ACNWR-0154

June 29, 2000

Dr. William D. Travers
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Dr. Travers:

SUBJECT: NRC EVALUATION OF DOE'S SITE RECOMMENDATION CONSIDERATIONS REPORT

During its 118th meeting, March 27–29, 2000, the Advisory Committee on Nuclear Waste (ACNW) heard presentations from the NRC staff about development of a strategy to review the Department of Energy's (DOE's) Site Recommendation Considerations Report (SRCR) and the staff's strategy to prepare sufficiency comments. The ACNW recognized that the strategy is a work in progress. The staff briefed the ACNW on the purpose, scope, objectives, integration of the strategy with ongoing activities, schedule for completion, stakeholder involvement, and proposed interactions with the ACNW.

At its 119th meeting, June 13–15, 2000, representatives from DOE briefed the ACNW on planned updates to the DOE's Repository Safety Strategy (RSS). When the revised RSS is released, it should provide important information to the NRC staff for reviewing the SRCR. The staff's approach to its sufficiency review appears to be well thought out, logical, and consistent with the overall risk-informed strategy outlined in the draft 10 CFR Part 63.

The Committee offers the following comments:

1. The ACNW plans to follow closely how the staff integrates its sufficiency review with the development and application of the Yucca Mountain Review Plan (YMRP) and with activities to resolve issues. The ACNW requests that the staff provide an example of how they plan to evaluate a specific Process Model Report (PMR) for sufficiency, using the staff's sufficiency strategy, accompanying guidance, and the YMRP.

2. The ACNW wants to gain a better understanding of how the staff prioritizes open issues, using the process for resolving key technical issues while considering an issue's importance to performance and to DOE's RSS. Specifically, the ACNW is interested in the extent to which the number and priority of open items will influence the NRC staff's sufficiency evaluation of DOE's SRCR.

3. During the NRC staff presentation to the ACNW, the concept of using conservatism as a counterbalance to uncertainty was discussed. The ACNW is skeptical about the use of

"conservatism" to compensate for uncertainty in performance analysis. Especially because overestimating consequences is not necessarily conservative. This topic may be one that the ACNW and the NRC staff should explore together so that the basis for positions on this issue are better understood.

Because of the importance of the NRC's review of the SRCR, the ACNW has drafted its own detailed plan for review of the SRCR, including a schedule to review selected supporting documents and to conduct interactions with NRC staff, DOE, and others. A copy of that draft plan is attached for your information. The ACNW looks forward to meeting with the staff throughout the review period of the SRCR.

Sincerely,

/RA/

B. John Garrick
Chairman

Attachment:

"ACNW Task Action Plan for 2000 Action Plan Tier-One Priority, Site Suitability and License Application"

ADVISORY COMMITTEE ON NUCLEAR WASTE
TASK ACTION PLAN

For

2000 Action Plan Tier One Priority

SITE SUITABILITY AND LICENSE APPLICATION

Task Action Plan

Tier One Priority: Site Suitability and License Application

Lead ACNW Member: George Hornberger

Lead ACNW Staff Member: Lynn Deering

Purpose of the Plan

The purpose of this plan is to outline a strategy for the Committee to advise the Commission on the NRC staff's sufficiency review of the Department of Energy's (DOE's) Site Recommendation Considerations Report (SRCR) in Fiscal Years FY 2000 and FY 2001. This activity is a first-tier priority in ACNW's 2000 action plan (Ref. 1). A primary activity in advising the NRC on its sufficiency review will be for the Committee to conduct its own independent review of the SRCR and technical basis documents. The scope of this review will be limited by available resources, discussed further under "Review Scope and Strategy." Other major activities will include reviewing the draft Yucca Mountain Review Plan (YMRP) and the NRC staff's application of the YMRP to review the SRCR, and, finally, reviewing the staff's sufficiency comments. The Committee will interact informally with the NRC staff throughout the staff's review of the SRCR and development of the YMRP. The ACNW's approach to review the YMRP will be described in a separate task action plan.

This task action plan describes the purpose, objectives, and scope of the ACNW's review of the SRCR and technical basis documents and its desired outcome of the review; past and present related activities; planned information-gathering activities, including DOE and NRC staff briefings of the Committee and attendance at outside meetings; responsibilities of the ACNW staff, Committee members, and consultants; and products and schedules.

