recommendation

Conclusions to Date

- Lathrop Wells
  - Age of lavas bracketed between 65,000 and 130,000 years
  - Age of cone 25,000 - 45,000 years

WORK UNDERWAY

Volcanism Investigations (Continued)

Planned Trenching - FY93

- Finish at Lathrop Wells
- Begin at the Sleeping Butte centers and the 1Ma centers in Crater Flat

WORK UNDERWAY

North Ramp Geologic Borehole Program (Continued)

NRG-6

- 1100 foot deep borehole along the north ramp alignment

Purpose:

- Engineering design data for tunneling conditions
- Confirm the location of the TSw_1 - TSw_2 stratigraphic contact

Use of Data:

- Support design package for the north ramp

Schedule:

- Access road and pad construction scheduled to start October 19, 1992
- Drilling scheduled to start November 1992

WORK UNDERWAY

North Ramp Geologic Borehole Program

NRG-2

- 200 foot angle hole along the north ramp alignment

Purpose:

- Engineering design data for tunneling condition
- Intercept the Bow Ridge Fault at proposed north ramp level

Use of Data:

- Support design package for the north ramp

Schedule:

- Drilling scheduled to start December 1992

OTHER FY92 MAJOR ACCOMPLISHMENTS

Regulatory/Licensing

- Oversight group interactions include
  - 16 with NRC
  - 15 with NWTRB
  - 15 with ACNW

- Prepared annotated outline for License Application and transmitted to NRC for review

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Waste Package

- Determined maximum waste package size and weight for repository/ESF design
- Completed Advanced Conceptual Design (ACD) readiness review
  - No hold points identified
- Developed Thermal Loading Action Plan

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Repository

- Completed ACD readiness review
- Supported ESF ramp sizing study
- Supported repository thermal loading studies
- Initiated repository horizon and gradient study
- Initiated sub-surface ventilation study

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Issued Early Site Suitability Evaluation (ESSE) Report and Peer Review Report

- For the qualifying conditions the report concluded
  - 13 of 32 qualifying conditions are present and additional data is unlikely to change this conclusion
  - 19 of 32 qualifying conditions are likely to be present but further information is needed
- ESSE report supports continuing site characterization studies to determine if Yucca Mountain is a safe site for a geologic repository

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Issued Early Site Suitability Evaluation (ESSE) Report and Peer Review Report

- Evaluated the Yucca Mountain Site using DOE's siting guidelines (10CFR960)
- Same guidelines used in the 1986 EA to identify candidate sites for characterization
- For the disqualifying conditions of the guidelines the report concluded
  - 13 of 17 disqualifying conditions are not present and additional data is unlikely to change conclusion
  - 4 of 17 disqualifying conditions are not likely to be present, but additional data is needed

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Quality Assurance

- Received formal notification from the NRC that their objection (stated in their Site Characterization Analysis) to the QA Program was resolved
- Streamlined the QARD to eliminate separate QA Program Plans for participants

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Study Plans

- 70 of 103 planned study plans have been prepared and submitted to YMP to date for initial and revision review
- 61 of the 103 study plans focus on data collection rather than analysis
- 43 study plans have been submitted to NRC for review to date
- 28 study plans have been accepted by NRC to date
  - 23 of these focus on data collection

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Public Outreach and Institutional Affairs

- YMP public information office was opened in Pahrump, Nevada, approximately 50 miles from the Yucca Mountain Site
- 106 tours of the Yucca Mountain site were given for 5,300 members of the public and other visitors
- Some VIP visitors included
  - Senator J. Bennett Johnston, Chairman of Senate Subcommittee on Energy and Natural Resources
  - Senator Richard Bryan, Senator from Nevada
  - William Young, Assistant Secretary for Nuclear Energy
  - Ivan Selin, NRC Commission Chairman
  - Forrest Remick, NRC Commissioner

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Public Outreach and Institutional Affairs

- Representatives from other oversite groups also toured the site
  - National Association of Regulatory Utility Commissioners
  - Edison Electric Institute UWASTE Group

- An initial Payments-Equal-To-Taxes (PETT) payment of $1 million was made to Nye County, Nevada

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Project Control

- Mission 2001 was completed, validating YMP plans to submit license application in 2001
  - PACS currently has 800 planning and scheduling acccounts, 3,200 summary accounts and 7,000 scheduled activities
- Implement rigorous internal management control process

Major M&O Transition Completed

- Records management
  - Central records facility
  - Project microfilm center
  - Local records center
  - Plans and procedures
  - Production of all project level reports

OTHER FY92 MAJOR ACCOMPLISHMENTS

(CONTINUED)

Major M&O Transition Completed

- Systems engineering and integration
  - Configuration management
  - Project change control boards

- Regulatory and licensing
  - Site characterization support
  - Regulatory reviews
  - Technical/Regulatory Information Management System (TRIMS)
  - Technical documentation
  - Site characterization progress reports

- Business management
  - Planning and Control System (PACS)