SEP 10 1993

MEMORANDUM FOR: B. J. Youngblood, Director
Division of High-Level Waste Management

FROM: Joseph J. Holonich, Director
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management

SUBJECT: TRIP REPORT ON AUGUST 24 AND 25, 1993 LOCAL GOVERNMENTS WORKSHOP

On August 24 and 25, 1993, John Gilray, Phil Justus, and I attended the "Yucca Mountain Affected Units Program Review Workshop" in Pahrump, Nevada which was sponsored by the Affected Units of Local Governments (AULGs). Our attendance was in response to an invitation to Mr. Robert M. Bernero, Director, Office of Nuclear Material Safety and Safeguards. Its purpose was to provide a forum by which the AULGs could explore the range of issues and viewpoints regarding the U.S. Department of Energy's (DOE's) program. It included presentations by a number of program participants and involved organizations as well as question and answer sessions on issues and activities pertaining to the program. Enclosure 1 is a copy of the agenda for the two days of meetings.

As part of the staff's participation in the workshop, I gave a presentation on the Nuclear Regulatory Commission and its role in the high-level waste program. Enclosure 2 is a copy of my presentation. In addition, I was also asked the NRC's position on a number of different issues including the idea raised by many participants that a Presidential Commission needs to be established to reanalyze the repository program, and the recent task force report on alternatives for licensing issued by DOE for public comment. With respect to the need for a Presidential Commission, I noted that the NRC's regulatory role was one of oversight of the program within the policy framework mandated by Congress in the Nuclear Waste Policy Act, and that we are able to implement our program within the existing structure. My response on the NRC comments on the task force report was that the NRC mainly found that much of what was described in the report was being implemented, and the staff was unsure what could be done beyond what was already in place.

Other presentations included discussions on the U.S. Environmental Protection Agency standards for the disposal of high-level waste, the DOE alternative licensing strategy, the status of the Nuclear Waste Negotiator's Office quest for the volunteer host for the Monitored Retrievable Storage facility, the Nuclear Waste Technical Review Board's role, the General Accounting Office's recent findings and recommendations, and industry and public utility commission viewpoints. Several environmental groups, local governments, and citizens interest were discussed. Enclosure 3 contains information provided by other presenters or made available during the workshop. Many of the speakers did not use handouts, and therefore, copies of their presentations are not available.

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Overall, we found the workshop highly informative, and believe that it was useful to the representatives of local governments in understanding the various organizations involved in the high-level waste program.

/S/

Joseph J. Holonich, Director
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management

Enclosures: As stated on the shelf IN JACKET SAMS ACCT.

cc: R. Bernero
J. Linehan
J. Wolf
J .Gilray/P. Justus
R. Virgilio

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WORKSHOP TO REVIEW
U.S. DEPARTMENT OF ENERGY'S NUCLEAR WASTE REPOSITORY PROGRAM
YUCCA MOUNTAIN AFFECTED UNITS OF LOCAL GOVERNMENT

August 24 & 25, 1993 Bob Ruud Community Center Pahrump (Nye County), Nevada

WORKSHOP AGENDA

August 24

7:30 a.m.	Continental Breakfast
8:00 a.m.	Welcome/Workshop Overview • Les Bradshaw/Convenor • P. Niedzielski-Eichner/Facilitator
8:15 a.m.	Regulatory and Licensing • Environmental Protection Agency Bill Gunter • Nuclear Regulatory Commission Joe Holonich/Phil Justus/John Gilray
9:30 a.m.	Oversight and Analysis • General Accounting Office Dwayne Weigel
10:15 a.m.	Break
10:30 a.m.	Oversight and Analysis (con't) • Nuclear Waste Technical Review Board Bill Barnard
11:15 a.m.	Thermal Loading and Site Suitability • Larry Ramspott, Lawrence Livermore National Lab • Marty Mifflin, Mifflin and Associates
12:45 p.m.	Lunch (open)
2:00 p.m.	State of Nevada Policy, Oversight and Regulatory Perspectives • NV Agency for Nuclear Waste Projects/Nuclear Waste Project Office Bob Loux
3:45 p.m.	Break
4:00 p.m.	One Outside Observer's Analysis • Luther Carter, author *Nuclear Imperatives and Public Trust*
4:45 p.m.	Summary and Discussion
5:00 p.m.	Adjournment for Day 1

August 25

7:30 a.m.	Continental Breakfast
8:00 a.m.	Introduce Day 2
8:15 a.m.	Status of Secretary of Energy's Review • Linda Smith, OCRWM
8:45 a.m.	Fiscal Analysis: OCRWM FY83 to FY92 • Jim Williams, Planning Inform. Corp.
9:15 a.m.	Industry/Regulator Perspectives • American Nuclear Energy Council Ed Allison • Michigan Public Service Commission Ron Callen
10:00 a.m.	Break
10:15 a.m.	Industry/Regulator Perspectives (con't)
10:45 a.m.	Congressional Perspective • Senate Environment and Public Works Committee Dan Berkovitz, Counsel
11:30 a.m.	Environmental Perspective • National - Safe Energy Comm. Council Martin Gelfand • State - Nevada Citizen Alert Chris Brown
12:15 noon	Lunch
1:30 p.m.	Environmental Perspective (con't)
2:00 p.m.	Alternative Program Strategy • Tom Isaacs, Lawrence Livermore National Lab
3:00 p.m.	Break
3:15 p.m.	Office of Nuclear Waste Negotiator • Chuck Lempesis, Chief of Staff
4:00 p.m	Meeting Summary and Discussion
4:30 p.m.	Adjournment

ENCLOSURE 1

WORKSHOP TO REVIEW
U.S. DEPARTMENT OF ENERGY'S NUCLEAR WASTE REPOSITORY PROGRAM
YUCCA MOUNTAIN AFFECTED UNITS OF LOCAL GOVERNMENT

August 24 & 25, 1993 Bob Ruud Community Center Pahrump (Nye County), Nevada

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WORKSHOP BACKGROUND AND OVERVIEW

The United States is in its fifth year beyond the passage of the Nuclear Waste Policy Amendments Act of 1987 (NWPA), the legislation which designated Yucca Mountain as the country's sole candidate geologic site for storing high-level nuclear waste. The Clinton Administration has committed to completing a review of the Civilian Radioactive Waste Management Program. Secretary O'Leary has distinguished between a financial and management review, which will be independently conducted, and a program review, which is to be handled internally, but with stakeholder input. The General Accounting Office has called for an independent program review managed by someone at a high level outside DOE. The Western Governors' Association has also called for an independent program review, as has the State of Nevada.

Nye County, as the situs jurisdiction for Yucca Mountain, and the nine counties immediately adjacent to Nye[1], have been designated as "affected units of local government" (AULGs). While operating independently from one another on policy matters, the counties coordinate many of their technical oversight activities, particularly in the areas of geohydrology, socioeconomics, transportation, and emergency response. The AULGs meet periodically with the State, Tribes and cities on repository-related issues of common interest.

The counties recently advised the Secretary of Energy of their intent to contribute to the national examination of the high-level waste program, however the review becomes configured. To this end, Nye County is sponsoring a workshop on behalf of the other AULGs to explore the range of issues and viewpoints regarding DOE's past and current implementation of its charter under the NWPA.

The workshop will focus on the significant repository-related views held by the State, federal oversight agencies, the Nuclear Waste Negotiator, Congress, national and Nevada environmental groups, the nuclear power industry, and informed outside program observers. The counties will utilize the information derived from the Workshop to establish their own independent assessment. The opportunity will be taken by many of the AULGs to develop written comments that will be conveyed to the Secretary, as well as to any independent review process that may be established.

Perspectives will be provided by the State of Nevada, Congress, the General Accounting Office, Nuclear Regulatory Commission, Nuclear Waste Technical Review Board, representatives from national and State of Nevada environmental organizations, State Utility Regulators, the nuclear power industry, and the Office of the Nuclear Waste Negotiator. Special sessions will be provided on (1) thermal loading as a key site suitability issue, (2) an analysis of DOE/OCRWM expenditure history from FY83 to FY92, (3) an "insider's" alternative strategy to DOE/OCRWM's current program, and (4) a long-time high-level waste program outside observer's soon-to-be-published views on storing high-level nuclear waste and other long-lived radionuclides at Yucca Mountain and the Nevada Test Site. DOE has been invited to participate in the discussion of the issues.

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[1]In addition to Nye, the affected units of local government are Churchill, Clark, Esmeralda, Eureka, Inyo, Lander, Lincoln, Mineral, and White Pine Counties.

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NRC'S HIGH-LEVEL WASTE REPOSITORY PROGRAM

Joseph J. Holonich, Director
Repository Licensing and Quality
Assurance Project Directorate
Division of High-Level Waste Management
Office of Nuclear Material Safety and Safeguards

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ENCLOSURE 2

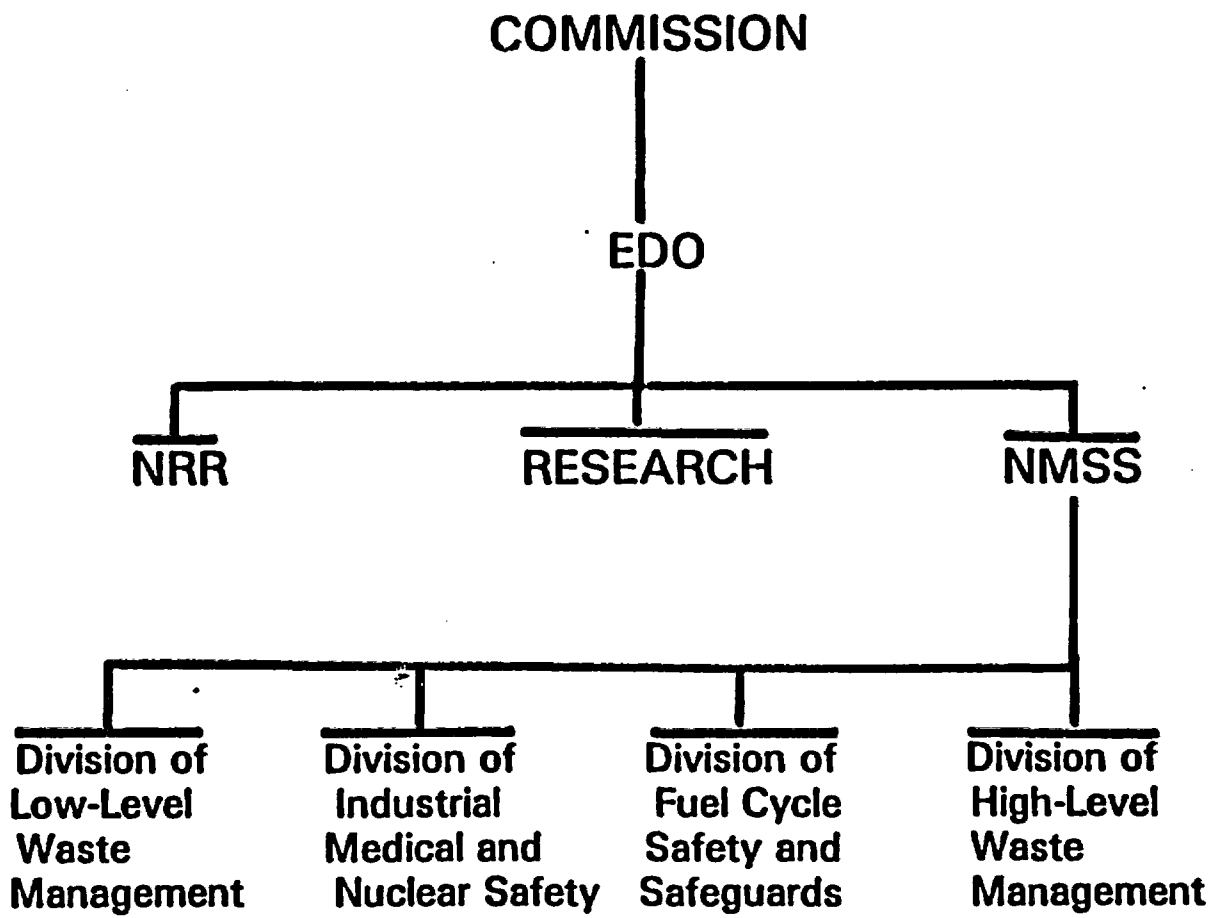
AGENDA

- Overview of NRC
- Independent Regulatory Role
- NRC Regulations and Licensing Documents
- License Application Review Plan
- Conclusion

BACKGROUND ON NRC

- Independent regulatory agency
- Established through Energy Reorganization Act of 1974
- Approximately 3,000 staff members
- Responsible for licensing of civilian use of radioactive materials
  - Reactors
  - Special nuclear, source, and byproduct material
  - Transportation
  - Low-level and high-level waste

U.S. NRC ORGANIZATION
MAJOR PROGRAM OFFICES



NRC'S INDEPENDENT REGULATORY ROLE

- o Develops Regulation and Guidance
  - 10 CFR Part 60
  - License Application Format and Content Regulatory Guide
  - License Application Review Plan
- o Pre-application Review
  - Early identification and resolution of issues at the staff level
  - Pre-licensing consultation to help enable the Department of Energy (DOE) to provide complete and high quality license application
  - Prepare preliminary site characterization sufficiency comments to be included in DOE's recommendation to the President
- o Review of license application
  - Burden of proof on DOE to provide complete and high quality license application that demonstrates compliance with 10 CFR Part 60
  - NRC reviews license application and determines acceptability of DOE demonstration of compliance

NRC POSITION ON PRE-LICENSING

- As the Commission noted in its development of 10 CFR Part 60, during site characterization there would be no facility for storage of HLW, and therefore, no basis for the exercise of the Commission's Licensing Authority. (46 Federal Register 13971, 13975, February 25, 1981).

- Furthermore, the Commission stated that "The Commission cannot direct the Department to comply with the provisions for involving it during site characterization activities." (44 Federal Register 70408, 70409, December 6, 1979).

- However, the Commission also noted that "[Al]though the Commission cannot direct the Department to comply with the provisions for involving it during the site characterization activities, any failure to do so is likely to result in imprudent expenditures and subsequent delays, and ultimately could result in the denial of the application for the proposed site."

HOW NRC STAFF IS IMPLEMENTING ITS PRE-APPLICATION RESPONSIBILITIES FOR REPOSITORY REGULATION

- Multi-disciplinary reviews
- Independent modeling and research
- Open interactions with DOE, the State, the public, and any affected Indian tribes/units of local government
  - Procedural Agreement
  - Meetings
  - Technical Exchanges
  - Site Visits
- Quality Assurance reviews and observations
- Two On-site Representatives

DOE'S QUALITY ASSURANCE PROGRAM

- o QA Program Requirements

  - 10 CFR Part 60, Subpart G
  - 10 CFR Part 50, Appendix B as applicable and appropriately supplemented by additional criteria

- o QA program Application

  - Structures, systems, and components important to safety
  - Barriers important to waste isolation

- o QA Program Coverage

  - Site characterization
  - Facility and equipment construction
  - Facility operations
  - Performance confirmation
  - Permanent closure
  - Decontamination dismantling of surface facilities

IMPORTANCE OF DOE QA

- NRC cannot review or inspect everything
- DOE QA
  - Structured and systematic method of obtaining facts and data and performing analyses
  - Assurance work done properly
- DOE records
  - Supporting documentation for NRC licensing decision
  - Provide traceability of work
  - Lack of complete records; NRC cannot make a finding that work was done

STRUCTURE AND CONTENT OF THE LICENSE APPLICATION REVIEW PLAN

- Guidance to staff in conducting its reviews
- Both generic and specific to Yucca Mountain
- 100 individual review plans
- Structure

PART A: License Application Review Strategy
PART B: Review Plans for General Information
PART C: Review Plans for the Safety Analysis Report
- Natural Systems (Geologic, Hydrologic, Geochemical, Climatological, and Meteorological Subsystems)
- Geologic Repository Operations Area
- Engineered Barrier Systems
- Overall System Performance Assessment
- Repository Operations
- Other (Performance Confirmation, Land Ownership and Control Quality Assurance, and Emergency Planning)

LICENSE APPLICATION REVIEW STRATEGY

- Determine the completeness and acceptability of DOE's license application
- Finish review within the first 18 months of the three-year mandated time period for the Commission's construction authorization decision
- Document the findings with respect to compliance with 10 CFR Part 60 in the safety evaluation report

STRATEGY FOR DEVELOPING THE LICENSE APPLICATION REVIEW PLAN

- Early development

  Focus on content of license application and staff review needs

  Improve basis for pre-licensing reviews and guidance to DOE

  Allow time to develop and refine based on pre-licensing experience

  Allow time for conducting needed research and model development

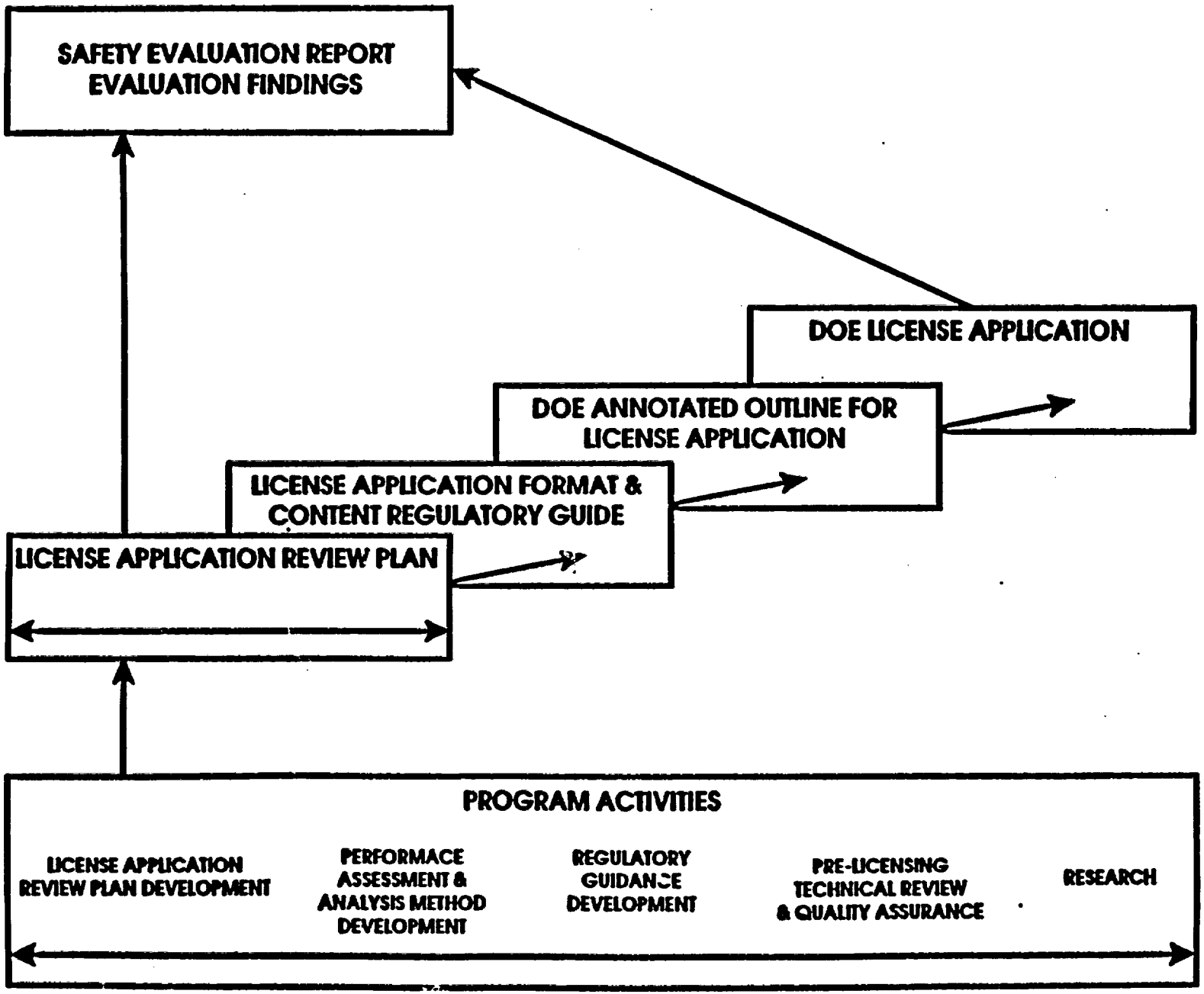
- Develop and revise iteratively based on new information and implementation experience

  Recognize exploratory and evolving nature of program

  Need for flexibility

  Need for feedback from site characterization, modeling, research and other parties

NRC REVIEW DOCUMENTS AND PROCESS



CONCLUSION

- Facing several challenges in the program
- Helping to ensure DOE considers regulatory aspect in site characterization
- Building staff review capability

Enclosure

3

Significance of Repository Thermal Loading for Site Suitability*

Yucca Mountain Affected Units of
Local Government

Workshop to Review U.S. Department of Energy's
Nuclear Waste Repository Program

Pahrump, Nevada
August 24, 1993

Larry Ramspott
Lawrence Livermore National Laboratory

*This work was performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under contract number W-7405-ENG-48.