Purpose and Objectives of Reviews

The primary purpose of the ACNW's conduct of an independent review of the SRCR is to become familiar with DOE's approach and analysis so that the Committee can evaluate the NRC's review of the SRCR and sufficiency comments. Also, the ACNW anticipates that the Commission will request ACNW comments on the SRCR, as it did with the DOE's Viability Assessment (VA). In addition, conducting its own review of the SRCR will allow the Committee to interact with the NRC staff during its sufficiency review rather than becoming involved after the staff completes its review. Finally, the ACNW's independent review of the DOE's SRCR should enhance public and stakeholder confidence in the NRC's sufficiency review.

The ACNW's objectives in reviewing the staff's review of the SRCR and sufficiency comments include the following: (1) evaluate whether the NRC's guidance (YMRP) and approach for reviewing the SRCR reflect a risk-informed and performance-based (RIPB) approach; (2) evaluate whether the staff's sufficiency comments are logical, defensible, and focused on the most risk-significant issues; (3) identify gaps in the NRC's tools, guidance, and capability (if any) to review a license application (LA), as well as identify strengths; and (4) identify what the NRC needs to do between now and when the LA is submitted.

To position itself to conduct a review of the NRC's sufficiency review, the Committee's objectives in reviewing the SRCR and technical basis documents include evaluating (1) whether the DOE's overall approach in the Repository Safety Strategy (RSS) and the Total System Performance Assessment-Site Recommendation (TSPA-SR) is defensible; (2) whether the assumptions in the TSPA-SR are transparent, traceable, and reasonably supported on the basis of existing or planned data; (3) whether DOE's treatment of uncertainty and multiple barriers is transparent and defensible; and (4) whether the DOE has done a good job of assessing the work that it needs to do between now and submission of an LA.

Desired Outcome of Review

The ACNW's desired outcome for this Tier One priority is providing useful, high-quality advice to the Commission; bringing to the Commission's attention any vulnerabilities in the staff's capability, guidance, or other tools to review an LA for Yucca Mountain; identifying strengths; helping the Commission identify what, if anything, the staff needs to do between now and submittal of an LA; and evaluating whether the staff has a logical, defensible, RIPB basis for its findings that are obviously linked to safety. Overall, the ACNW would like its advice on the SRCR and the staff's sufficiency review to help the Commission make better, informed decisions about Yucca Mountain site sufficiency with a high degree of public confidence.

Background and Rationale for Review

The Committee has identified the SRCR as a first-tier priority in its 2000 action plan because the NRC's review of the DOE's SRCR and preparation of sufficiency comments is a high-priority activity of the Commission having national significance. The Nuclear Waste Policy Act (NWPA) requires DOE to make a site suitability recommendation to the President, which is currently planned for May 2001. The NWPA requires that the DOE's site suitability recommendation include preliminary comments from the NRC concerning the extent to which the at-depth site characterization analysis and waste form proposal seem to be sufficient for inclusion in an LA.

The NRC's review has national significance for at least two reasons. First, the NRC staff's sufficiency review will serve as an indicator of whether the staff has the tools, guidance, and capability to review an LA for Yucca Mountain, including whether there are gaps in NRC's existing program and what, if anything, the agency must do to position itself to review an LA. Second, the NRC's review will indicate, from the regulator's perspective, whether DOE has enough data and conceptual understanding of the system to develop a safety case for the LA. NRC's review will have implications regarding whether DOE decides to recommend the Yucca Mountain site and eventually submit an LA.

The DOE's current schedule calls for release of the SRCR in mid-December 2000 and for the NRC to provide its comments by May 25, 2001. The NRC staff will provide its strategy for conducting its sufficiency review to the Commission by June 30, 2000. The staff is developing the YMRP guidance in parallel with the strategy so that the staff can use the YMRP in reviewing the process model reports (PMRs) and the SRCR. The staff currently plans to release Revision 1 of the YMRP in September 2000 and to brief the ACNW at that time, in advance of DOE's formal request to NRC to provide its sufficiency comments. The ACNW was briefed on the draft strategy for sufficiency in March 2000 and will begin informal interactions with the NRC staff on its strategy

for site characterization sufficiency comments and Revision 1 of the YMRP beginning in June 2000.

The purpose of the staff's review is to evaluate whether DOE has enough data and conceptual understanding of the system to develop a safety case for the LA. The staff's documented review will serve as a progress report on DOE's sufficiency of data, design, analyses, and plans for the LA, and on the status of the Key Technical Issues (KTI) issue resolution. The NRC staff will evaluate sufficiency in the context of the NRC's performance-based approach to licensing as proposed in draft 10 CFR Part 63. The review is to be fully integrated into the NRC's licensing strategy outlined in the YMRP and the KTI issue resolution process. The staff will not remark on DOE's dose estimate, nor will it review the document against DOE's proposed siting guidelines in 10 CFR Part 963.