Heat results from the radioactivity of the waste

- Reduces exponentially with time
- For spent fuel, the effect can last up to 100,000 years
- Heat from the waste declines to equal that from the earth's local heat flow in 30,000 years
- For a high-level waste repository, it is insufficient to consider only how the site will behave without heat
  - heat is certain
- Heat has been regarded as potentially deleterious for each rock type for different reasons

Potentially deleterious effects of heat in high-level waste repositories

- Granite
  - negative effect on montmorillonite backfill
  - possible fracturing of overlying rock seal
- Salt
  - openings flow closed during operational period
  - brine migration toward heat source
  - possible fracturing of overlying rock seal
- Unsaturated tuff
  - evaporates water which can migrate, condense, and drip onto waste
  - possible alteration of key rock properties

Heat is not necessarily deleterious

- LLNL developed the concept of constructive use of waste heat in 1983

- By keeping waste containers above boiling, there will be no liquid water, and therefore no corrosion, waste dissolution, or aqueous transport of radionuclides can occur

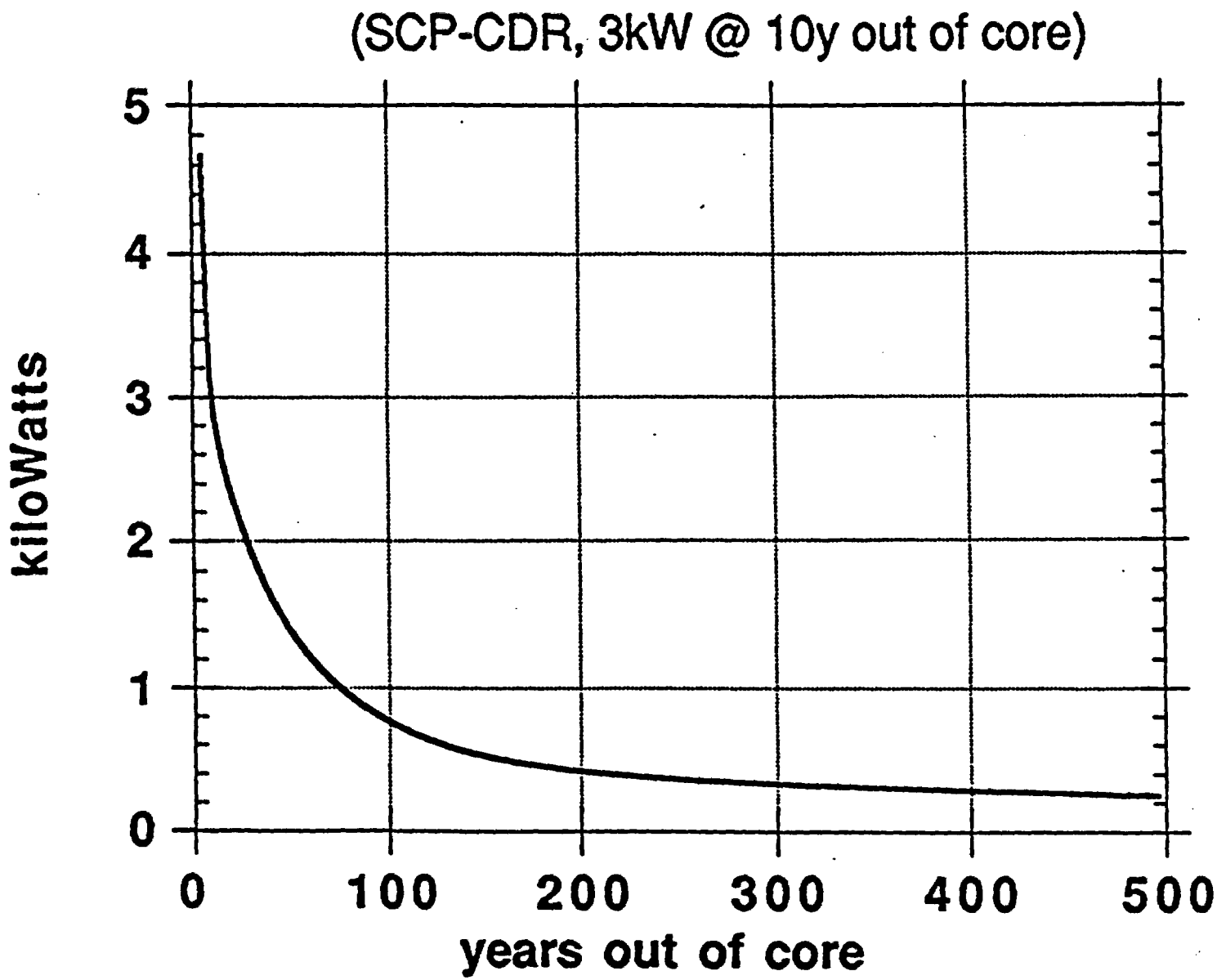
- Germans now regard rapid salt flow with resulting sealing around waste packages a plus

- Hypothetical calculations show heated repository might be either "better" or "worse" than ambient repository
  — testing is needed to resolve issue

Why recent increased interest in thermal loading?

- Advances in understanding from G-tunnel tests
- Advances in understanding from repeated parametric calculations
- Extending calculations to include entire mountain instead of just near-field
- Increase in age of fuel to be disposed
- Evaluation of advantages of drift emplacement
- Differences between U.S. programs and other programs
  - — heat characteristics of spent fuel versus reprocessed waste
  - — response to heat of tuff versus salt or granite

WP Heat Load for PWR Spent Fuel



Spent fuel in tuff versus reprocessed waste in salt or granite

- Reprocessed waste in salt or granite was the concept that underlay early repository concepts and the current regulations in the U.S.

- Two design inputs are different for spent fuel in unsaturated tuff compared with reprocessed waste in salt or granite:

  1. When heat in spent fuel is integrated for more than a hundred years, the majority of heat comes from actinides and persists for thousands of years

     * Because of the reduction in actinide content, reprocessed waste has less heat than spent fuel.
     — spent fuel has 10 W/MTIHM at 12,000 years
     — reprocessed waste has 10 W/MTIHM at 300 years

Comparison of heat generation of spent fuel and reprocessed waste

Heat generation, watts/MTIHM

Time (years)	Spent fuel	Reprocessed waste
10	1200	1000
100	375	110
1,000	60	2
10,000	12	0.5
100,000	1	0.08

Ref: USNRC NUREG-0804, 1983, p. 456-7

Spent fuel versus reprocessed waste (cont'd)

2. Unsaturated tuff has one-third the thermal conductivity of salt and two-thirds that of granite

   Salt - 6 W/mK
   Granite - 3 W/mK
   Tuff - 2 W/mK

- In early concepts, less heat was to be introduced into rock that had greater thermal conductivity

Water can migrate through unsaturated tuff as a liquid or a gas

- Liquid water travels down and sideways due to gravitative force
- Gaseous water travels upwards and sideways due to heat-driven convection
- It is almost always easier for water to migrate through fractures in the rock than through the rock matrix, particularly over long distances

Water already in the rock dominates repository performance

- At 1 mm annual downward flux, one meter of water will pass the repository horizon in 1000 years

- Rock at the repository level is about 15% porosity and 65% saturation, or about 10 volume % water

- Thus, 10 meters of rock at the repository level already contains water equal to an upper expected flux from the surface during 1000 years
  - 100 meters contains the 10,000 year flux

This near-field water can be mobilized by heat

Liquid water is tightly bound in the unsaturated tuff

- Capillary forces will prevent liquid water from flowing into openings in the rock unless something changes

- Only two changes are likely that would allow flow into repository openings
  - more water enters the rock, upsetting the equilibrium
    - a) liquid water from above
    - b) water vapor from below (heat driven)

  - the water in the rock evaporates and migrates
    - a) evaporation requires heat

Summary — effect of heat on repository behavior in unsaturated tuff

- Under ambient conditions at Yucca Mountain, water does not flow into an opening in unsaturated tuff despite the rock's containing water in the pores

- Introduction of heat into the rock mobilizes this pore water; and under some circumstances it could drip into openings

Ambient conditions at Yucca Mountain will be perturbed for up to 100,000 years under all thermal loading options

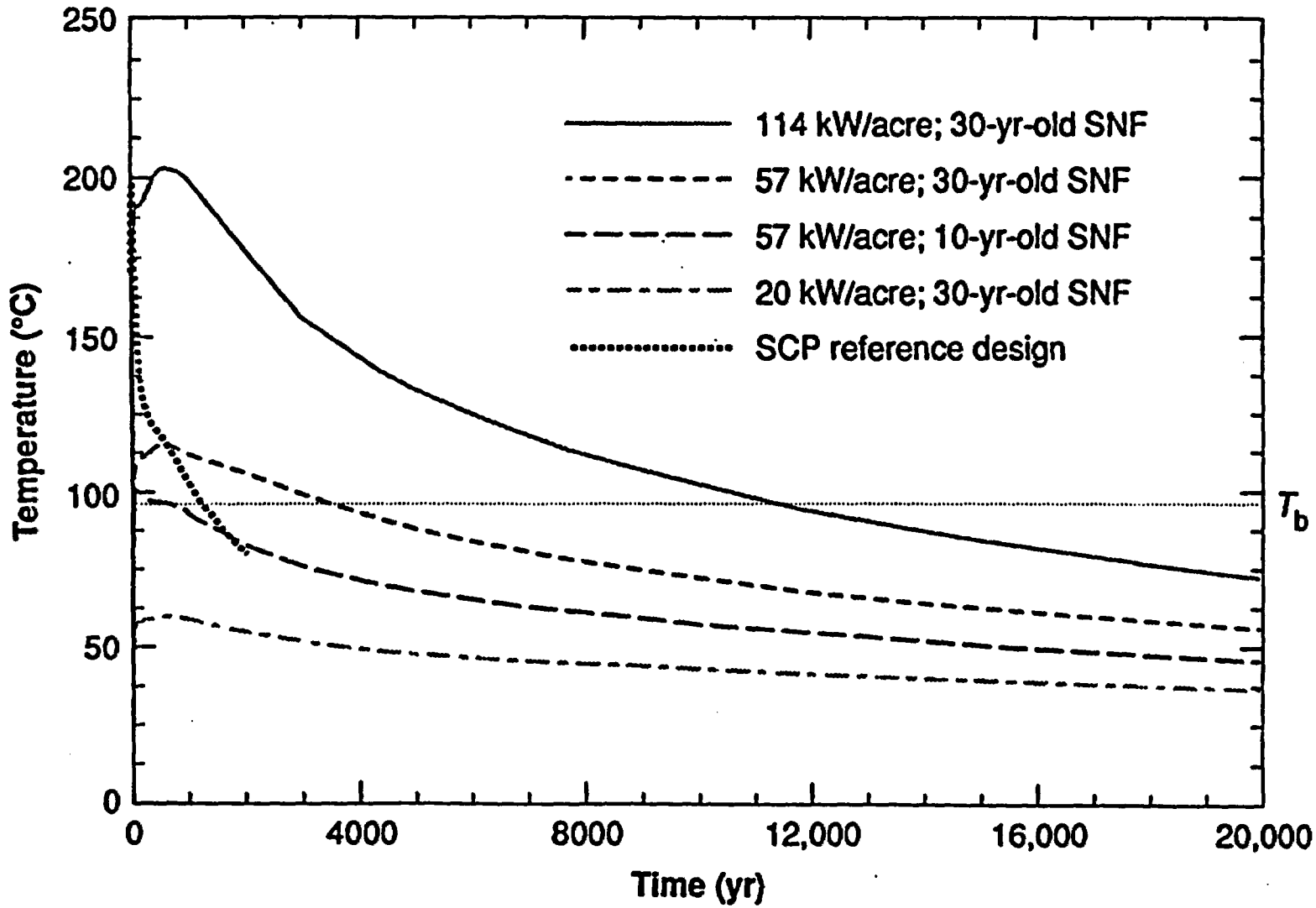
Thermal loading concepts fall into three groups

- The Site Characterization Plan Conceptual Design (SCP-CD)
  - borehole emplacement of 10 years-out-of-core (YOC) spent fuel or high-level waste in thin wall, corrosion-resistant, unshielded containers at about 57 kW/acre, maximum drift wall about 130°C and maximum borehole wall about 230°C

- Sub-boiling drift emplacement
  - self-shielded casks containing 30 YOC fuel
  - maximum 50°C, 1-4 PWR per cask, maximum 20 kW/acre
  - maximum 90°C, 8-12 PWR per cask, maximum 40 kW/acre

- Extended dry drift emplacement
  - self-shielded casks containing 30 YOC fuel
  - maximum 205°C allows 21-24 PWR per cask at 114 kW/acre
  - maximum 125°C allows 21-24 PWR per cask at 57 kW/acre

Temperature history along the repository centerline for various thermal loading conditions at the repository horizon.



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Issues common to SCP reference, extended dry, and sub-boiling repositories

- Heat will affect the system
  - the real question: is the effect deleterious?
- Water will be mobilized
  - hydrologic behavior of the system must be predicted
- Most of the water that affects the repository does not flow from the surface
  - already underground
- There will be zones where hot water contacts rock for decades
- Saturated zone will be heated, resulting in convective flow

Understanding achieved over the last decade suggests changing the SCP thermal loading concept

- The SCP concept maintains the waste above boiling (dry) for 1000 years

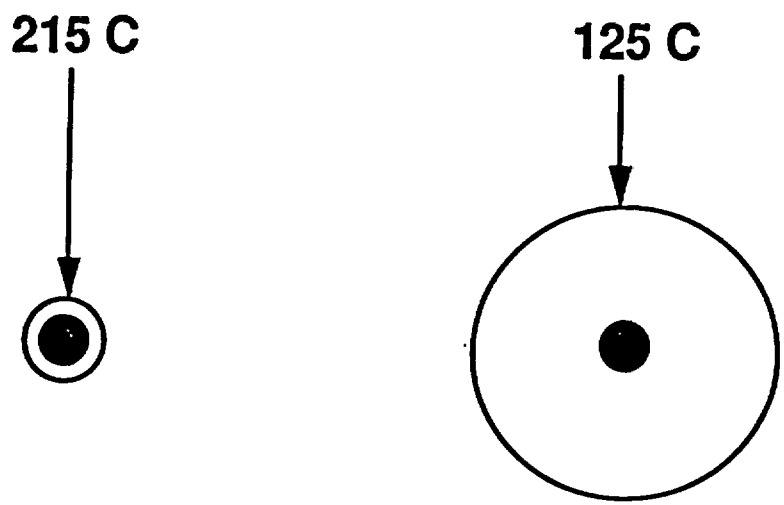
- Two opposite concepts seem to have emerged
  - take advantage of drift emplacement to extend the dry period
  - take advantage of drift emplacement to keep the temperature as low as feasible in the hope of remaining close to ambient conditions

Drift emplacement facilitates both extended dry and sub-boiling repository concepts

- For the same peak wall-rock temperature
  - drift emplacement allows a much greater loading density, which combined with older fuel facilitates the extended dry concept

- For the same loading density
  - drift emplacement gives a lower peak wall-rock temperature, which combined with older fuel facilitates a sub-boiling repository

Effect of opening diameter on rock wall temperature



The emergence of drift emplacement is based on many features beside thermal loading

- Cheaper and simpler
- Allows self-shielding, which makes retrievability more believable
- Facilitates the use of a more robust waste package
- Makes the MPC/MPU concepts feasible
- May reduce risk from seismic activity
- Eliminates the "bathtub" scenario around a single waste package
- May lessen consequences of human intrusion

A thermal loading decision

- There would be no need for a thermal loading decision except for its potential effect on licensing for isolation. Otherwise, the most cost effective design (high thermal loading) would be automatically adopted.

- A specific thermal loading is needed for a final (licensing) repository design.

- At that point, a decision must be based on test data and analysis, not calculations alone.

- With respect to site suitability
  - emphasis in 10 CFR 60 and 10 CFR 960 is on ambient site conditions
  - therefore SCP emphasizes ambient site conditions
  - a repository will perform under thermally loaded conditions

Conclusions

- A high-level waste repository by definition contains heat
- The near-field rock at Yucca Mountain contains tightly bound water, which will be mobilized by the heat
- Recent advances in understanding have changed concepts of the relation among the waste heat, the repository design, and the site response
- In determining the ability of an unsaturated tuff repository to isolate waste, the response of the site to the heat from the waste is probably the single most important issue
- This information must be obtained from underground access and testing — hypothetical models will not provide the answers

The Other Side of the Mountain

Politics Aside, Burying Warhead Plutonium at Nevada's Test Site Makes Sense

By Luther J. Carter

PRESIDENT CLINTON and Congress would do the world, the nation and even the state of Nevada a favor by making the proposed Yucca Mountain nuclear waste repository at the Nevada Test Site (NTS) the preferred place for long-term, internationally monitored storage of plutonium from disassembled nuclear warheads. But to do so they will have to straighten out some misguided thinking at the U.S. Department of Energy.

DOE recently gave notice that storage of surplus warhead plutonium at the NTS is indeed a possibility now being considered. But should this happen, DOE indicated that the plutonium will not be safeguarded by the International Atomic Energy Agency against further weapons use and that it *will* be held in reserve as part of the military stockpile pending future decisions as to what to do with it.

This is precisely the wrong way to go. It runs counter to the U.S. policy of seeking to have the Russians permanently remove surplus nuclear explosives from their military stockpile. It does not support U.S. appeals for the Nuclear Nonproliferation Treaty to be made permanent when it comes up for renewal in 1995. And the existing stockpile of 100 tons of weapons-grade plutonium is several times what will be needed for the downsized U.S. nuclear arsenal expected after the turn of the century. Furthermore, it overlooks a chance to strengthen the Yucca Mountain project politically by mobilizing strong support for it among members of Congress worried about nuclear weapons as well as among those worried about nuclear waste.

Yucca Mountain is already the site of an exploratory DOE project to establish a deep geologic repository for irradiated (or "spent") fuel from nuclear power reactors and the high-level waste generated by past plutonium production for nuclear weapons. The existing project is meeting fierce resistance led by the state of Nevada and aided and abetted by the antinuclear groups and some environmental organizations. The addition of warhead plutonium would initially bring more opposition from Nevada. But the importance of the mission could lend the project a political weight and momentum that Nevadans could not ignore.

American warheads are now being disassembled at DOE's Pantex plant in the Texas Panhandle near Amarillo, at a rate of about 1,800 a year. Some 15,000 warheads must be disassembled over the coming decade for the United States to honor its arms reduction obligations. The plutonium "pits" or cores recovered from disassembled warheads are now stored at Pantex in earth-covered concrete bunkers or "igloos."

Texas Gov. Ann Richards supports Pantex in its critical post-Cold War role but worries about what will become of the plutonium. A potent carcinogen if inhaled or ingested, plutonium has a 24,000-year half-life and so, on a human time scale, lasts forever.

Richards is determined that the Texas Panhandle, where water from the underlying Ogallala aquifer is vital to the region's multi-billion-dollar farm economy, not become *de facto* this dangerous material's permanent resting place. But plutonium recovered at Pantex could go first to temporary igloo storage, then to Yucca Mountain for long-term, possibly final, isolation.

Underground retrievable storage is the best strategy for development and operation of a Yucca Mountain repository and should be preferred over the present policy of seeking to build and license a permanent disposal facility by the year 2010. Committing the warhead plutonium as well as spent fuel to Yucca Mountain for retrievable storage would offer these benefits:

■ *Tighter physical security.* The so-called "reactor grade" plutonium, if recovered by chemical reprocessing, is a usable, although inferior, bomb material that can itself contribute to the spread of nuclear weapons. If the warhead plutonium (only lightly radioactive) and the spent fuel (highly radioactive) were placed together in the same massive storage casks, anyone attempting to steal or divert the plutonium would risk a lethal dose of radiation.

■ *Hedging against uncertainties.* Plutonium is now a dangerous nuisance but its retrievable storage inside Yucca Mountain would provide a hedge against the possibility that some day it might become an important energy resource.

Princeton professor Frank von Hippel, a leading arms control expert, would prefer to see plutonium permanently disposed of but regards secure retrievable storage as a "good compromise."

Retrievable storage also offers a hedge against present uncertainties with respect to containment of the plutonium and other very long-lived radioactive species over the long period of hazard. It does so by allowing research and development on containment systems to continue indefinitely.

The casks containing plutonium and spent fuel could, of course, be removed from the repository to form temporary storage arrays at the surface. But for the long term, storage deep inside Yucca Mountain would offer far greater probability of safe isolation and containment.

Although Yucca Mountain is in a region that has been wracked over geologic time by earthquakes and volcanic activity, scientists at the U.S. Geological Survey like this site because the repository could be built high above the water table, protecting spent fuel casks from corrosion.

The state of Nevada maintains that DOE, under its own siting guidelines, could have disqualified Yucca Mountain on any one of these three grounds: prospectors and miners will sooner or later intrude upon any repository built there; groundwater flow from the repository to the accessible environment will take, perhaps, only hundreds of years, not thousands; the presence of earthquake faults threatens repository integrity.

But the Nuclear Waste Technical Review Board, created by Congress to look over DOE's shoulder, said in a special report this past March that, although questions need to be cleared up, nothing in the data from the Yucca Mountain investigation thus far appeared to give scientific or technical reason to reject the site. The board also again recommended, as it has before, that DOE hedge against uncertainties about geologic containment by developing robust, long-lived waste containers. It also called on DOE to consider maintaining retrievability beyond the 50 years now contemplated.

It should not be forgotten that there are also benefits for Nevadans. Their thinking is still shaped by the national uproar of the 1980s over repository siting. But in the late 1970s the Nevada legislature actually petitioned for storage of such waste at the NTS.

Today's challenge for the White House and DOE is to convince Nevadans that retrievable storage keeps all options open and that a Yucca Mountain repository can bring their state substantial benefits at very little risk. Why not offer Nevada a considerable part in running or overseeing the repository project and, in addition, a share in building and demonstrating a state-of-the-art reactor designed to burn up warhead plutonium while generating electricity safely and at high efficiency?

General Atomics of San Diego recently struck an agreement in Moscow to build such a reactor to burn Russian warhead plutonium, subject to U.S. financial support. Edward M. Davis, president of the American Nuclear Energy Council, the industry lobby, suggests that a similar undertaking at the NTS could be part of a state benefits package to be paid for out of the nuclear waste fund, which receives well over a half billion dollars a year from a fee on nuclear electricity.

The NTS already has a new, not quite finished $89 million device assembly facility that could be used to help Pantex in the disassembly of warheads and recovery of plutonium.

Nevada Sen. Harry Reid, like many of his constituents, is worried about a loss of jobs at the NTS from the moratorium on nuclear weapons testing. He wants some weapons disassembly done there, even though the plutonium recovered would have to be stored on the site somewhere, somehow.

Reid has gotten at least qualified support on this issue from Las Vegas Mayor Jan Laverty Jones but not from his Senate colleague, Richard Bryan. Bryan has been the state's political "enforcer" with respect to keeping the ranks unbroken in opposition to nuclear waste disposal in Nevada. He has speculated whether accepting the warhead plutonium wouldn't really be taking in nuclear waste under "another name."

But Nevadans are also coming to realize that their obstructionism could have the wrong result. Indeed, last spring, the Nevada Senate's Republican majority leader, Bill Raggio of Reno, called for negotiations with DOE. Thus far Sen. Bryan has kept Raggio in the minority and on the defensive. But things could easily change, because many Nevadans share Raggio's worry lest the state get the "nuclear dump" anyway, with nothing in return.

Luther Carter is working on a book on "civilizing the atom" under a MacArthur grant. This article is adapted from one that will appear in the National Academy of Science's journal, Issues in Science and Technology.

Comparison of Selected Part 60 and Part 960 Criteria (cont.)

C. Favorable Conditions

Licensing Requirement	60.122 Siting Criteria. (b) Favorable Conditions (8) For Disposal in the unsaturated zone, hydrogeologic conditions that provide - (ii) A water table sufficiently below the underground facility such that fully saturated voids contiguous with the water table do not encounter the underground facility.
Suitability Requirement	960.4-2-1 Geohydrology. (b) Favorable Conditions. (5) For Disposal in the Unsaturated Zone, at least one of the following pre-waste emplacement conditions exists: (ii) A water table sufficiently below the underground facility such that fully saturated voids continuous with the water table do not encounter the host rock.

D. Potentially Adverse Conditions

Licensing Requirement	60.122 Siting Criteria. (c) Potentially Adverse Conditions. (14) More frequent occurrence of earthquakes or earthquakes of higher magnitude than is typical of the area in which the geologic setting is located.
Suitability Requirement	960.4-2-7 Tectonics. (c) Potentially Adverse Conditions. (4) More frequent occurrence of earthquakes or earthquakes of higher magnitude than are representative of the region in which the geologic setting is located.

FLOW OF FUNDS IN THE OCRWM PROGRAM: FY 1983 - FY 1992

NYE COUNTY REPOSITORY PROGRAM
JIM WILLIAMS, PLANNING INFORMATION CORPORATION

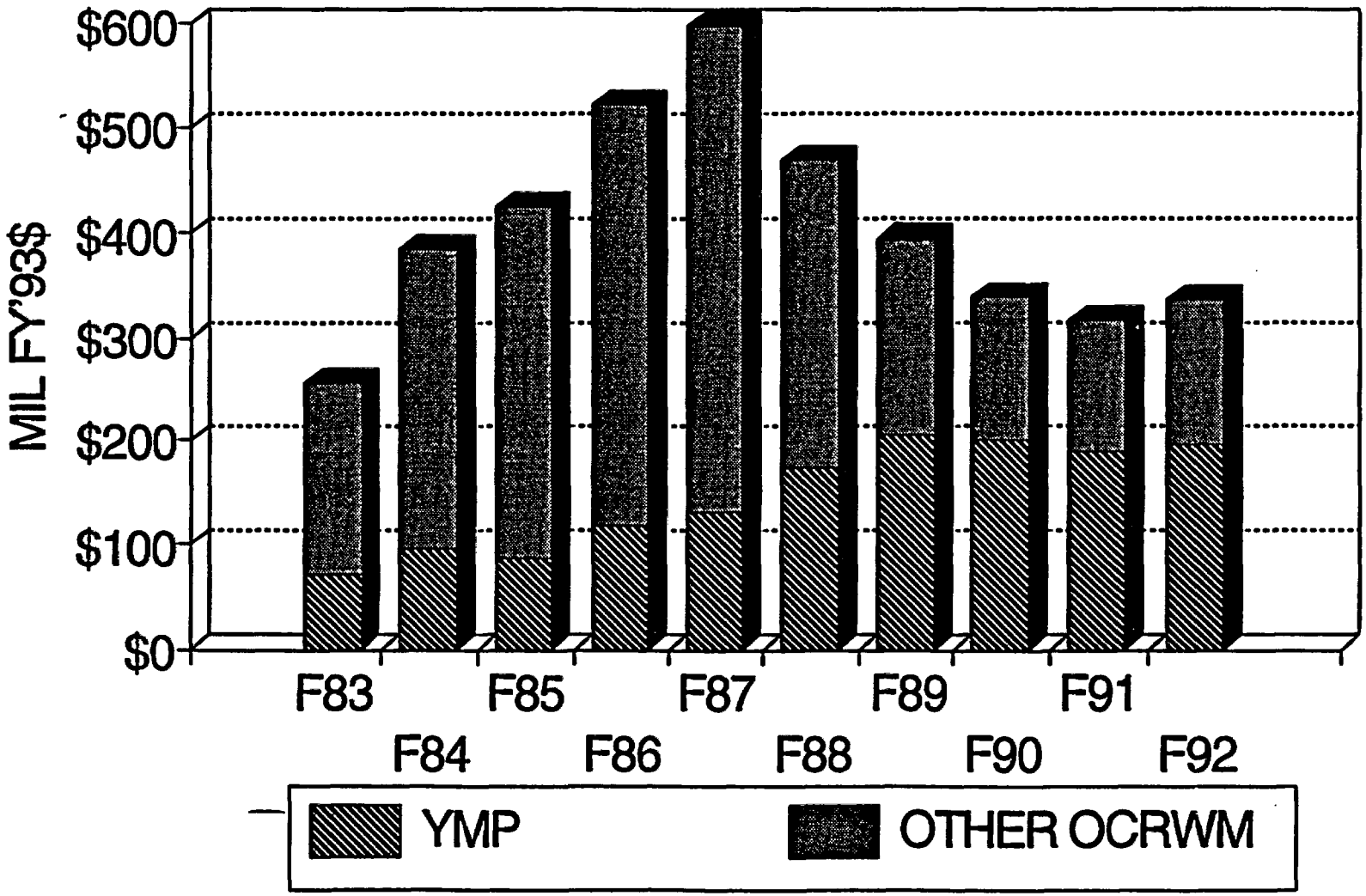
WORKSHOP TO REVIEW
USDOE NUCLEAR WASTE REPOSITORY PROGRAM

AUGUST 25, 1993
PAHRUMP, NEVADA

THE PROGRAM AND THE PROJECT

REAL HLNW SPENDING IS DOWN 45% SINCE FY 87 -- YMP IS HALF THE PROGRAM, BUT DOWN SINCE FY 89

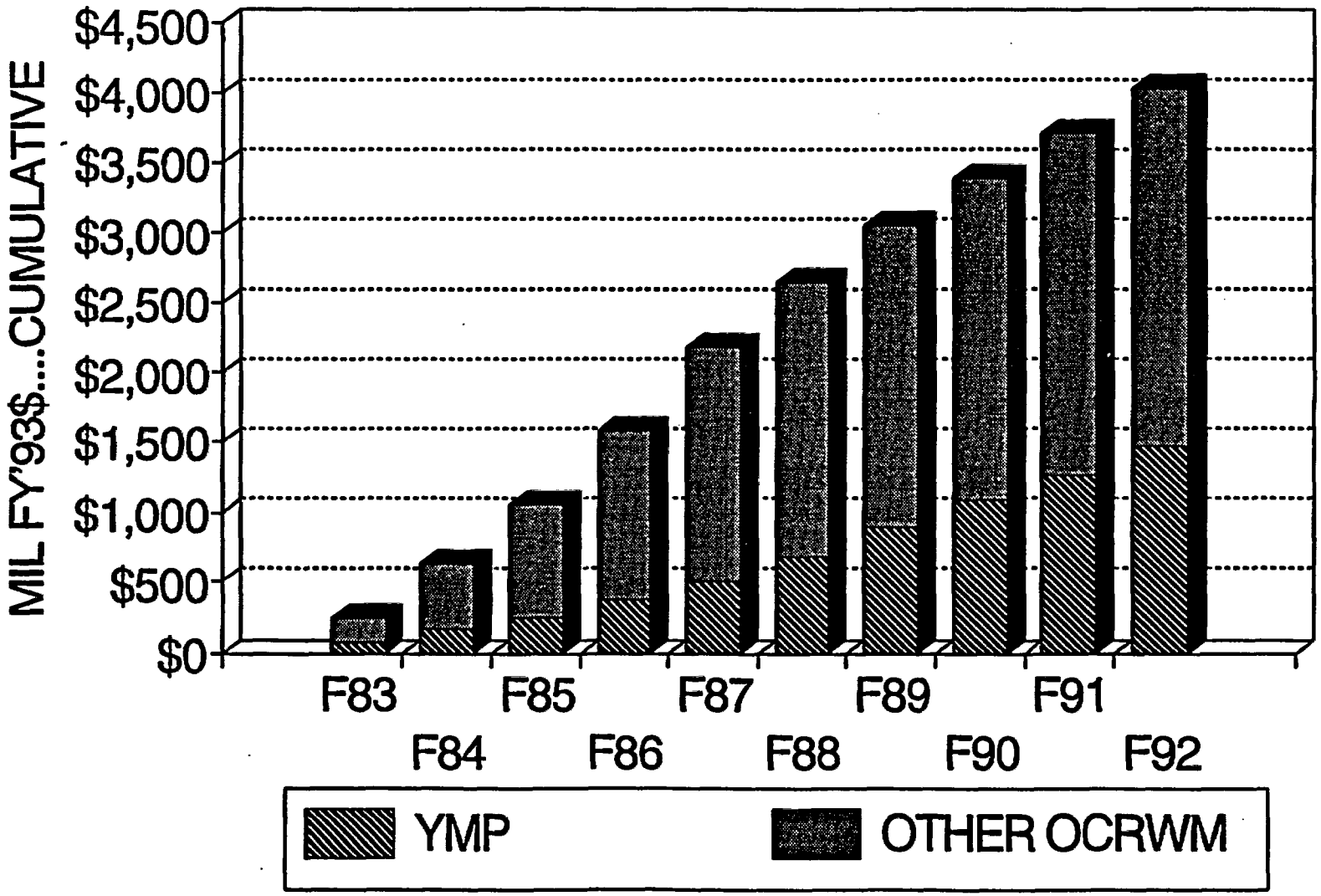
(YMP AND OTHER OCRWM SPENDING, FY 83 TO FY 92 [IN FY 93 $])