Past Related ACNW Activities

In 1999, the ACNW conducted an independent review of the DOE's VA at the request of the Commission. The Commission also requested the Committee to review and comment on the draft High-Level Waste (HLW) rule for Yucca Mountain, 10 CFR Part 63. The Committee provided comments on the proposed final 10 CFR Part 63 in early 2000. Over the past several years, the Committee has offered advice on implementation of RIPB regulation, including the agency RIPB white paper, implementation of defense-in-depth and multiple barriers concept in draft 10 CFR Part 63, transparency in performance assessment, and implementing a risk-informed framework for NMSS. Other related activities include developing white papers on DOE's design selection process and repository design, and on the repository near-field chemistry, and a letter on the Engineered Barrier System (EBS) for the proposed repository.

Review Scope and Strategy

Scope

Once the DOE issues the SRCR in December 2000, the ACNW will review relevant portions of the SRCR, as well as the NRC staff's sufficiency comments, currently scheduled for completion in May 2001. Before DOE submits the SRCR, the ACNW will review, to the extent possible, Revision 4 of the RSS, the SR-design, the TSPA-SR, selected PMRs and analysis and model reports (AMRs), selected issue resolution status reports (IRSRs), the TSPA methods and assumptions document, and possibly other technical basis documents as identified. Further, the Commission has requested that the ACNW review and comment on Revision 1 of the YMRP. This document will be presented to the ACNW in September 2000, and the Commission expects the ACNW to help the staff in developing the document before the September 2000 meeting. The YMRP is a closely related activity because the staff plans to use Revision 1 of the YMRP to conduct its sufficiency review. Other related activities include evaluating the staff's overall capability to review a license application, including the TPA Code 4.0, and the Code peer review report, which may be explored as part of the ACNW's annual research review at the Center for Nuclear Waste Regulatory Analyses (CNWRA) in November 2000. Because of time and resource constraints, the Committee expects to review many of these documents informally rather than conducting a formal review and providing comments to the Commission. Selected PMRs, AMRs, and IRSRs may fit in this category.

Strategy

The ACNW members, staff, and consultants will be assigned a lead role on various documents or portions of documents corresponding to their areas of expertise. Individuals will form into teams to conduct the reviews. Each team will be responsible for coordinating with the NRC staff on their areas of responsibility, as well as interacting with and evaluating their consultants' input. George Hornberger of the ACNW and Lynn Deering of the ACNW staff will be responsible for consolidating all of the review comments and orchestrating development of the draft letter on the SRCR to be issued by May 2001. General areas of responsibility and assigned PMRs are identified in Tables 1 and 2, respectively. Obviously, because of resource and time limitations, the Committee cannot review all portions of all documents. High priority will be given to the PMRs that correspond to one or more of DOE's principal factors,[1] including (1) unsaturated zone flow and transport, (2) saturated zone flow and transport, (3) waste package degradation, (4) waste form degradation, (5) biosphere, and (6) disruptive events. High priority will also be given to reviewing the TSPA methods and assumptions document. A medium priority rating will be given to all other PMRs, including near-field environment and EBS degradation. Finally, a low priority rating will be assigned to reviewing the integrated site model PMR.

To further focus the ACNW's review, a review plan or a template providing guidance to the reviewers is being developed for reviewing the RSS, the PMRs, and the AMRs, the YMRP, the TSPA-SR, and eventually, the SRCR. The templates should consist of several or more key questions that will guide and focus the Committee's review and help position the Committee in preparing letter reports on the SRCR, the YMRP, and other reviews.

Planned information-Gathering Activities

Table 3 contains a list of briefings of the ACNW related to the Committee's review of the SRCR and related documents, the YMRP, and the staff's sufficiency review. Table 4 lists NRC-DOE Technical Exchanges and Appendix 7 meetings and outside meetings that the Committee members, staff, or consultants plan to attend.

ACNW-NRC Staff Interactions

Table 5 lists planned informal interactions between individual Committee members and NRC staff on selected technical topics.

Schedule

See Figure 1, attached.

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[1]The DOE's principal factors as of an M&O briefing of the Committee on June 14, 2000, include seepage into drifts, drip shield performance, waste package performance, dissolved radionuclide concentrations, colloid-associated radionuclide concentrations, unsaturated zone radionuclide transport, saturated zone radionuclide transport, biosphere dose conversion factors, igneous activity probability, and igneous activity repository effects.

Updating this Plan

This task action plan will be updated monthly and included in the Committee's meeting notebook.

Reference

Letter from John Garrick, Chairman, ACNW, to Chairman Meserve, "ACNW Action Plan and Priority Issues," April 18, 2000.