THE CUMULATIVE SPENDING PICTURE

$4 BILLION SPENT SINCE INCEPTION, ABOUT $1.5 BILLION OF THE TOTAL SPENT ON THE YMP

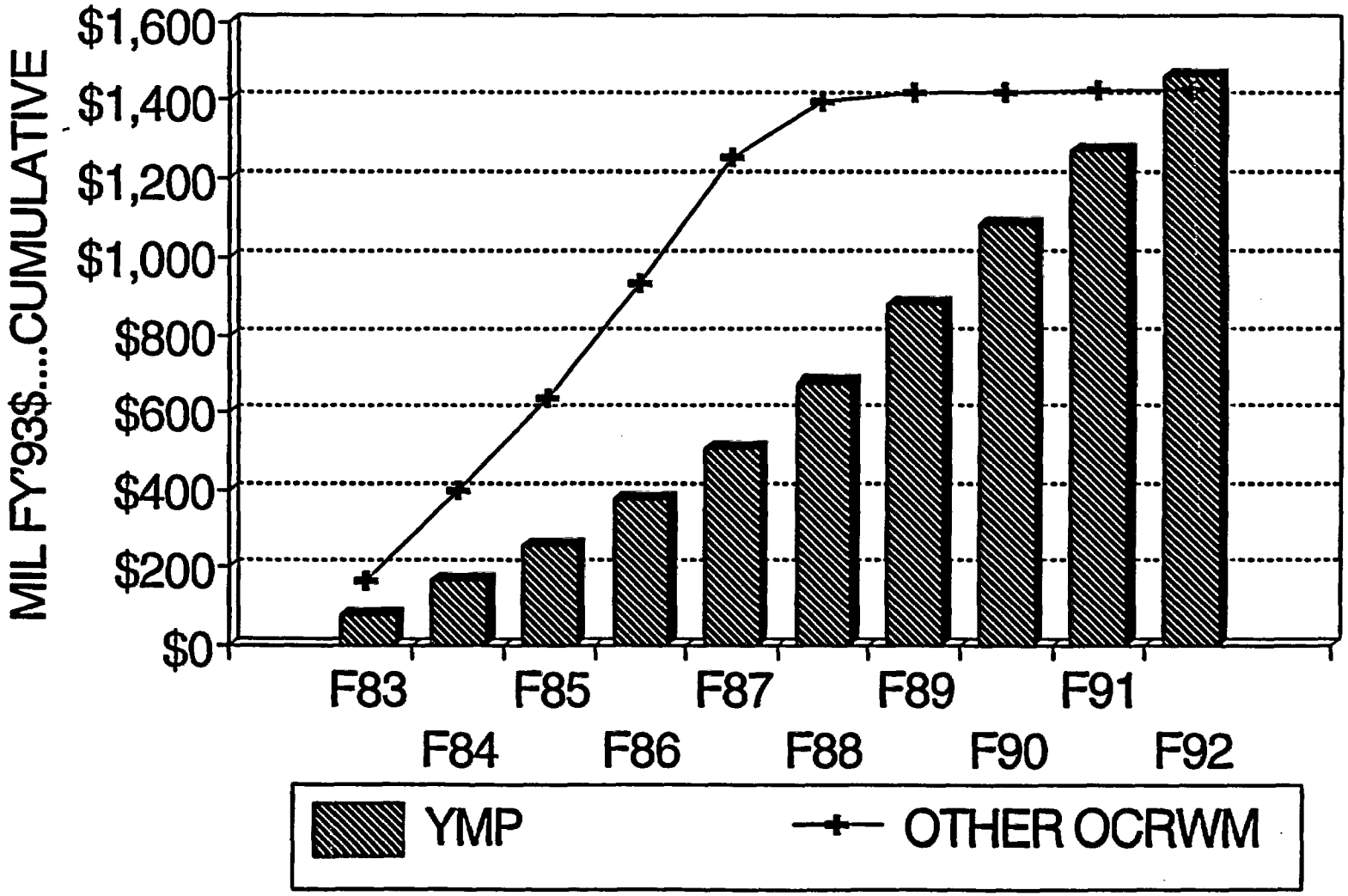
(CUMULATIVE YMP AND OTHER OCRWM SPENDING SINCE FY 83 [IN FY 93 $])



CUMULATIVE COMPARISON

IN FY 92, CUMULATIVE YMP SPENDING FINALLY CAUGHT UP TO OTHER REPOSITORY SUBPROGRAMS

(CUMULATIVE SPENDING, YMP VS OTHER REPOSITORY IN FY 93 $)

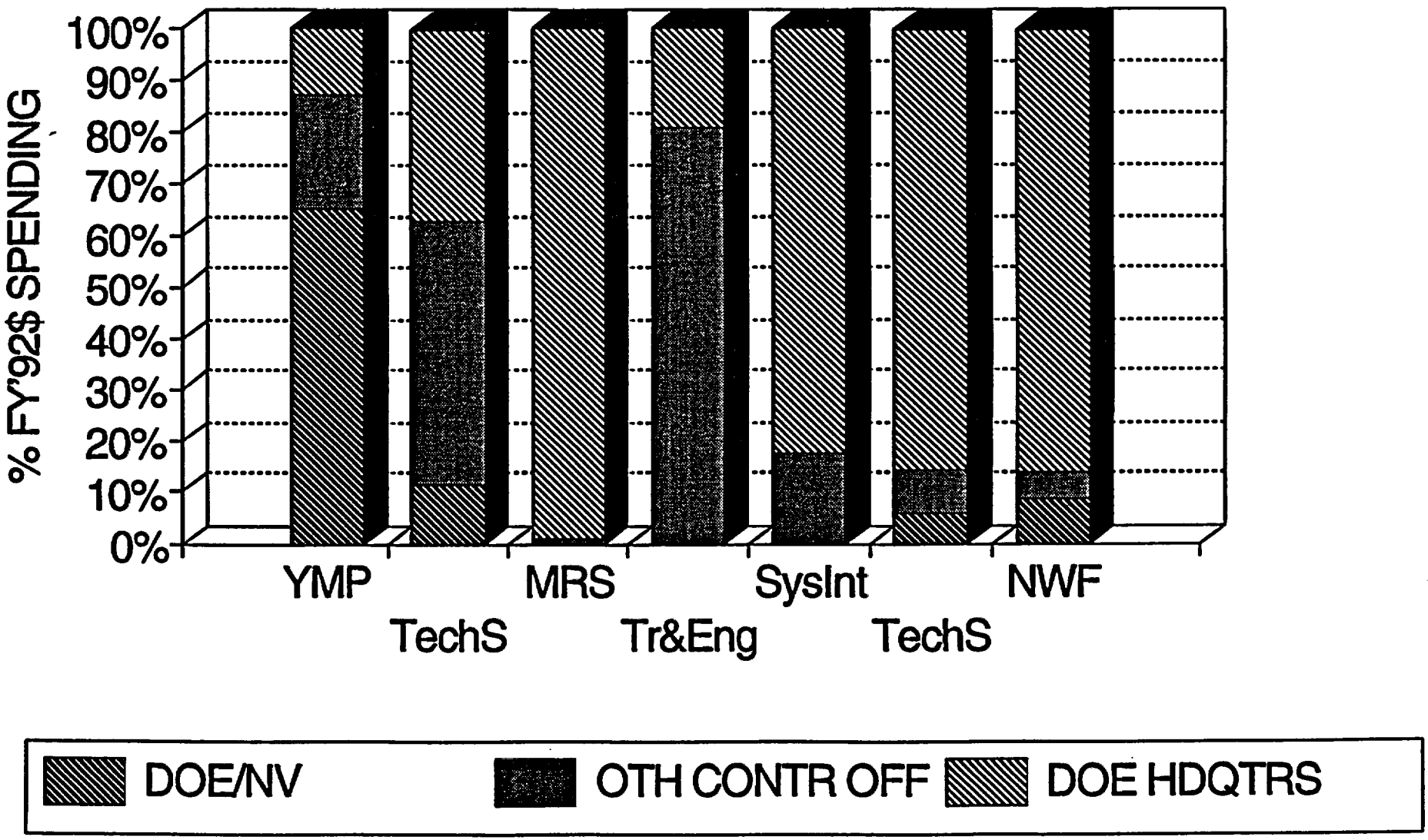


WHO RUNS THE PROGRAM?

DOE/NV CONTROLS 65% OF YMP SPENDING

BUT HQ AND OTHER OFFICES CONTROL OTHER KEY ASPECTS

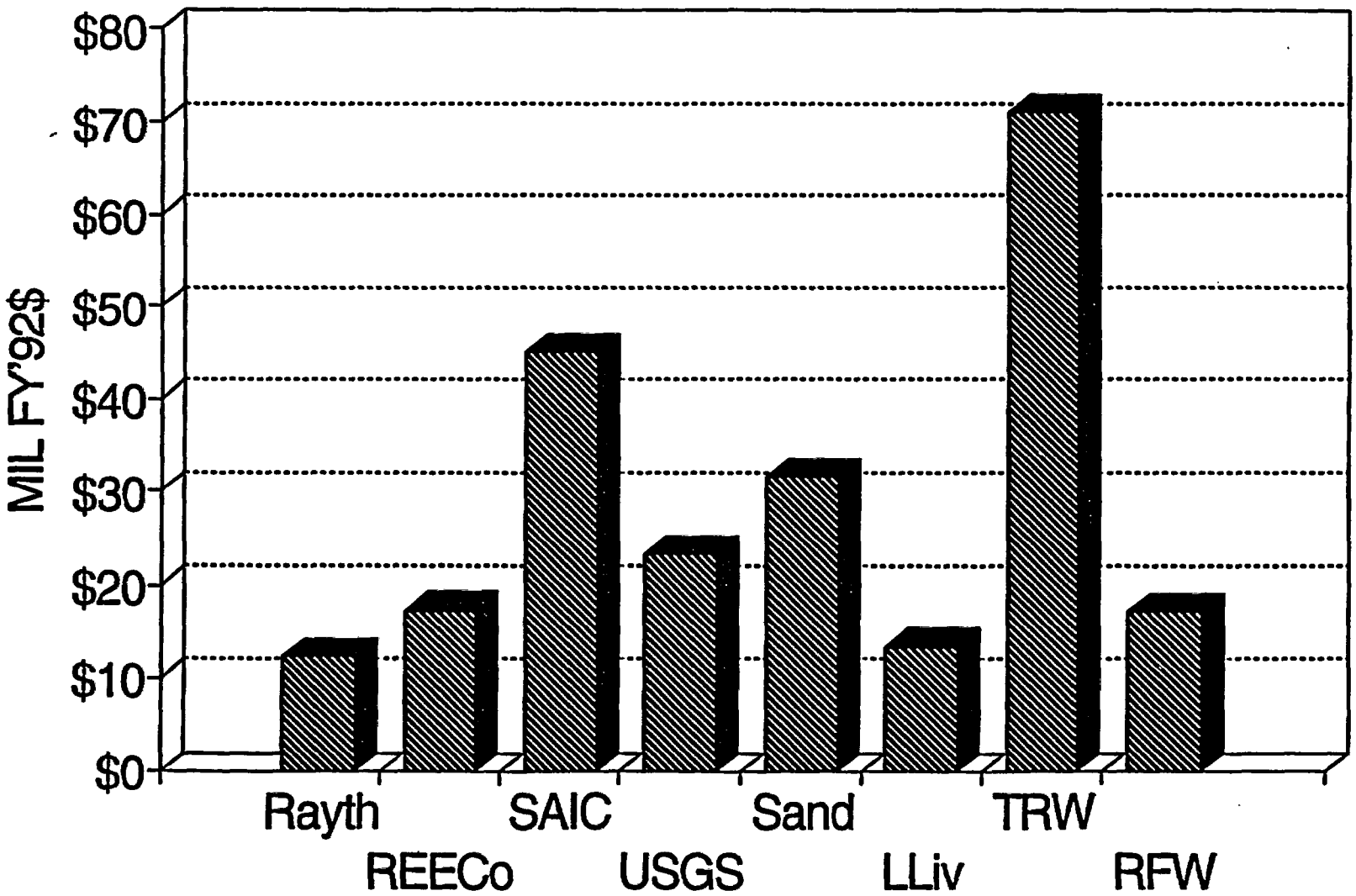
(OCRWM CONTRACTING OFFICES, FY 1992: NEVADA, OTHER, HDQTRS)



THE PROGRAM-WIDE CONTRACTING LINEUP

WITHIN THE FIRST TIER OF CONTRACTORS, TRW AND SAIC RISE ABOVE THE CROWD.

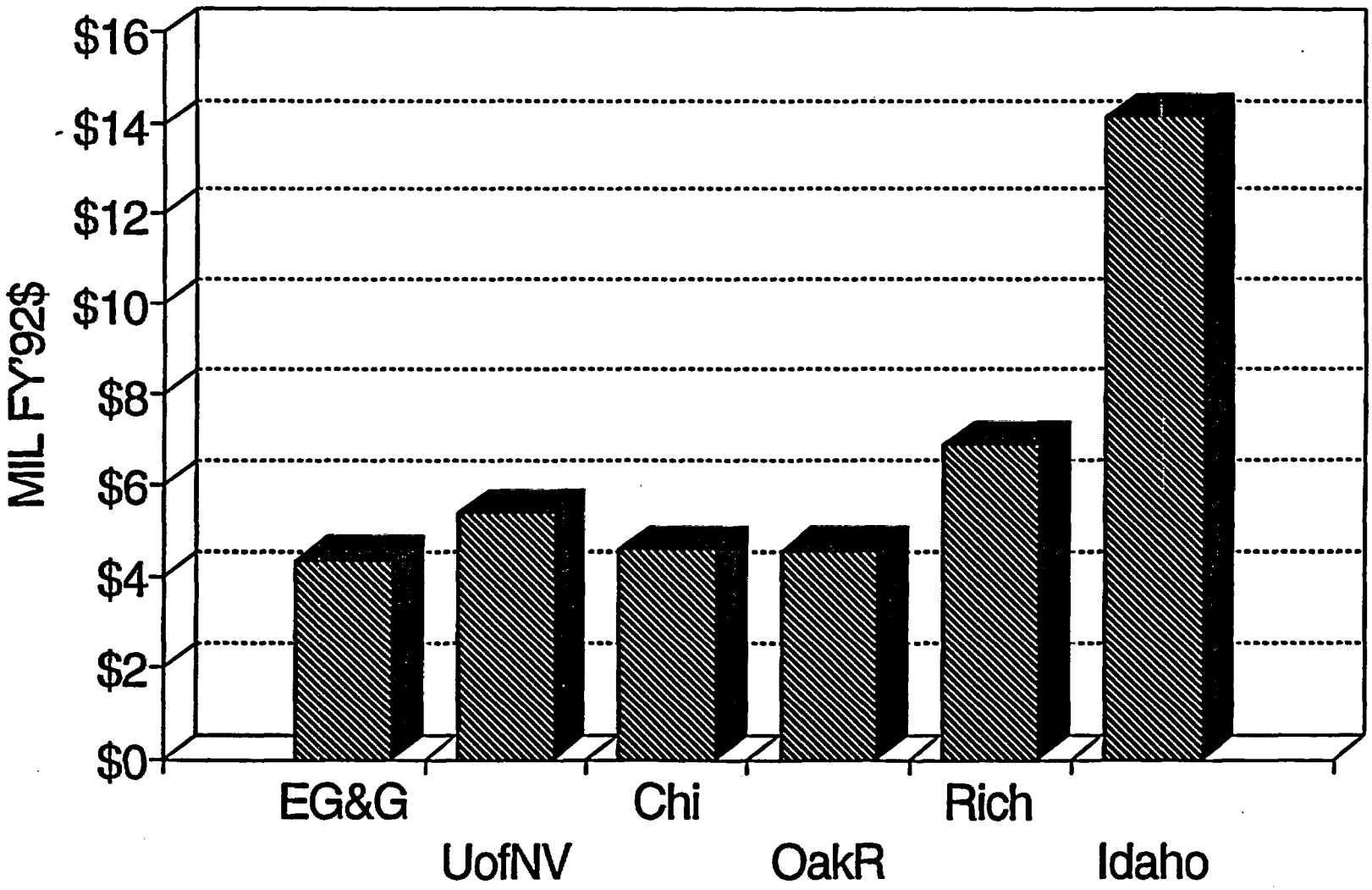
(MAJOR OCRWM PARTICIPANTS, FY 1992: RAYTHEON, REECO, SAIC, TRW, ETC.)



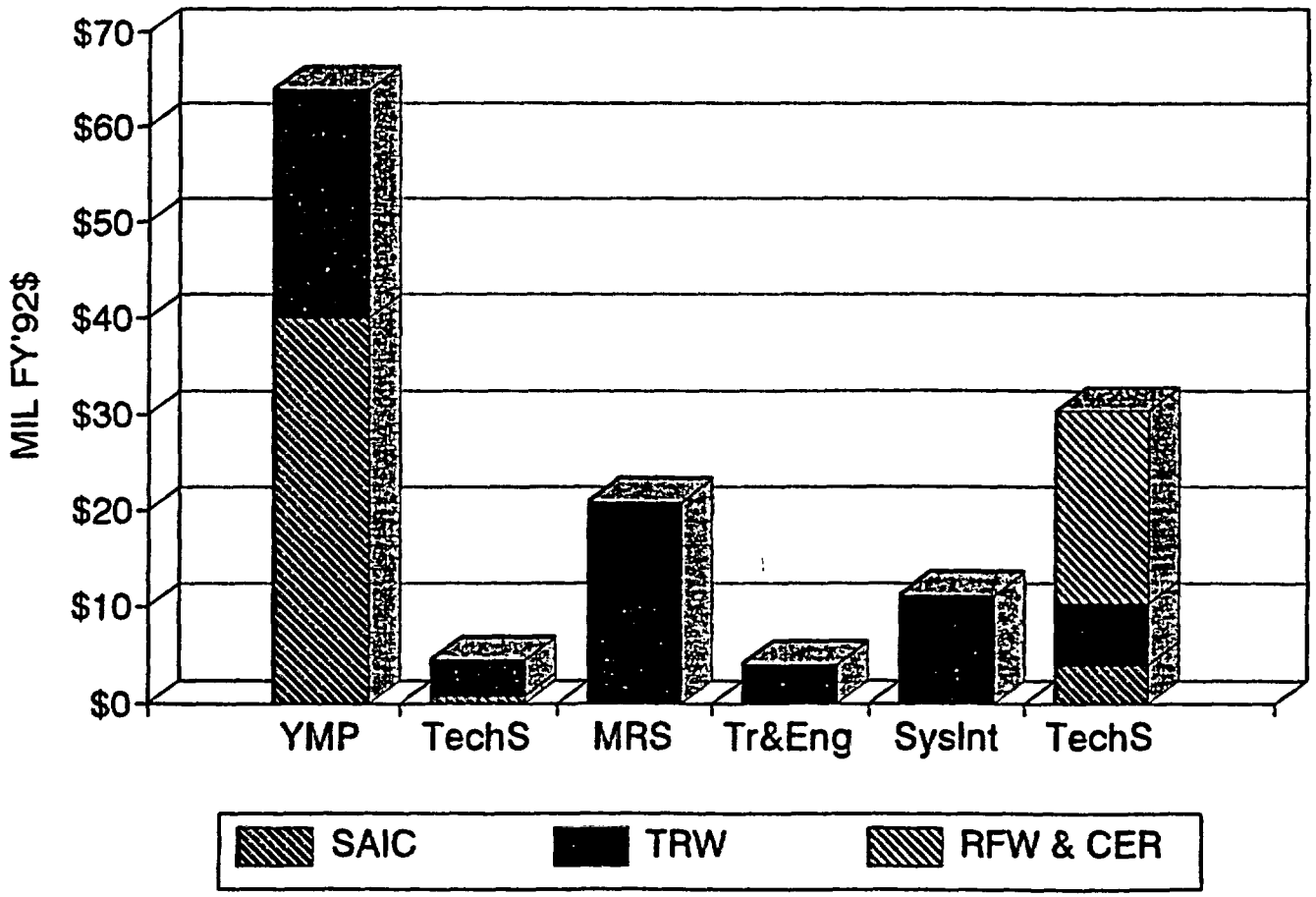
OTHER PROGRAM-WIDE PLAYERS

THE SECOND TIER INCLUDES CONTRACTORS, PLUS DOE FIELD OFFICES AND ACADEMIC INSTITUTIONS

(OTHER OCRWM PARTICIPANTS, FY 1992: IDAHO, RICHLAND, U OF NV, ETC.)

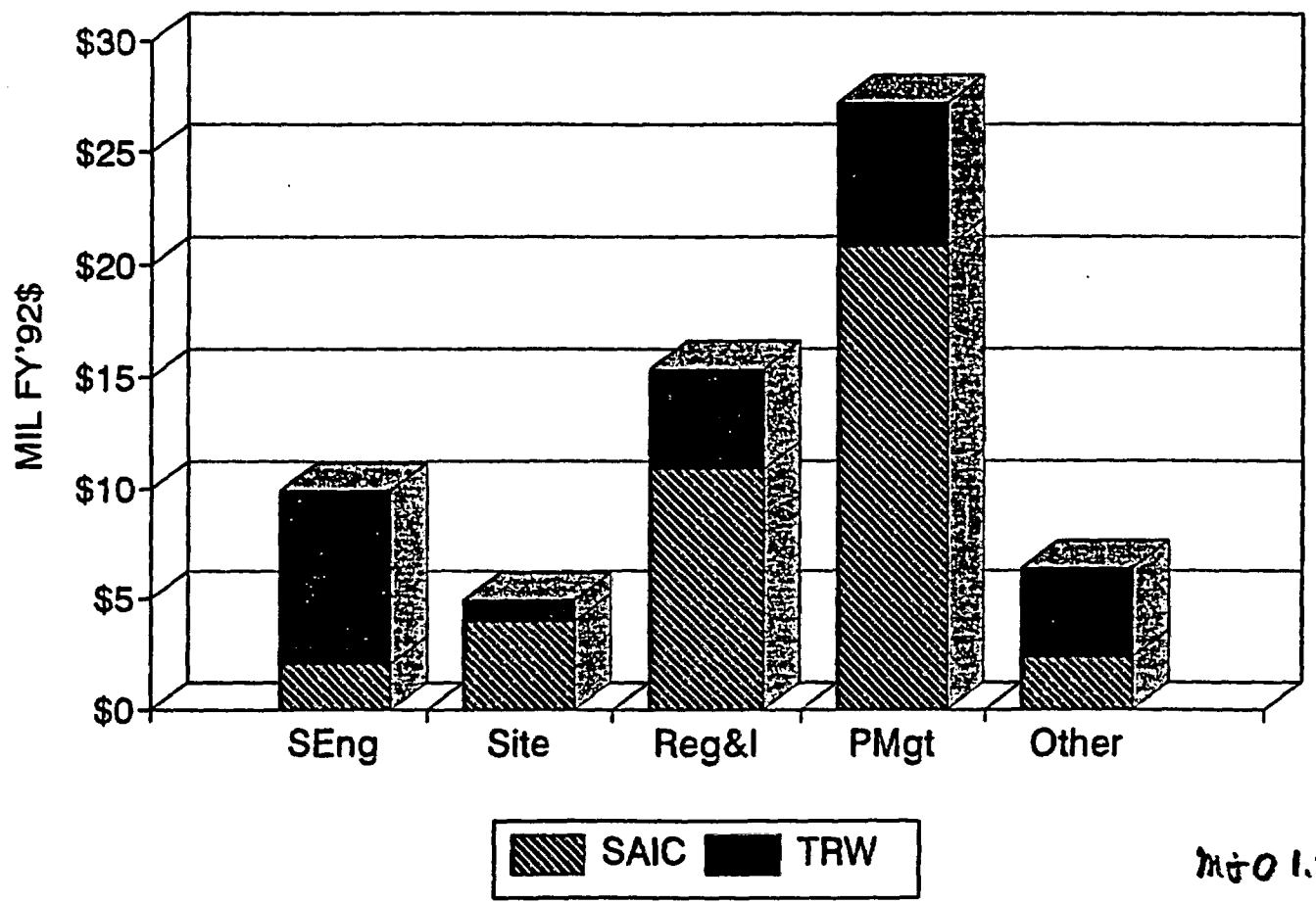


OCRWM CONTRACTING OFFICES: FY 1992
SAIC, TRW, ROY F WESTON & CER



STRW
SOMR 922

YMP "M&O" SPENDING: FY 1992
SAIC & TRW, FY'92$

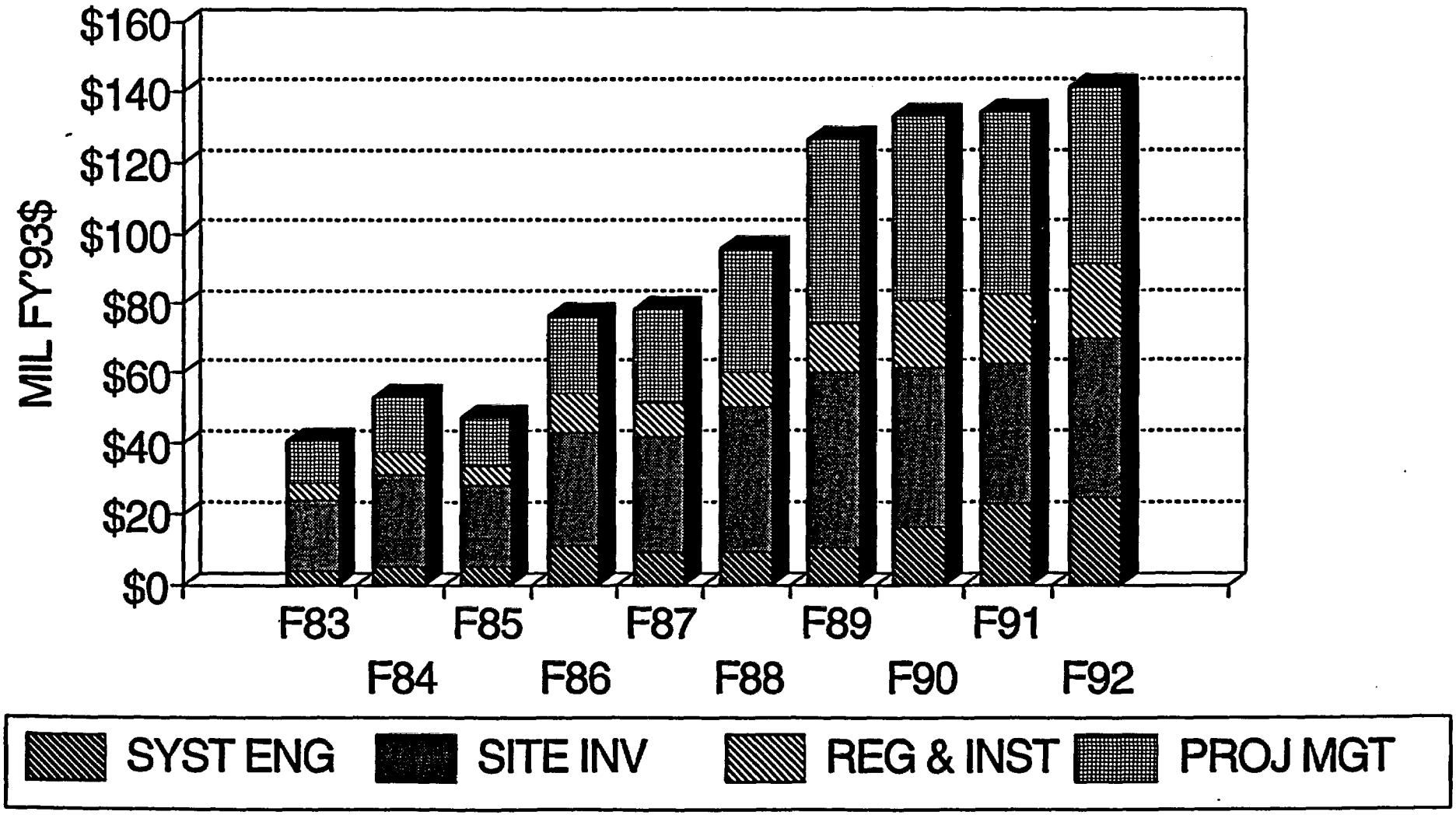


M+O 1.2
SOAR922

PROJECT TASKS ON THE RISE

GROWTH TASKS ARE SYSTEMS ENGINEERING, SITE WORK, REGULATORY AFFAIRS, AND MANAGEMENT

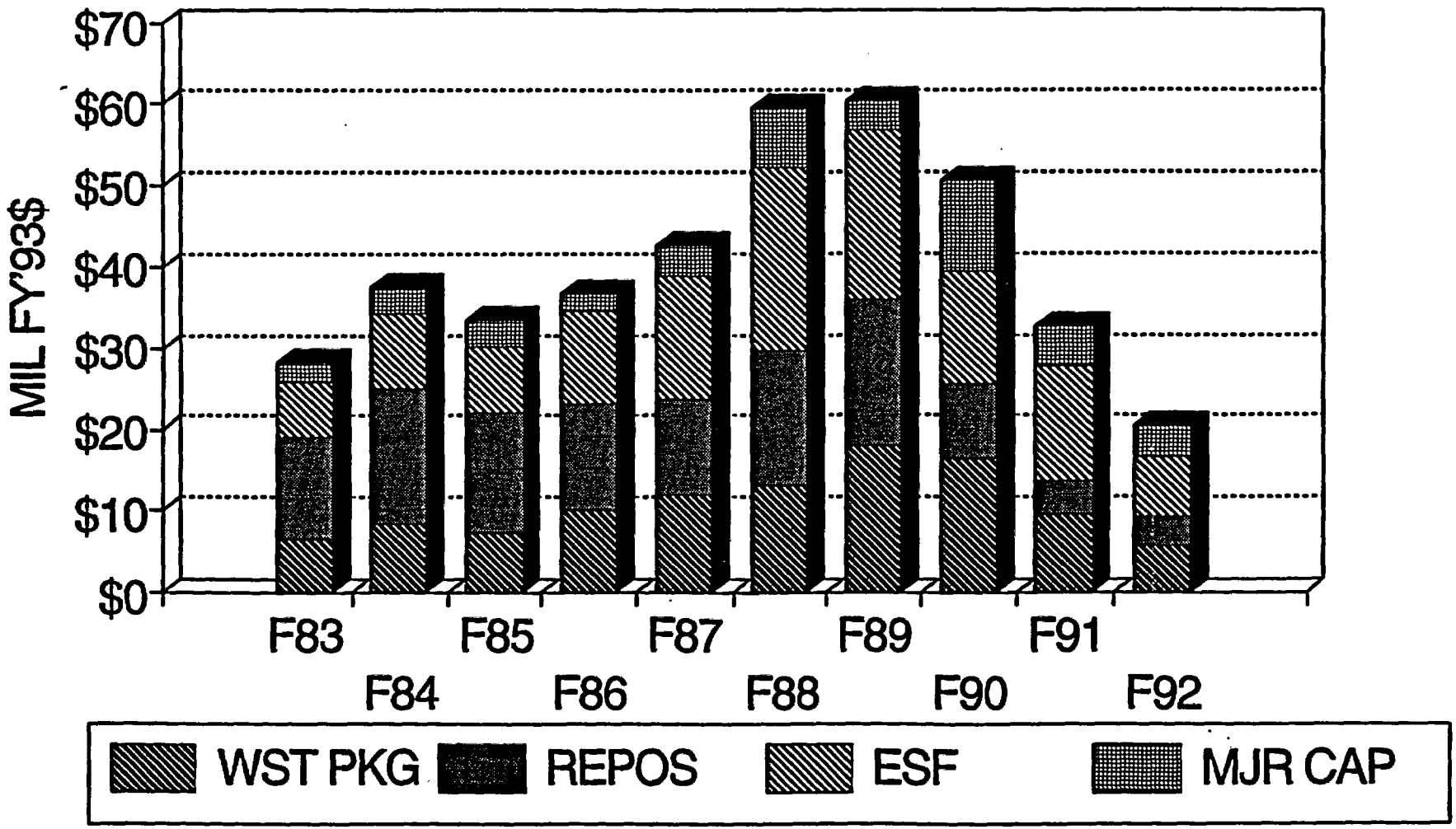
(SELECTED OCRWM TASKS, FY 83-92, TASKS #1, #3, #5, & #9)



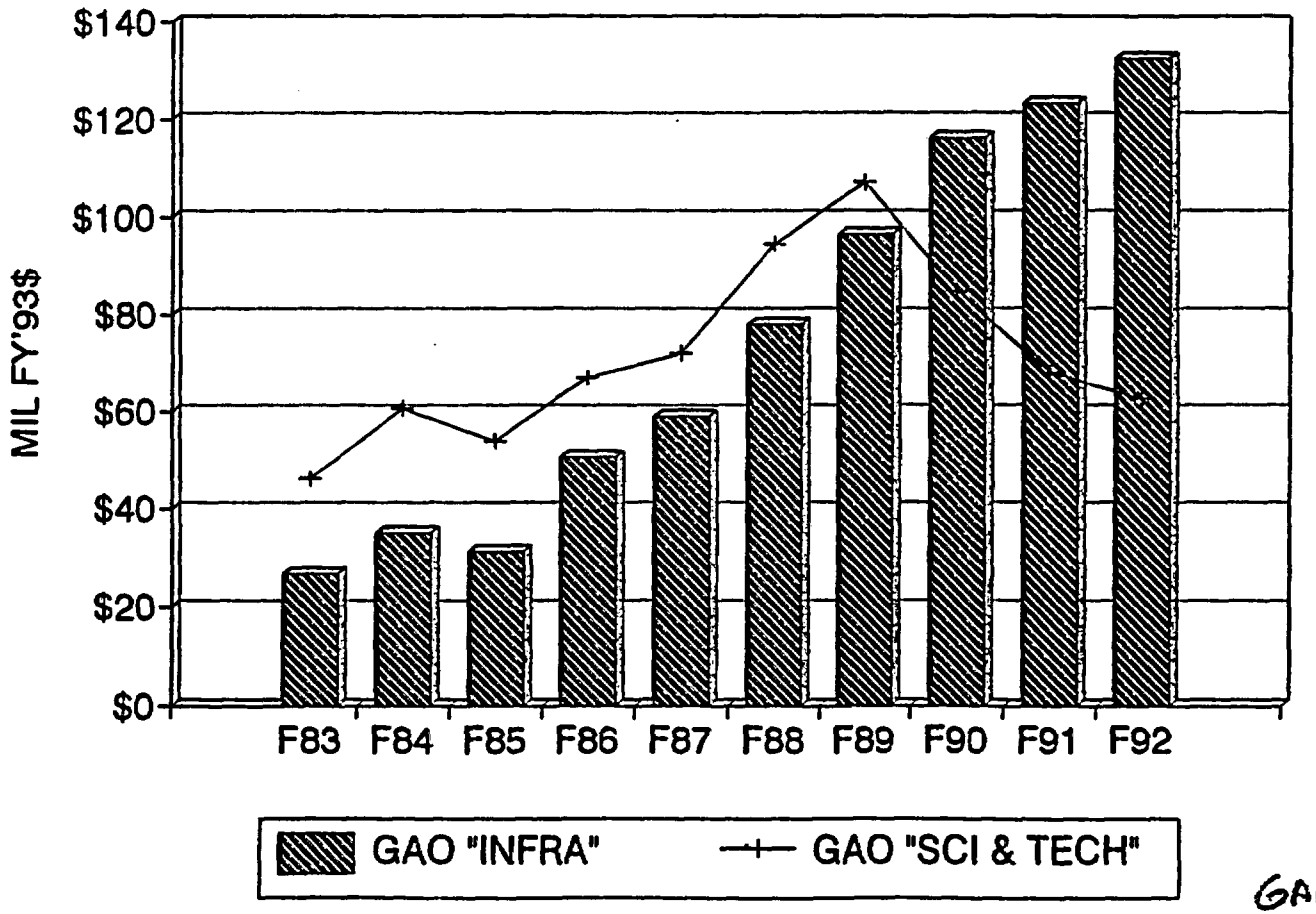
PROJECT TASKS IN DECLINE

CUTBACKS HAVE HIT WASTE PACKAGE, REPOSITORY DESIGN, THE ESF, AND CAPITAL EXPENDITURES

(SELECTED OCRWM TASKS, FY 83-92, TASKS #2, #4, #6, & #C)