TABLE 1 — ASSIGNED AREAS OF RESPONSIBILITIES

TEAM MEMBER	GENERAL AREAS OF RESPONSIBILITY
George Hornberger , ACNW	Lead on SR review, saturated and unsaturated zone flow & transport, disruptive events, coupled processes, radionuclide transport, natural analogs, multiple barriers, KTI issue resolution
Raymond Wymer, ACNW	Waste form and waste package degradation, radionuclide transport, near-field environment, corrosion, natural analogs, multiple barriers, coupled processes
John Garrick, ACNW	YMRP, integrated safety assessment (ISA), TSPA-SR, DID, multiple barriers, RIPB, FEPS, biosphere
Milton Levenson, ACNW	Repository design, ISA, EBS degradation, thermal loads, coupled processes, performance confirmation
Lynn Deering, ACNW staff	Staff lead on SR review; sat and unsaturated zone flow and transport, natural analogs, disruptive events, KTI issue resolution
Amarjit Singh, ACNW staff	Preclosure issues, (ISA), waste form degradation, waste package design
Richard Savio, ACNW staff	performance confirmation, waste package design, corrosion, EBS degradation
John Larkins, ACNW Director	Oversight of SR review, performance confirmation
Howard Larson, ACNW staff	KTI issue resolution, RES
Richard Major, ACNW staff	YMRP, ISA, repository design, thermal load, coupled processes
Andrew Campbell, ACNW staff	EBS, waste form and waste package degradation, radionuclide transport, TSPA-SR, FEPs, near-field environment, natural analogs

TABLE 2 — PMR ASSIGNMENTS

PF= principal factor based on June 14, 2000 DOE briefing on RSS
OF= other factors noted in table 3-3 of Rev 3 of DOE's Repository Safety Strategy (Ref. 2)

PMR	ACNW PRIORITY	PRINCIPAL FACTORS	KTI	TEAM MEMBERS AND STATUS OF PMR
UZ F&T	High	PFs =Seepage, retardation in UZ. PMR describes processes affecting amount of water entering UZ above repository that could contact waste and the movement of water thru the UZ below the repository and potential transport of radio- nuclides in that water.	UZ and SZ Flow; Rad Transport	Hornberger, Deering, TBD * draft PMR has been provided to the NRC staff, waiting for final PMR to begin review
SZ F&T	High	PFs= retardation in SZ; dissolved radionuclide concentrations. PMR describes processes that control the movement of water thru the sat zone below the repository and the distribution of dissolved rads or colloids that might be released and migrate to the sat zone, and dilution of rad concentrations during migration thru sat zone.	UZ and SZ Flow; Rad Transport	Hornberger, Deering,TBD *draft not yet provided

TABLE 2 — PMR ASSIGNMENTS (CONT'D)

PMR	ACNW PRIORITY	PRINCIPAL FACTORS	KTI	TEAM MEMBERS AND STATUS OF PMR
Waste Package Degradation	High	PFs= performance of drip shield; performance of waste package barriers. PMR describes processes that could lead to drip shield and waste package degradation e.g. corrosion of waste package materials in the near-field environment.	Container life	Wymer, Major, TBD * draft PMR has been provided to the NRC staff, waiting for final PMR to begin review
TSPA-SR Methods and Assumptions	High	All	Total System Performance Assessment and Integration	Garrick, Campbell,TBD * draft PMR has been provided to the NRC staff, waiting for final PMR to begin review
Waste Form Degradation	High	PFs= colloid associated radionuclide concentrations. PMR describes waste characteristics that limit the rate of release of rads. Processes include waste canister degradation, cladding degradation, and waste form dissolution. Describes the manner in which waste forms degrade and expected rad releases.	Container Life Source Term Rad Transport	Wymer, Campbell, TBD * draft PMR has been provided to the NRC staff, waiting for final PMR to begin review

TABLE 2 — PMR ASSIGNMENTS (CONT'D)

PMR	ACNW PRIORITY	PRINCIPAL FACTORS	KTI	TEAM MEMBERS AND STATUS OF PMR
Biosphere	High	PFs= Biosphere dose conversion factors. PMR describes characteristics of biosphere that influence transport of rads to humans.	Total System Performance Assessment and Integration	Garrick, Major, Kearfott * Draft PMR has been provided to the NRC staff, waiting for final PMR to begin review
EBS Degradation F&T	Med	OFs = Environments on drip shield; Transport through drift invert. PMR describes processes that would lead to degradation of the EBS and affect movement of rads thru those barriers Provides info about thermal, hydro, and geochemical processes acting on engineered barriers.	Evolution of Near Field; Thermal effects on Flow	Levenson, Major, TBD * draft PMR has been provided to the NRC staff, waiting for final PMR to begin review
Disruptive events	High	PMR describes tectonic properties that could disrupt repository system	Structural Deformation and Seismicity, Igneous Activity	Hornberger, Deering, Hinze *waiting for final PMR to begin review