YMP $ FOR "INFRASTR" VS "SCI & TECH"
GAO "SCI & TECH"....1.2-4&6: MIL FY'93$



GAO
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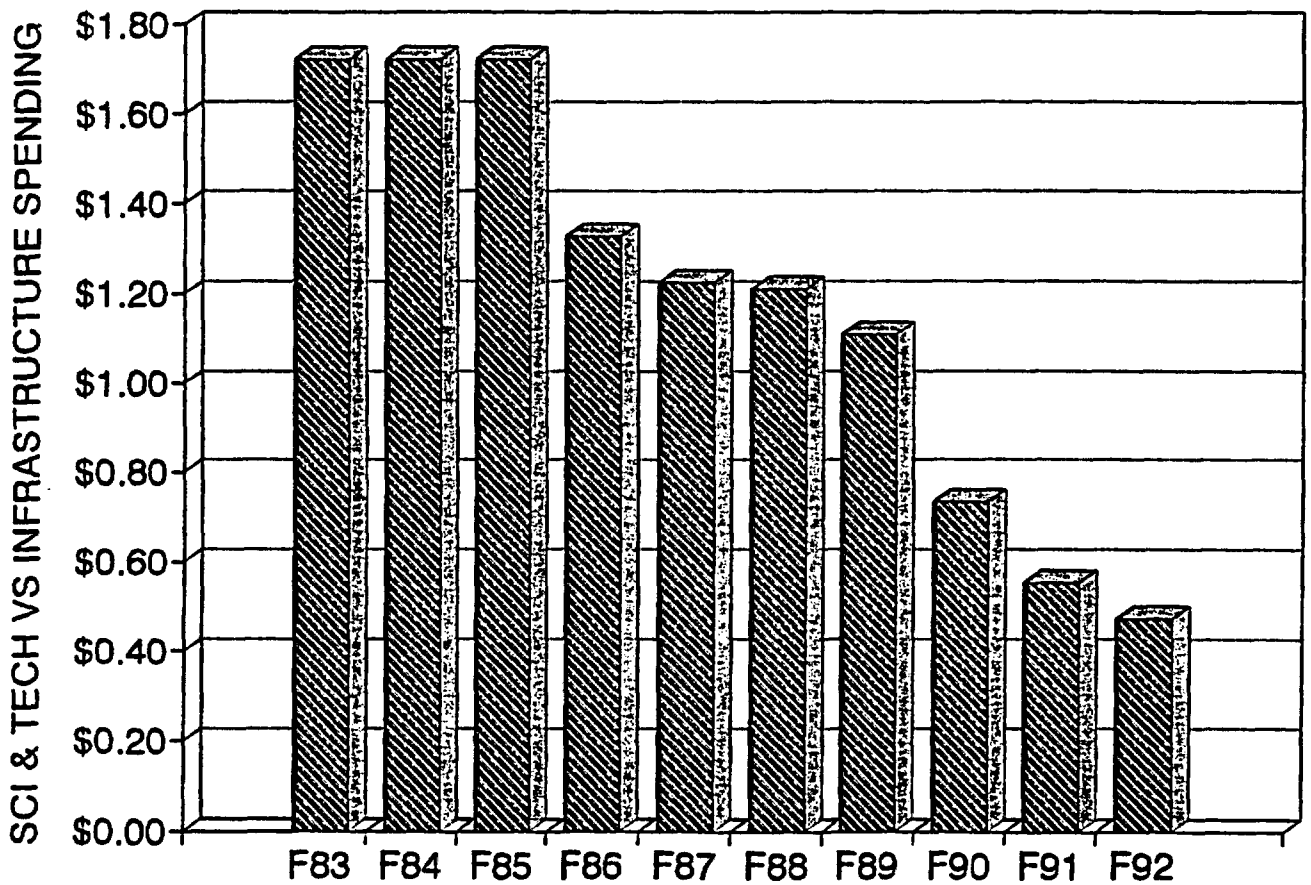
SOAR 132

"SCI & TECH" $ PER $ "INFRA"
GAO "SCI & TECH"....TASKS 1.2-4&6



GAO
NSA
SDI P.132

BOB MILLER
Governor

STATE OF NEVADA

ROBERT R. LOUX
Executive Director

AGENCY FOR NUCLEAR PROJECTS
NUCLEAR WASTE PROJECT OFFICE

Capitol Complex
Carson City, Nevada 89710
Telephone: (702) 687-3744
Fax: (702) 687-5277

August 20, 1993

Mr. Dwight E. Shelor
Office of Civilian Radioactive
Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Re: State of Nevada's Final Comments -- Section 803 Report, Energy Policy Act of 1992

Dear Mr. Shelor:

The State of Nevada appreciates the opportunity to provide final comments on the report required under Section 803 of the Energy Policy Act of 1992. As you know, Section 803 directs the Department of Energy (DOE) to prepare a congressional report that assesses the adequacy of existing DOE plans and programs to manage nuclear waste generated by nuclear power plants to be constructed after 1992. The law also requires the analysis to include defense waste that might be generated from future reprocessing and cleanup of the DOE's nuclear weapons manufacturing plants.

As stated in the Federal Register Notice dated February 5, 1993, the DOE's Office of Civilian Radioactive Waste Management (OCRWM) must submit this report to the President and the Congress by October 1993.

In April 1993, the State of Nevada provided extensive "scoping" comments on a draft annotated outline for the report[1]. After reviewing the draft report, including the DOE's response to our comments, we subsequently delivered a detailed public statement[2] on the draft report at the DOE sponsored public meeting held in Las Vegas, Nevada on July 20, 1993.

Below is a summary of our final comments followed by an attachment with a more detailed review. These final comments are based on a thorough review of the draft report, a review of DOE's responses to comments provided on the annotated outline and our assessment of other comments provided at the public meeting held in Las Vegas, Nevada.

Once again, these are our last and final comments on the congressional required Section 803 report and we are requesting that these final comments, along with the DOE's responses, be included in the final report that will be submitted to the Congress.

COMMENT SUMMARY

- Each case scenario described in the draft report should be amended to include all "other wastes" described in chapter 7 of the draft report. "Other Wastes" include high-level waste (HLW) generated from the Decontamination and Decommissioning (D&D) of nuclear power plants and defense waste facilities, wastes classified as Greater-Than-Class C (GTCCW), and all DOE owned spent fuel. All of these wastes are slated for disposal in a geologic repository. In addition, the uncertainties concerning the amount of defense waste, in terms of the number of waste canisters that might be produced from the DOE's vitrification program, should be quantified in the final report.

- The final report should address the issue of repository capacity. Without addressing the issue of total waste capacity for a single repository, the DOE simply cannot draw any convincing conclusions about the adequacy of existing plans and programs to deal with the storage and disposal of wastes to be generated in the future. The issue is further complicated by the DOE's inability or unwillingness to investigate any waste management contingencies should the Yucca Mountain site be found to be unsuitable. Finally, because the draft report fails to estimate the waste capacity of the Yucca Mountain site, the DOE cannot assume that an additional repository will not be needed in the near term.

• Critical questions about the schedules and costs of the repository program are not dealt with in the draft report in a meaningful way. Recent findings by the U.S. General Accounting Office (GAO) point to serious cost shortfalls that have significantly altered the legally required milestone for acceptance of waste by the DOE. Accordingly, the final report should assume that interim dry cask storage of commercial spent fuel at reactor sites will be the most likely scenario for waste management in the near term. Hence, the "case scenarios" presented in the report should include this assumption as the basis for the evaluation of the adequacy of the current plans and programs to manage both existing wastes and future wastes from new nuclear power plants.

• The Secretary of Energy's 1993 planned review of the DOE's repository program is based on the notion that the DOE has yet to demonstrate that it can successfully site, characterize, or develop a HLW management facility. Accordingly, the final report should address whether the DOE's current program is in fact adequate to carry out plans and programs for managing waste inventories at both the reference case (base case) and future waste generation levels.

• Because the draft report failed to provide a cost analysis for the upper bound scenario (i.e. Partitioning and Transmutation), this scenario should <u>not</u> be included in the final report. The upper bound scenario should also be omitted because the purpose of the report has nothing to do with future energy demand or the potential "acceptability of nuclear power". We contend that it is not the DOE's mission or responsibility to market this unproven technology on behalf of the nuclear power industry. Nevertheless, in the "likely" event that the DOE retains this scenario, then the DOE must acknowledge the licensing difficulties that will result from co-mingling of canisters containing spent fuel from light water reactors and canisters containing corrosive wastes from pyro-chemical reprocessing.

• Despite the intent of Congress in mandating this report, the DOE has developed a report, which simply finds that present plans and programs are adequate to manage the disposal of spent fuel generated by nuclear reactors constructed after 1992. The notion of flexibility, however,

which is the key to the DOE's finding of adequacy (as stated in the draft report), is largely the flexibility to amend the Act, which the DOE has so successfully promoted at critical times over the past several years.

Sincerely,

Robert R. Loux
Executive Director

Attachment
RRL/jbw

cc: Governor Bob Miller
Nevada Congressional Delegation
Leo Penne, State of Nevada, Washington Office
U.S. Nuclear Regulatory Commission
U.S. Environmental Protection Agency
Affected Local Governments

STATE OF NEVADA'S FINAL COMMENTS
SECTION 803 REPORT, ENERGY POLICY ACT OF 1992
August 20, 1993

I. WASTE VOLUMES

The report discusses three scenarios concerning the amount of high-level waste (HLW) and spent fuel that will be produced by existing nuclear power plants, future nuclear power plants, and defense waste processing facilities.

Although most assumptions for the scenario appear reasonable, none of the three scenarios includes estimates of "other wastes" that are slated for geological disposal. The report also failed to include reliable estimates of HLW generated from DOE defense reprocessing activities.

Other Wastes: Other wastes are defined as DOE owned or managed spent nuclear fuels (such as low burn-up spent fuel previously scheduled for reprocessing and naval reactor fuel), wastes classified as greater than Class "C", and waste from decontamination and decommissioning activities. By excluding "Other Wastes" from the three scenarios, the report fails to fully assess the adequacy of existing plans and programs for the management of wastes generated at current or future projected levels. As an example, the DOE's own inventory of spent nuclear fuel would increase current fuels in storage by as much as 13 percent[3].

High-Level Waste (HLW): The ultimate volume of HLW that might be produced for deep geologic disposal is not adequately discussed in the draft report[4]. This determination is essential to assess the impact of HLW disposal on existing DOE plans, facility designs, as well as on the need for additional repositories. Specifically, the draft report fails to discuss reasons for the large disparity in the number of HLW canisters that will be produced. As the DOE is well aware, most of the uncertainty surrounding the discrepancy in the number of canisters stems from the "stalled" vitrification program at the Hanford site. The report should make note that the DOE's Environmental Restoration and Waste Management Program (EM) is currently conducting a "re-baselining study" to determine

alternatives for the management, treatment, and disposal of the HLW at Hanford. The report should also acknowledge that recent changes in the EM program at Hanford have been undertaken to address safety concerns associated with HLW tank storage, as well as with the uncertainties concerning waste pretreatment systems. At a minimum then, the final report should address the HLW volume issue and its potential impact on the amount of waste that can be disposed in the first repository (i.e., 70,000 Metric Tons of Heavy Metal MTHM).

II. ISSUES THE REPORT SHOULD ADDRESS

The development of conclusions and recommendation about managing future wastes must be based on a clear understanding of DOE's current plans and programs to manage radioactive wastes generated by existing nuclear power plants and defense waste processing facilities. We believe this was the intent of Section 803 of the Energy Policy Act. Yet the draft report fails to address this concern at the most rudimentary level.

By the DOE's own admission, the draft report limits the analysis of existing programs and plans to "programmatic" concerns, while excluding important technical issues. We contend, however, that there are certain technical issues that must be understood to forecast the adequacy of DOE's existing and future waste management programs. Examples of these technical issues include:

- Repository Waste Emplacement Capacity;
- Statutorily Required Schedules and Program Costs;
- Program Management and Systems Integration;
- Contingencies;
- Regulatory Constraints.

These are issues the report must focus on if the DOE is sincerely interested in assessing the flexibility and adequacy of its current plans and programs to manage future wastes from power plants constructed after 1992.

• <u>Repository Waste Emplacement Capacity</u>: We contend that by not estimating this parameter, the DOE will miss the intent of Section 803 of the Act. Clearly, the requirements of the Energy Policy Act suggest that Congress wants to know what the available

waste emplacement capacity of the Yucca Mountain site or a generic repository site might be. Such an estimate is critical for determining the adequacy of existing plans and programs to handle future waste generation.

To estimate the waste emplacement capacity of a repository, the DOE should develop a common unit of measure[5] for the different types of wastes, which includes "Other Wastes" as described in Section 7 of the draft report. A common unit of measure is needed for the estimation of the areal power density, which can then be used to estimate the space needed for waste emplacement. Such an analysis does not involve geologic or hydrologic data and actually is a "programmatic" concern.

• Statutorily Required Schedules and Program Costs: Section 302 of the Nuclear Waste Policy Act as amended, stipulates that the Secretary of Energy will begin accepting nuclear waste for disposal by January, 1998. Because the DOE has not changed this date in budgeting forecasts and in discussing contractual obligations with utilities, this "statutorily required scheduled" must be discussed in the final report. Specifically, the report should state that a decision for a repository site will not be finalized by 1998 and that it is highly unlikely that a Monitored Retrievable Storage Facility (MRS) will be available at this early date as well. These are important concerns since the overall program cost remains an issue for ratepayers, the Congress, and the President. Rather than basing program assumptions on the existence of an MRS by 1998, all scenarios in the final report should be based on the assumption of interim dry cask storage for spent fuel at existing nuclear reactor sites. This is the most likely scenario for the reference case and the final report should adopt this assumption for evaluating the adequacy of existing plans and programs to manage both current and future waste generation.

If the final report evades such an assumption, then the DOE must conclude that its current plans and programs are inadequate to handle existing waste management activities as stipulated under the time periods required in current legislation. Along this same line, and because of the uncertainties surrounding the volume and number of HLW canisters and "Other Wastes", the final report should also assess the requirement to advise the President and the Congress on the need for a second repository[6].

• Program Management and Systems Integration: Recently, the Nuclear Waste Technical Review Board (NWTRB) advised the Congress that the DOE is experiencing significant management problem(s) that are affecting certain technical aspects of the repository program[7]. According to the NWTRB, organizational management at the DOE is a significant problem and is contributing to inefficiencies, particularly in the development of an integrated waste management system. They found the organizational structure of the program is multilayered and spread out over a wide geographic area, with highly fragmented decision making being shared between DOE personnel, the management and operations (M&O) contractor, other private contractors, the national laboratories, and the U.S. Geological Survey[8].

Given these highly critical remarks, the final report should present conclusions and recommendations about the adequacy of the DOE's institutional, organizational, and management abilities that will be needed to carry out the plans and the programs for managing current and future waste inventories. Furthermore, because so many uncertainties plague the DOE's existing repository program and because management decisions are diffused and uncoordinated, we contend that the program remains in a permanent state of transition.

While the draft report claims that the DOE's current waste management program is flexible and adequate to manage future waste from new nuclear power plants, the facts presented in the draft report do not support this finding. The DOE has yet to demonstrate that its waste management program is in compliance with key requirements of the Nuclear Waste Policy Act as amended. The DOE has failed to write a comprehensive update to the Mission Plan, as required by the Act. This has left the Congress and the people of Nevada without a concise up-to-date description of the program. Hence, without a Mission Plan, without a credible Site Characterization Plan, and without regulatory standards to guide site characterization at Yucca Mountain, we think that the DOE cannot make a determination on the adequacy of its existing program.

The DOE's repository program simply lacks the management structure to implement a fully integrated waste management system. The final report should reflect this situation rather than postulate that the program is adequate and flexible to

manage existing and future wastes generated by the commercial power industry and DOE defense activities.

• Program Contingencies: The draft report makes the following statement: "Major facilities for storage, transportation, and disposal have not been sited, and final designs for their construction have not been developed ... therefore, the system design can be adjusted to meet new requirements." The present plan calls for the Yucca Mountain site to be the first repository. There are no backup sites under consideration, nor are there any contingencies under contemplation. Thus, should there be a need to abandon the Yucca Mountain site, the system cannot "be adjusted to meet new requirements."

In addition, the draft report asserts that the disposal capacity of the first repository is now an objective of site characterization, which is simply not the case. The objective of the Yucca Mountain Site Characterization Plan clearly indicates that the site is being characterized for 62,000 MTHM of spent fuel and the equivalent of 8,000 MTHM of defense high-level waste. Even if the Congress were to decide to adjust the waste cap, stipulated under the Nuclear Waste Policy Act (i.e. 70,000 MTHM), because the draft report failed to estimate the waste emplacement capacity of Yucca Mountain, means that DOE cannot assume that additional repositories will not be needed in the near term.

• Regulatory Constraints: Section 801 of the Energy Policy Act of 1992 requires the Environmental Protection agency (EPA) to promulgate new health-based dose standards to protect the public from the release of radioactive materials at the Yucca Mountain site. The law further requires the EPA to contract with the National Academy of Sciences for the recommendation of the new standards. The law then compels the Nuclear Regulatory Commission (NRC) to conform its regulatory requirements and criteria to the new EPA standards.

While the draft report ignores issues pertaining to regulatory compliance, the final report should acknowledge that it is likely that new dose rates and new release standards will emerge from revisions to existing regulatory strategies contained in 40 CFR 191. The report should also acknowledge that when

regulatory problems have been encountered in the past, the DOE has simply lobbied the Congress to rescind the obstacle concerning regulatory compliance.

We note for example, a 1992 document issued by a DOE Contractor[9], which concludes that release of gaseous Carbon-14 from a repository at Yucca Mountain was problematic and that solving the issue could be accomplished only by continuing to "interact with the EPA" concerning revisions to 40 CFR Part 191, including the containment requirements for Carbon-14. Carbon-14 is a problem for repository sites, such as Yucca Mountain located in the unsaturated zone. Congressional action implementing Section 801 of the Energy Policy Act was the result of the Carbon-14 controversy, which suggests that when the DOE encounters problems pertaining to regulatory requirements, the notion of flexibility implies correction of the problem at the legislative level rather than at the programmatic or technical level. Accordingly, the notion of flexibility, which is the key to DOE's finding of adequacy in the draft report implies flexibility to amend the Act, which the DOE has so successfully promoted for the past several years.

III. ISSUES THE REPORT SHOULD NOT ASSESS

It appears that the main thrust of the draft report is to encourage congressional support for a new spent fuel reprocessing technology along with an un-proven, yet to be demonstrated, liquid metal actinide burning reactor concept. The report calls this the "Partitioning and Transmutation Case for Spent Nuclear Fuel and High-Level Radioactive Waste."

We contend that this section of the draft report should be completely eliminated. Reprocessing commercial spent fuel through the use of a pyro-chemical reprocessing method to produce fuel elements for an actinide burning reactor is an unproven technology, which may require decades of development. Moreover, if the DOE remains intent on "marketing" this technology, then the final report should at least assess the associated research and development costs for establishing new reprocessing plants, fuel fabrication facilities, and liquid metal reactors.

Instead of projecting associated costs for these technologies, or addressing the difficulties inherent in co-

mingling canisters containing spent fuel and canisters containing corrosive salts in a single repository, the draft report only focuses on the wide margin of uncertainty about the waste volumes that would be generated by the unproven technology. On the issues of co-mingling, we are aware that scientists from the DOE's Argonne National Laboratory[10] have suggested that co-mingling pyro-process waste with spent fuel from light water reactors would likely complicate the licensing process for the first repository. As might be expected, however, the anticipated problems associated with co-mingling of different waste types in a single repository were not addressed in the draft report.