TABLE 2 — PMR ASSIGNMENTS (CONT'D)

PMR	ACNW PRIORITY	PRINCIPAL FACTORS	KTI	TEAM MEMBERS AND STATUS OF PMR
Near Field Environment	Medium	OFs = Coupled process effects on seepage. PMR describes processes important to limiting the amount of water that can contact waste, including effects of heat on UZ flow at drift wall; seepage; temperature and humidity on the EBS, and chemical reactions and products and mechanical interactions in near field host rock and drifts.	Evolution of Near-field environment; repository design and thermo-mechanical effects	Wymer, Campbell, possibly Hornberger TBD *draft not yet provided
Integrated Site Model	Low	PMR describes framework for geologic properties	Structural Deformation and Seismicity	Hornberger, Deering, Hinze *final PMR has been provided to the ACNW

TABLE 3 — BRIEFINGS TO THE COMMITTEE

ACNW MEETING	SCHEDULED OR PLANNED BRIEFING	LEAD MEMBER AND STAFF	CONSULTANT * = INVOLVED BUT NOT PRESENT AT MEETING
June 13- 15, 2000	1. DOE Briefing on RSS	1. Hornberger, Deering	None
	2. DOE Briefing on SR-Design	2. Levenson, Major	None
	3. DOE Briefing on 963	3. Singh, Hornberger	None
	4. ACNW Staff Briefing on Proposed Strategy for ACNW 's review of SR	4. Hornberger, Deering	None
	ú Product - Task Action Plan	completed	
	ú Product - Letter Report To EDO on Staff's Sufficiency Strategy	completed	
	5. Informal Discussions with NRC Staff on YMRP	5. Garrick, Major	None

TABLE 3 — BRIEFINGS TO THE COMMITTEE (CONT'D)

ACNW MEETING	SCHEDULED OR PLANNED BRIEFING	LEAD MEMBER AND STAFF	CONSULTANT * = INVOLVED BUT NOT PRESENT AT MEETING
JULY 25-27, 2000	1. NRC staff Briefing on Highlights of KTI Issue Resolution Technical Exchange ú Product - Possible Letter Report to Com-Mission on KTI Issue Resolution	1. Hornberger, Deering	
	2. June 21st, DOE Brief-ing on Performance Con-firmation ú Product - Possible Letter Report to Com-Mission on Perform-ance confirmation	2. Levenson, Larkins, Savio	
	3. Informal discussions with NRC staff on YMRP	3. Garrick, Hornberger, Levenson, Wymer	3. None

TABLE 3 — BRIEFINGS TO THE COMMITTEE (CONT'D)

ACNW MEETING	SCHEDULED OR PLANNED BRIEFING	LEAD MEMBER AND STAFF	CONSULTANT * = INVOLVED BUT NOT PRESENT AT MEETING
September 19-21, 2000 Las Vegas, NV	1. DOE Briefing on Final SR-Design 2. DOE Briefing on TSPA-SR 3. Working Group on YMRP ú Product - ACNW Letter Report to Commission on YMRP	1. Levenson, Major 2. Garrick, Campbell 3. Garrick, Major	1. None 2. TBD 3.TBD **Kick-off Meeting with Consultants Ewing, Shewmon, Clark, Kearfott
October, 17-19, 2000	TBD		
November 15-17, 2000	1. Visit to CNWRA to evaluate research, TPA Code, and technical capability	1. Hornberger, Larson	1.TBD

TABLE 4 — UPCOMING MEETINGS OF INTEREST TO ACNW

MEETING	DATE	LOCATION	MEMBER/STAFF COVERAGE
NWTRB Summer Meeting - TSPA-SR	8/1 - 8/2	Carson City, NV	Campbell
Appendix 7 UZ Flow and Transport PMR	8/16-17/00	Berkeley, CA	Davis
Biosphere PMR Technical Exchange	8/29/00 **POST-PONED**	Las Vegas, NV	Kearfott
Disruptive Events PMR Igneous Activity	8/30 - 8/31	Las Vegas, NV	Hinze
Waste Package and Waste Form Degradation PMRs Technical Exchange	9/12- 9/13/00	Las Vegas, NV	Singh
Surface and Subsurface Design SDD	10/24/00	Las Vegas, NV	Levenson/Major
Saturated Zone F&T Technical Exchange	11/1 - 2/00	Albuquerque, NM	Davis
Repository Safety Strategy & KTI Resolution	11/7 - 11/8	Berkeley, CA	TBD
BRWM - Site Recommendation	12/14 - 12/15	Wash. DC	TBD
EBS Degradation, F&T PMR; Near-field PMR	1/9 -10/01	Las Vegas, NV	TBD, Levenson