ENDNOTES

[1] Comments by the State of Nevada, Section 803 -- Energy Policy Act of 1992, April 6, 1993. Agency for Nuclear Projects, Nuclear Waste Project Office.

[2] Statement by the Agency for Nuclear Projects, Nuclear Waste Project Office to the U.S. Department of Energy on a draft congressionally required report titled " Adequacy of Management Plans for the Future Generation of Spent Nuclear Fuel and High-Level Radioactive Waste (Draft for Public Comment)." The statement was given at a public meeting held in Las Vegas on July 20, 1993.

[3] U.S. Department of Energy, Spent Fuel Background Report, Predecisional Draft, June 25, 1993 (Page 3-2).

[4] The variation in the number of HLW canisters that might be produced for final disposal in a federal repository range between between 15,000 and 21,000 -- to more than 200,000. See Sixth Report to the U.S. Congress and The U.S. Secretary of Energy, Nuclear Waste Technical Review Board, December 1992, page 24.

[5] In comments submitted on DOE's annotated outline for the Section 803 report, the Nuclear Regulatory Commission suggested that "in order to determine repository capacity needs in the future, it will be necessary to establish some common unite of measure for these different waste types", (i.e., waste materials form boiling-water and pressurized-water reactors, D&D waste and HLW from defense installations such as glass logs and solidified sludges).

[6] Amendment to the Nuclear Waste Policy Act (Title V of P.L. 100-2003, section 161(b)).

[7] NWTRB, Special Report to the Congress and the Secretary of Energy, Nuclear Waste Technical Review Board, March 1993, page 14.

[8] Only 12 percent of the 2,000 people working on OCRWM's repository program are DOE employees, the rest are considered agency contractors.

[9] Yucca Mountain Site Characterization Project, Report of Early Site Suitability Evaluation of the Potential Repository Site at Yucca Mountain, Nevada, January 1992. Science Applications International Corporation, SAIC-91/8000.

[10] Use of Transuranic elements form LWR Fuel in Integral Fact Reactors, Report ANL-IFR-165, Johnson T.R., L. Burrios, N.M. Levitz and R. N. Hill, February 1990.

STATE OF NEVADA
EXECUTIVE CHAMBER
Carson City, Nevada 89710

BOB MILLER
Acting Governor

TELEPHONE
(702) 885-5670

November 14, 1989

The Honorable James D. Watkins
Secretary of Energy
1000 Independence Avenue
Washington, D.C. 20585

Dear Secretary Watkins:

In view of your announced current effort to restructure the U. S. Department of Energy Nuclear Waste Policy Act program, I believe it is important that I provide you with some of our information and thoughts on the Yucca Mountain Project that may bear on your upcoming decisions.

You will find attached to this letter a brief description of three elements regarding the geotechnical suitability of Yucca Mountain for a geologic repository which the State of Nevada believes should cause the site to be disqualified from further consideration. These are in the areas of (1) the potential for future human intrusion, (2) tectonics, including faulting and vulcanism, and (3) groundwater travel time. Each of these topics has been discussed in past State of Nevada comments on the Draft Environmental Assessment for Yucca Mountain, the Consultation Draft Site Characterization Plan, and most recently, the Site Characterization Plan. However, because of the importance of these issues, I believe they should be brought directly to your attention during your current program evaluation and restructuring.

As you will see from the attached discussion, there is no question that Yucca Mountain is located within a rich mining district that will remain attractive for exploration and development for many years in the future. Because of this location, it is essentially assured that Yucca Mountain and its nearby surroundings, at some time in the future, will be intruded in search of valuable mineral resources, regardless of what any current natural resources evaluation at the site might conservatively conclude. Such a potential for future human intrusion simply cannot be eliminated or even mitigated through either engineering means or passive controls over the long period

of time required for waste isolation. This attribute of Yucca Mountain, alone, is sufficient reason for you to find, now, that the Yucca Mountain Site is disqualified pursuant to the intent of Section 112(a) of the Nuclear Waste Policy Act, and the DOE siting guidelines (10 CFR Part 960) which were promulgated to implement that section of the Act.

The existing information regarding the number and ages of geologic faults intersecting and associated with the Yucca Mountain Site, coupled with the extremely complex tectonic and hydrologic setting of the site, should certainly serve as a warning that there is significant risk of disruption of repository performance during the waste isolation period. It is also highly questionable whether geophysical technology exists, or can become available by the time needed, to test the site parameters necessary for characterization of the tectonic setting and site performance assessment. If the standards of conservative technical judgment and the use of reasonably available technology called for in the DOE siting guidelines are applied, as they must be, once again, there exists now, sufficient reason for disqualification of the site pursuant to the guidelines.

In the area of hydrology, as related to groundwater travel time evaluations, the DOE appears to have abandoned any pretext of conservative scientific assumptions, and has embraced with enthusiasm an unwarranted optimism.

While a thick unsaturated zone surrounding a geologic repository may appear beneficial to waste isolation in a generic sense, characterizing that zone at Yucca Mountain sufficiently to assure an understanding of present groundwater movement is beyond available hydrologic modelling and testing capabilities. Furthermore, the ability to validate such models, as is required for use in long-term performance assessment relative to the site hydrology, does not exist at present, and likely cannot be achieved within the time period available for site characterization. The scientific community acknowledges that the science of unsaturated zone hydrology necessary for characterization and modelling of future performance is in its infancy. It further recognizes that it will take considerable basic research and time, first in settings less complex than Yucca Mountain, to bring this discipline to a level of maturity and validation sufficient for acceptable application to the Yucca Mountain project.

Aside from the problem of hydrologic modelling of the unsaturated zone, Nevada's previous reviews and comments have pointed out that conservative calculations using DOE's Yucca Mountain data can show that the NRC's groundwater travel time standard for licensing would be violated, even if DOE's optimistically postulated slow matrix flow condition prevails. Evaluation of existing data shows that the faster, fracture flow condition exists, and suggests that it likely prevails. Therefore,

the DOE guidelines requiring use of both reasonably available technology and the application of conservative technical judgment cannot be met, again providing sufficient reason now for you to determine, pursuant to the guidelines, that the Yucca Mountain site is disqualified.

In addition to the evidence attached and summarized above which should result in your immediate disqualification of the Yucca Mountain site, there are further factors which I would like to bring to your attention prior to your announcement of decisions regarding restructuring of the Nuclear Waste Policy Act program.

As I am sure you are aware, it has been my belief that the Nevada Legislature's adoption, and my signature of Assembly Joint Resolutions Number 4 and 6, in early 1989, constituted a Notice of Disapproval of the Yucca Mountain site, pursuant to the Nuclear Waste Policy Act. The Notice became effective once these resolutions opposing, and refusing State consent for, a repository were transmitted to the Congress as required by law. In order to reassure myself on this matter, I requested an opinion from the Nevada Attorney General regarding the validity of the resolutions as a Notice of Disapproval. For your information, I have attached a copy of the Attorney General's Opinion, which finds that the Notice is valid and that the Congress failed to respond in the manner required by the Nuclear Waste Policy Act. Therefore, it is Nevada's position that the Yucca Mountain site has been lawfully vetoed, and that the DOE's authority from Congress to pursue the Yucca Mountain site as a nuclear waste repository has terminated.

As you are also aware, there are numerous obstacles that have already, or likely will continue to halt or impede progress on the Yucca Mountain Project, only some of which are within your ability to control and resolve within the Department of Energy. The following are a few examples of obstacles in addition to those discussed in the attachments to this letter: there are at least two unrelated endangered species issues which must be reconciled with the federal agency of jurisdiction; acquisition of protested, although needed water rights from the State of Nevada for the Yucca Mountain project must be accomplished; numerous lawsuits regarding both the DOE's programmatic implementation of the Nuclear Waste Policy Act and the Yucca Mountain Project are pending, any one of which could invalidate key past actions of the DOE and cause significant further delays and reversals; and, there are significant unresolved issues regarding the compatibility of the missions of the Nevada Test Site and the Nellis Air Force Range with acceptable nuclear waste management and isolation at Yucca Mountain.

I must also remind you that it is of more than passing interest that the people of the State, joined by the Legislature, are firmly resolved to oppose the imposition on Nevada of a disposal site for the nation's commercial nuclear waste. The

singling out a state for imposition of such an unwanted federal intrusion is without precedent in our nation's history, and rightfully so. I, as Governor, cannot permit Nevada's rights as a state to be so abridged without exhausting every available challenge.

In light of your responsibilities as the federal official charged by law with implementation of the Nuclear Waste Policy Act and prudent administration of the ratepayer-funded Nuclear Waste Fund, I believe you are compelled now to exercise your duty under the Nuclear Waste Policy Act and inform the Congress, and the Governor and legislature of Nevada, that you have removed the Yucca Mountain site from further consideration as a high-level nuclear waste repository.

It is my hope that you will consider seriously the matters I have presented in this letter before proceeding with any decisions to restructure the Nuclear Waste Policy Act program and the Yucca Mountain Project.

Sincerely,

Bob Miller

Bob Miller
Governor

Attachments (2)

SUMMARY STATEMENT OF GEOLOGIC AND HYDROLOGIC DEFICIENCIES SUPPORTING DISQUALIFICATION OF THE YUCCA MOUNTAIN POTENTIAL NUCLEAR WASTE REPOSITORY SITE

INTRODUCTION

Section 113(c)(3) of the Nuclear Waste Policy Act, as amended by the NWPAA of 1987, provides, in part, as follows:

> "If the Secretary at any time determines the Yucca Mountain site to be unsuitable for development as a repository, the Secretary shall -
>
> (A) terminate all site characterization activities at such site;
>
> (B) notify the Congress, the Governor and the legislature of Nevada of such termination and the reasons for such termination;
>
> (C) . . .
>
> (D) take reasonable and necessary steps to reclaim the site and to mitigate any significiant adverse environmental impacts caused by site characterization activities at such site;
>
> (E) . . .
>
> (F) report to Congress not later than 6 months after such determination the Secretary's recommendations for further action to assure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority."

Sufficient information exists to compel the conclusion that Yucca Mountain is unsuitable for development as a repository and thus to invoke the provisions of §113(c)(3). This information has been developed by the Department of Energy (DOE) itself, or its contractors, and thus is found in the agency's records, or has been developed or brought to DOE's attention by the State of Nevada, the Nuclear Regulatory Commission (NRC), or others, and is thus reasonably available to the Secretary. This Statement will set forth that information, and demonstrate how it requires that the site be found unsuitable.

Before proceeding a disclaimer is necessary, however. Nevada's primary message in this Statement is that under the Secretary's final guidelines for siting nuclear waste repositories, adopted as required by the NWPA, disqualifying factors clearly exist. Further efforts to demonstrate the site's suitability would prove fruitless, and thus characterization should not proceed and work at and in support of the Yucca Mountain site should be terminated under the provisions of §113(c)(3) of the NWPA, as amended. The State believes that those guidelines are invalid under the NWPA, and has challenged them under §119 of the Act in the Ninth Circuit Court of Appeals. See Nevada v. Watkins, No.

85-7308 (managed under EPI v. Watkins, No. 84-7854).[1] In showing unsuitability under those guidelines in this Statement, Nevada, in no way intends to concede their validity or operative effect as to the State, or to retreat from any of the positions stated in its Petition for Review which is pending before the Ninth Circuit. Even though they may not be applied to the disadvantage of the State of Nevada, until those guidelines are declared invalid by the courts, they bind the Secretary in his conduct of the repository siting and development program. Even under those guidelines, invalid as they may be, sufficient information exists in the current record, or is reasonably available to the Secretary, to conclude that Yucca Mountain is disqualified under his own siting guidelines, and thus to compel his abandonment of any further efforts to characterize the site.

Recent events make crystal clear that the Department's repository siting program has arrived at the point where prudence dictates that no further expenditure of federal, or state, time and effort, or rate-payers' money, is warranted on attempting to qualify the Yucca Mountain site under the Secretary's own siting

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[1] In that challenge, Nevada, as well as the other petitioners, assert that the Secretary's final guidelines do not go far enough; that they do not contain enough disqualifying factors, that certain potentially adverse conditions should in reality constitute disqualifying factors, and that certain other considerations required under §112 of the NWPA, which would themselves mandate disqualification of the Yucca Mountain site, are missing from the guidelines entirely. We thus take the position, in that litigation, that had the Secretary in 1984 adopted guidelines strictly in compliance with the requirements of the NWPA the Yucca mountain site would not have gotten as far as it has in this process.

guidelines. The camel will simply not pass through the eye of the regulatory needle. The State hopes that this document will show, to the informed and objective reader, that in three specific areas at least, the site is, and will remain disqualified.

THE ROLE OF THE GUIDELINES

Section 112(a) of the NWPA, 42 USC 10132, requires the Secretary to adopt guidelines which:

> "shall <u>specify</u> detailed geologic considerations that shall be primary criteria for the selection of sites in various geologic media. Such guidelines shall <u>specify</u> factors that qualify or disqualify any site from development as a repository, including factors pertaining to the location of valuable natural resources, hydrology, geophysics, seismic activity, and atomic energy defense activities, proximity to water supplies, . . . ". (Emphasis supplied

The Secretary did adopt such guidelines, roughly a year and a half later than the statute required. 10 CFR Part 960. The guidelines contain various qualifying, disqualifying, favorable and potentially adverse conditions. This Statement will focus primarily on three disqualifying conditions, in the areas of

mineral resources (human intrusion), tectonics, and hydrology (ground water travel time).

The guidelines contain, as good science and prudence would require, a significant constraint on the Secretary's handling of the scientific information developed in the course of the siting process. That is, conservative assumptions must be throughout. Section 960.3-1-4-2, which is part of §960.3-1-4, Evidence For Siting Decisions, provides, in part, as follows:

> "In developing the above-mentioned bases for evaluation, as may be necessary, assumptions that approximate the characteristics or conditions considered to exist at a site, or expected to exist or occur in the future, may be used. These assumptions will be realistic but conservative enough to under-estimate the potential for a site to meet the qualifying condition of a guideline; that is, the use of such assumptions should not lead to an exaggeration of the ability of the site to meet the qualifying condition." (Emphasis supplied)

That provision is explained in the supplementary information to the guidelines themselves, at 49 FR 47728, (12/06/84) as follows:

> "Included in the provision for evidence is a discussion about the use of assumptions. Before site characterization is completed, preliminary assessments of the potential of the site to meet the qualifying conditions

must necessarily employ judicious assumptions where definitive data are missing. Many commentors were concerned that consistent optimism in such assumptions would create benefits out of deficiencies in the scope of field testing and research undertaken by the DOE. Accordingly, §960.3-1-4 only allows the use of assumptions that would tend to underestimate the ability of a site to meet the qualifying conditions. Such assumptions are commonly termed 'conservative' because they are chosen to minimize the possibility that later findings will prove the assumptions to be wrong. This is a commonly used approach in engineering and in scientific predictions. Where some data exists, a statistical range of uncertainty may constrain the latitude of such assumptions. Even where no direct data exist, it is often possible to establish a sufficient conservative range of values by examining comparable situations in nature and by inference from related phenomena."
(Emphasis supplied)

Unfortunately, as many commentors (including Nevada) suggested even in 1983 and 1984, consistent optimism in DOE's assumptions continues to pervade the Department's entire technical program. In the simplest terms, Nevada's argument can be summarized as follows: The Secretary is required, not only by good science and the prudence required of him as fiduciary, but his own guidelines, to apply conservative assumptions where uncertainty exists in the data available to him at any stage in the siting process. The application of such conservative assumptions, at least in the areas of natural resources (human intrusion), tectonics and hydrology, require him to conclude, at this stage, that not only will the qualifying conditions of the guidelines not be met at the conclusion of site characterization, but that the disqualifying conditions applicable in each of those cases currently exist.

NATURAL RESOURCES (HUMAN INTRUSION)

Two guidelines sections are directly applicable, and require a determination, based on the current record, that the Yucca Mountain site is unsuitable for development as a repository.

Section 960.4-2-8, Human Interference, reads as follows:

> "The site shall be located such that activities by future generations at or near the site will not be likely to affect waste containment and isolation. In assessing the likelihood of such activities, the DOE will consider the estimated effectiveness of the permanent markers and records required by 10 CFR Part 60, taking into account site specific factors, as stated in §§960.4-2-8-1 and 960.4-2-8-2, that could compromise their continued effectiveness."

The natural resource postclosure disqualifying condition, §960.4-2-8-1(d), reads in part as follows:

> "The site shall be disqualified if -
> (1) . . .
> (2) Ongoing or likely future activities to recover presently valuable natural mineral resources outside the controlled areas would be expected to lead to an inadvertent loss of waste isolation."

This section provides that a site must be located in a place where "activities by future generations at <u>or near the site</u> will not be likely to affect waste containment and isolation." The record currently indicates, as will be demonstrated, that the Department must assume that some exploration activities by future generations will take place, if not at, then certainly near the site. The Department must also assume that those activities may affect waste containment and isolation. Likewise, the Department must assume that the estimated effectiveness of the permanent markers and records required by 10 CFR Part 60 will be less than 100 percent - that they will be unable to prevent <u>all</u> human intrusion. Again, with respect to the disqualifying condition, the Department must assume, based on the present information available to it, that future exploration will take place to recover valuable natural resources outside of the controlled area, and that those activities should be expected to lead to some inadvertent loss of the waste isolation capability of the site.

Numerous Nevada ore deposits demonstrate common geologic features, many of which exist within the Yucca Mountain area. These features include certain types of rock alteration, and a distinct geochemical signature (gold, silver, arsenic, mercury, antimony, molybdenum, zinc, barium, and fluorine). Also these ore

deposits are commonly found along and within faults and breccia zones, and are often associated with felsic or granitic dikes, plugs, sills, and stocks. Late stage barite (with or without fluorite) veins is common. All of these features exist within the immediate Yucca Mountain area.

Economically important mineralization within hydrothermal mineral deposits is obvious in several locations in the Yucca Mountain region. This is true in the Bullfrog Hills and at Bare Mountain, and probably at Wahmonie as well. In Bullfrog Hills, ore grade gold/silver mineralization is largely hosted by rocks of the Timber Mountain-Oasis Valley caldera complex and has been in the past, is currently, and will certainly in the future be exploited.