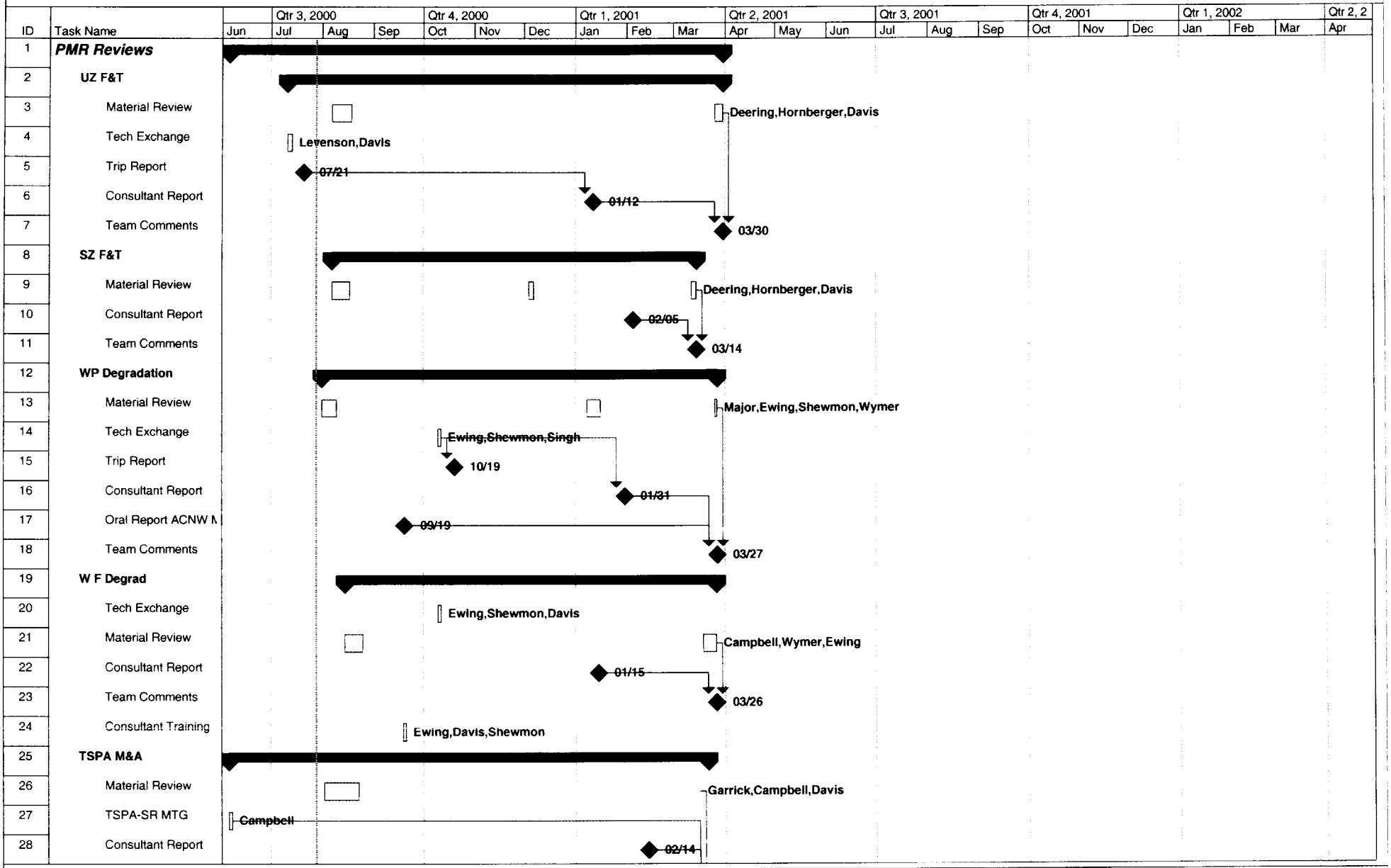
TABLE 5 — ACNW & ACNW STAFF PLANNED INTERACTIONS

ACNW MEETING	INDIVIDUALS AND SUBJECT
June 13- 15, 2000 lunch time meetings	YMRP, John Garrick, George Hornberger, R. Major w/ Jeff Ciacco, DWM
July 28-30, 2000	1. YMRP Rev. 1, John Garrick, George Hornberger, R. Major with Jeff Ciacco, DWM July 25, 3:00 - 5:00 pm 2. Sufficiency review and review of PMRs George Hornberger, L. Deering, James Firth July 26, lunch time meeting
September 2000	TBD
October, 2000	TBD
November, 2000	TBD

TABLE 6 — COMMITTEE PRODUCTS

LETTER * = Commission request	TARGET COMPLETION DATE	LEAD ACNW MEMBER ACNW AND STAFF
Letter to EDO on Staff's Sufficiency Strategy	6/00-completed	Hornberger/Deering
Possible Letter on KTI Issue Resolution	9/00	Garrick/Deering
Possible letter on performance confirmation	9/00	Levenson/Larkins
*Letter on Rev. 1 YMRP	10/00	Garrick/ Major
Staff's application of sufficiency strategy and YMRP to evaluate a PMR	11/00	Hornberger/ Deering
Letter to Commission on SRCR	4/01	Hornberger/ Deering

EXAMPLE SCHEDULE FOR ACNW REVIEW OF PMRs AND TECH BASIS DOCUMENTS



Project: RealWK
Date: 07/28/2000

Task
Progress
Milestone
Summary
Rolled Up Task
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Rolled Up Progress
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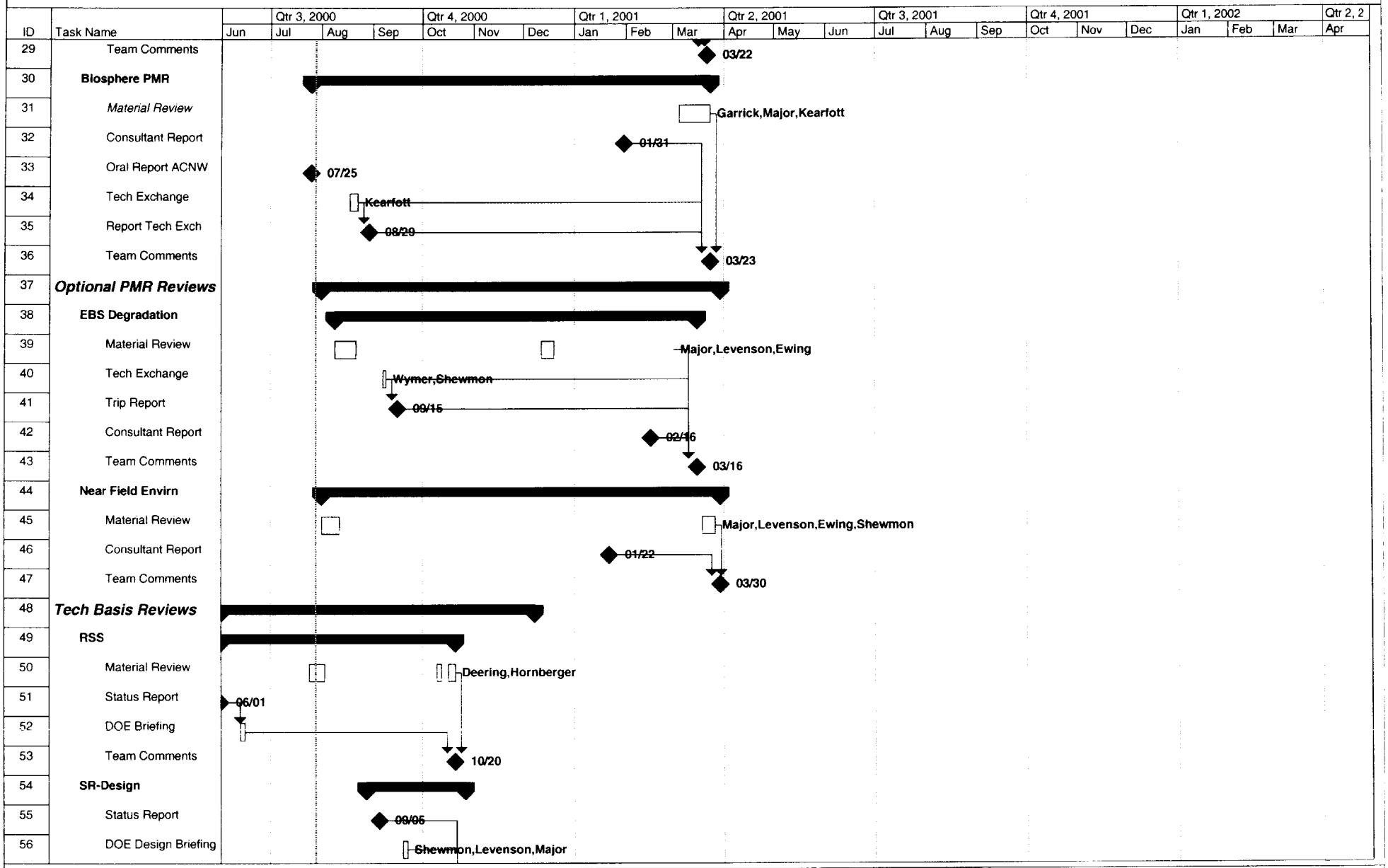
External Tasks
Project Summary

EXAMPLE SCHEDULE FOR ACNW REVIEW OF PMRs AND TECH BASIS DOCUMENTS



Project: RealWK
Date: 07/28/2000

Task | Summary | Rolled Up Progress | Project Summary
Progress | Rolled Up Task | Split
Milestone | Rolled Up Milestone | External Tasks

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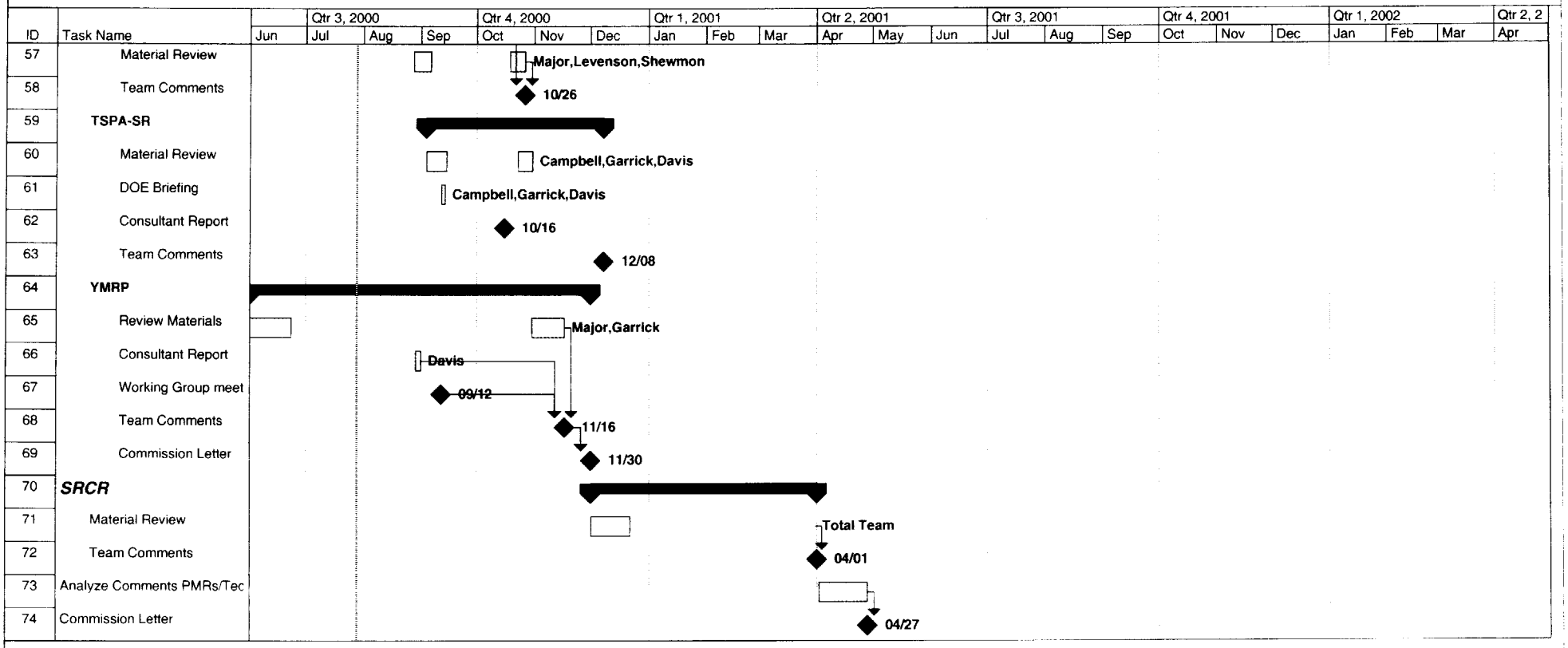

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Date: 07/28/2000

Task | Summary | Rolled Up Progress | Project Summary
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