The Yucca Mountain area presents a favorable geologic environment in which to find hydrothermal mineral deposits. Hydrothermal activity has taken place as a result of repeated magmatic and volcanic activity. The area has abundant faults, and a complex structural history. Gold Bar, Sterling, Daisy and Bond Bullfrog are producing mines in the vicinity of Yucca Mountain. Other mines in the vicinity, such as Gexa's Mother Lode, are currently in the development stage. Other areas, such as the Cordex claims (Bare Mountain), Transvaal and Thompson Mine northwest of Yucca Mountain, and the Calico Hills, Wahmonie, and

Mine Mountain areas within the Nevada Test Site are areas with geochemistry and geologic conditions favorable to mineral exploration.

Typical host rocks of mineral deposits in the Yucca Mountain area include dacitic to rhyolitic volcanic rocks and Paleozoic sedimentary rocks. Silicification, adularia, and argillic alteration are present and the mines and prospective mines show similar chemical signatures, such as elevated concentrations of one or more of the following: gold, silver, barium, arsenic, antimony, lead, copper, zinc, molybdenum, mercury, and fluorine. Favorable structures exist, such as faults, breccias and contacts, and dikes, plugs, and stocks are present in the area.

Yucca Mountain contains features that are suggestive of mineral potential. Hydrothermal alteration of the type associated with epithermal mineralization is clearly evident in the very limited published data from the subsurface of Yucca Mountain. In the subsurface hydrothermal mineral assemblages include quartz, illite, albite, K-feldspar, chlorite, calcite, pyrite, fluorite, and barite. The data available show elevated concentrations of fluorine, barium, zinc and gold in the subsurface. Elevated concentrations of arsenic, antimony, mercury, zinc, molybdenum, lead, and gold are present in altered rocks in Trench 14, less than

1 mile from the repository site. Elevated arsenic, mercury and gold concentrations are also present at the surface of Yucca Mountain in the Prow Pass and Claim Canyon areas. The elevated concentrations of one or more of these elements at various locations demonstrate that the hydrothermal system or systems were metal bearing. Radiometric dating and stratigraphic relations show that hydrothermal activity at Yucca Mountain is the same age as hydrothermal activity and mineralization in the Bullfrog Hills, northern Bare Mountain, Transvaal, Calico Hills, and Mine Mountain areas. The same volcanic rock units of which Yucca Mountain is composed host gold/silver ore at Gold Bar, Bond Bullfrog, the Cordex prospect, and at Mother Lode deposit. Finally, Yucca Mountain contains numerous faults and breccias, and high permeability channels that could have been favorable conduits for hydrothermal fluid circulation and mineral deposition.

The recent discoveries of mineral deposits in areas near, and even adjacent to, Yucca Mountain reflect increased and successful mineral exploration in the region. Such discoveries and successful exploration efforts make hydrothermally altered areas of the southern part of the southwestern Nevada volcanic field much more attractive to explorationists than was the case in the past.

In summary, the Yucca Mountain site is within an area of

widespread base and precious metal mineralization. Currently there is intense mineral exploration and development in all areas surrounding Yucca Mountain that are open to entry. Because, historically, where known or perceived mineralization exists, exploration and the resulting human intrusion has always taken place, it must be assumed that will be the case here, and that human intrusion, affecting the Yucca Mountain site, will also take place in the future, certainly during the 10,000 to 100,000 years within which the emplaced spent fuel and high-level waste must be isolated.

All of the information discussed above suggests that valuable mineral resources in the immediate area surrounding Yucca Mountain must be recognized, along with the potential for resulting human interference and intrusion at the site. Yucca Mountain is surrounded by nearby mineral districts that host at least one world class gold deposit (Bullfrog).

The presence of extensive subsurface rock alteration, a feature characteristic of hydrothermal mineral deposits, and being within an area already containing valuable working mines, means that the Yucca Mountain area will unquestionably attract exploration in the future. Explorationists, as history has proven time and time again, are much more likely to test even those areas

with the least promising surface characteristics when they find themselves in such a prolific area. In fact, in any particular area exploration is rarely a one shot effort. Repeated testing, often separated by years or decades, by successive companies, is the norm rather than the exception. This is particularly true during times of favorable metal prices, a factor which is and will remain, totally outside of the control of DOE.

The Department should recognize the evidence it has at hand and disqualify the Yucca Mountain site on the basis of the human interference guideline.

TECTONICS

The tectonics disqualifying condition, §960.4-2-7(d) reads as follows:

> "A site shall be disqualified if, based on the geologic record during the Quaternary period, the nature and rates of fault movement or other ground motion are expected to be such that a loss of waste isolation is likely to occur."

In Chapter 1 of its SCP DOE acknowledges that there are 32 active (Quaternary) faults that either transect or immediately surround the Yucca Mountain site. Such faults are found within the repository block itself. Additionally, late Pleistocene/Holocene volcanic activity exists in the near vicinity of the site. It is not acceptable to assume, under the guidelines, that any of the active faults, particularly those transecting the repository block itself, can be described in sufficient detail to ever resolve with reasonable assurance whether the nature of the present system is such that waste can be safely isolated. Most significantly, future movement on the active faults transecting and bounding the repository block (and some must be conservatively assumed) presents an unacceptable condition for predicting, with reasonable assurance that there will be no loss of waste isolation. Movement on faults will alter the repository geometry in an unpredictable manner. This, for example, could result in open pathways for water movement into and through the repository, thus destroying the integrity of the natural barrier and creating significant pathways to the accessible environment, along with extremely short ground water travel times.

Any movement on these active faults, whether from seismic creep, significant earthquakes on other nearby fault systems, or induced stress from DOE's underground nuclear explosions at the adjacent Nevada Test Site, has the distinct potential for causing

or continuing a condition where waste isolation will be adversely affected, or lost entirely. The nature of the changes brought about by these kinds of conditions is entirely unpredictable, and it is impossible to demonstrate that they will not occur.

NRC regulations (10 CFR 60, 10 CFR 100, Appendix A), and the methodologies and principles employed therein, also provide a de facto disqualifier in this area. Under 10 CFR 60.122(c)(4) and (11) the presence of active (Quaternary) faulting is a potentially adverse condition. Such a condition may compromise the ability of the repository to meet the performance objectives relating to waste isolation. Unless such faulting can be thoroughly investigated (10 CFR 60.122(a)(2)(i)), adequately evaluated using conservative assumptions (10 CFR 60.122(a)(2)(ii)), and shown not to affect significantly the waste isolation capability of the site, it should be considered, as a practical matter, taking into account historical NRC treatment of active faulting near nuclear facilities, unlicensable, and thus disqualified.

The preclosure guidelines also contain a disqualifying tectonic condition, §960.5-2-11(d), which reads as follows:

"The site shall be disqualified if, based on the expected nature and rates of fault movement and other ground

motion, it is likely that engineering measures that are beyond reasonably available technology will be required for exploratory-shaft construction or for repository construction, operation, or closure."

The presence of active faults transecting and bounding the proposed repository block presents a formidable engineering problem. Furthermore, the Department has not demonstrated that there is "reasonably available technology" to deal with those problems now, nor is it likely to be available in the near future. Of particular concern are the hazards associated with possible fault rupture during repository construction and operation.

Several other major problems exist. For example, the sealing problem may be one that cannot be demonstrated to have been resolved. Once the nature of the disturbed zone surrounding all repository openings including faults has been sufficiently characterized (assuming this is possible) between the repository horizon and the saturated ground water system there is the much more difficult problem of developing and demonstrating the adequacy of seals for the faults, as well as for the extensive number of bore holes that will be required to describe them. In developing the sealing program it must be conservatively assumed that movement will occur on one or more of these faults within the next 10,000 to 100,000 years ((§960.4-2-1(b)(2) and §960.4-2-1(d)). Further problems exist with respect to the faults and the disturbed zone

surrounding them relative to canister placement, performance allocation and performance assessment. Because the physical configuration of each emplacement hole and the spacing between holes must be assumed, conservatively, to change unpredictably with time, and because it must be assumed that any such changes will affect waste isolation, realistic performance allocation and assessment will be impossible.

HYDROLOGY (GROUND WATER TRAVEL TIME)

The disqualifying condition for ground water travel time, §960.4-2-1(d), reads as follows:

> "The Site shall be disqualified if the pre-waste emplacement ground-water travel time from the disturbed zone to the accessible environment is expected to be less than 1,000 years along <u>any</u> pathway of likely and significant radionuclide travel." (Emphasis supplied)

The available evidence not only supports, but literally demands, a finding that this disqualifying condition exists at the Yucca Mountain site.

The Department's conceptual model of the Yucca Mountain hydrogeologic system is simplistic and not conservative in nature. It assumes that rock matrix flow (water flow within the interconnected pore spaces of the rock itself) will not only dominate, but fracture flow (water flow along ruptures or breaks in the rock) will be absent. It assumes uniformly distributed infiltration from the surface, an absence of existing water, such as perched water or locally saturated zones within the vadose (unsaturated) zone, and it assumes that there will be essentially no net recharge available (less than 1 mm/yr). Based on these optimistic assumptions, extremely long predicted ground-water travel times are calculated by the Department.

The Department was shown, as long ago as March of 1985, when the State submitted its comments on the Draft Yucca Mountain Environment Assessment, that travel times may be much shorter, on the order of 970 years, <u>even while using</u> the Department's preferred matrix flux conceptual model (see <u>Nevada's comments on DOE's Draft EA, Volume II, Specific Comments of the Water Resources Center, Desert Research Institute, The University of Nevada System</u>, at pages 36-39). Even if the Department's rather simple conceptual model of the hydrologic system is applied, conservative calculations would lead to ground-water travel times less than those required in the disqualifying condition.

The Department should recognize the evidence that indicates fracture flow, and assume that it predominates, if not throughout the repository block, then certainly in some portions of the vadose zone. It should further assume that some of these fractures or fracture networks are interconnected from the surface to the repository horizon and from there to the ground-water table.

Water has been encountered within the vadose zone (which is typically more than 60 percent saturated) in the form of perched water or zones of saturation. This leads to the conclusion that fracture flow likely will produce pre-waste emplacement ground-water travel times along a pathway (and no more than one is required under the guideline), of less than 1,000 years. And, it is probably impossible to demonstrate that this is not the case.

The Department currently has ample evidence for the existence of fracture flow in the vadose zone. Fracture flow has been demonstrated to exist in similar tuffs at Rainier Mesa, where an extensive database exists. (Russell, C. E. 1987, "Hydrogeologic Investigations of Flow In Fractured Tuffs, Rainier Mesa, NTS," MS Thesis, University of Nevada, Las Vegas; and Thordarson, W., 1965, "Perched Groundwater In Zeolitized-Bedded Tuff In Rainier Mesa and

Vicinity, NTS", NV.; U.S. Geological Survey Preliminary Report TEI862).

Recent Chlorine-36 data from Yucca Mountain indicate fracture flow from the surface to a depth of approximately 500 feet over relatively short periods of time in borehole UZ1 (North, A. E., 1989, "The Use of Chlorine Isotope Measurements To Trace Water Movements At Yucca Mt.," LA-UR-89-2573, in press-proceedings of American Nuclear Society Topical Meeting-Focus 89, September, 1989).

The Department has demonstrated water within the vadose zone capable of being transported through the repository to the water table, and from there to the accessible environment. DOE drilling has encountered saturation within the vadose zone, in drillhole UZ4, UZ1, and H1. Free water was directly observed in core from UZ4 in September of 1984 by Nevada scientists. Reports for UZ1 and H1 show the presence of saturation as well. The presence of liquid water is direct evidence of fracture flow.

The Department should conservatively assume a reasonable net recharge to the hydrologic system. USGS studies prior to the repository program estimate a net recharge for the area of about

4.5 mm/yr. The Department has acknowledged that if vertical flux is greater than about 1 mm/yr, fracture flow will likely occur, if not predominate. The 4.5 mm/yr rate itself is a reasonable, but not overly conservative estimate. A conservative assumption would hold the 4.5 mm/yr estimate to be a modern climate value only, and that future infiltration and corresponding flux rates will, at least at times, be greater during climatically wetter periods, similar to those well documented during the Quaternary in the region. This, coupled with the 1 mm/yr fracture flow threshold, should disqualify the site.

Authigenic mineralization in the fracture system at Yucca Mountain also indicates that fracture flow exists. The minerals would not have formed without the presence of fracture flow. The presence of minerals such as zeolites located just below the repository horizon indicates massive water interaction with the volcanic glass. Therefore, mineralological evidence suggests that vadose zone water is being transported in fractures in the stratigraphic zone between the surface of Yucca Mountain and the Calico Hills formation below the repository horizon. The Calico Hills formation has been shown to be highly fractured, and therefore must be assumed to have the capability to transport these vadose zone waters to the saturated zone in a short period of time.

The Department recognizes that fracture flow will be fatal to the project. As recently as December 13, 1988, in an address to the 20th Annual Meeting of the NRC's Atomic Safety and Licensing Board Panel, Dr. Maxwell Blanchard of the Yucca Mountain Project staff said:

> "Also, the current evidence indicates that water flow is mostly confined to rock matrix. And I want to talk a little bit about that later, because, that is a fundamental characteristic of waste isolation in the unsaturated zone. <u>If that is not true, we probably do not have a viable site</u>." (Emphasis supplied)

The Department should recognize the existence of fracture flow and acknowledge, for that reason along, that Yucca Mountain is not a "viable site".

The existing data base also suggests that there is active soil gas circulation in the vadose zone at the Yucca Mountain site. If that is the case, then clearly such active upward gas circulation will represent the fastest path to the accessible environment at the ground surface immediately above the repository. Such soil gas circulation will surely provide a means for rapid radionuclide migration (C 14, I 129, Tritium) from failed canisters to the accessible environment well faster than the required minimum

1,000 year travel time. Any site with such a known or suspected condition does not merit further consideration as a repository.

CONCLUSION

The technical deficiencies which are pointed out here can only become more acute with further study of the Yucca Mountain site. The active faults transecting and bounding the repository will remain, and their age will not change. The fact that some movement on those faults might occur is almost inescapable, and must therefore be anticipated. The extensive fracturing in the vadose zone at Yucca Mountain will continue to exist, and the affect of those fractures cannot be compensated for in performance assessment. The mineralization in the immediate area of Yucca Mountain will not disappear, and basic human drives for resource exploration will likewise remain. There is no question that as the nation's mineral resources become scarcer and the need for them grows, areas even less promising than the Yucca Mountain vicinity will become targets for mineral exploration.

Section 960.3-1-5 provides that:

> "A site shall be disqualified <u>at any time</u> during the siting process if the evidence supports the finding by the DOE that a disqualifying condition exists or the qualifying condition of any system or technical guideline

cannot be met." (Emphasis supplied)

The evidence supports such a finding for each of the disqualifying conditions discussed in this statement. The time has come to disqualify this site, and to initiate the action required by §113(c)(3) of the NWPA, as amended.

Western Governors' Association
Resolution 93-007

June 22, 1993
Tucson, Arizona

SPONSOR: Governor Bob Miller
SUBJECT: Independent Review of the Federal High-Level Radioactive Waste Disposal Program Under the Nuclear Waste Policy Act

A. BACKGROUND

1. Under the *Nuclear Waste Policy Act of 1982*, as amended (NWPA), the U.S. Department of Energy is responsible for managing and permanently disposing of commercially generated spent nuclear fuel and other high-level radioactive wastes. Funds for this effort are generated by a fee imposed on customers of utilities operating nuclear power plants. To date, DOE has spent over $2 billion from the fee supported trust fund attempting to carry out their responsibilities.

2. Since 1983, DOE's schedule for developing a facility for accepting and managing spent nuclear fuel and high-level waste has slipped by 12 years from 1998 to 2010.

3. Due to the problems with cost increases, schedule slippage and management deficiencies, calls have been made for a thorough independent review of DOE's NWPA program. In a report to the Clinton Transition Team in December, 1992, the U.S. General Accounting Office (GAO) recommended that there be a thorough review of the nuclear waste disposal program before further resources are committed to it.

4. In March, 1993, the U.S. Nuclear Waste Technical Review Board issued a special report to Congress and the President also recommending a review of the program and the way the effort is being managed by DOE.

5. In testimony to the Senate Energy and Natural Resources Committee prior to confirmation as Secretary of Energy, Hazel O'Leary agreed that review of the program is needed. Secretary O'Leary also stated that she believes an internal DOE review alone would be inadequate to restore trust and credibility to the nuclear waste disposal program.

6. In a January, 1993 report for the National Science Foundation, researchers Ralph Keeney and Detlof von Winterfeldt of the University of Southern California found that the current approach to nuclear waste management being pursued by DOE is $10 billion to $50 billion more expensive than other

available alternatives, such as dry cask storage or above ground monitored retrievable storage.

7. A group of over 90 national environmental and public interest organizations has formally recommended the current DOE nuclear waste program be put on hold and a Presidential blue ribbon commission be created to conduct a comprehensive review of the program.

8. In a May, 1993 report on DOE's nuclear waste program, the GAO found that the studies to determine if Yucca Mountain is a suitable site for a repository will take 5 to 13 years longer than planned and will cost considerably more than DOE's current estimate of $6.3 billion. The report also found that only 22 percent of the funds appropriated for the program are being used for site investigation activities. GAO recommended that the program be thoroughly reviewed by an agency other than DOE.

B. GOVERNORS' POLICY STATEMENT

1. While the western governors continue to support geologic disposal as an appropriate means of managing and disposing spent nuclear fuel and high-level waste, it is apparent that the current program as implemented by DOE is in serious jeopardy due to cost, schedule and management difficulties.

2. The western governors believe that there is evidence of fiscal and management problems with the U.S. Department of Energy civilian radioactive waste management program, and that program costs are likely to continue to escalate and schedule to slip even further unless effective action is taken expeditiously.

3. In order to effectively address these problems, a thorough review of DOE's program under the *Nuclear Waste Policy Act* must be undertaken. To be effective, such a review must:

   a. Be done concurrent with curtailment of the current site characterization program at Yucca Mountain to assure that resources are not inappropriately utilized and schedules are not further impacted while the review is under way;

   b. Be independent from DOE;

c. Include representation from affected states, tribes, utilities, ratepayers and other stakeholders affected by federal nuclear waste policy; and

d. Be comprehensive and involve exploration of a comprehensive range of alternatives to the current effort and examination of lessons to be learned from programs in other countries where nuclear waste management efforts are progressing.

4. The governors strongly urge that such a review be carried out under the authority of a presidential directive and that it be overseen by the Administration in such a way as to provide the necessary authority to implement the recommendations that may result from it.

C. GOVERNORS' MANAGEMENT DIRECTIVE

1. This resolution shall be conveyed to the President, the Vice President, the Secretary of Energy, the U.S. Government Accounting Office and appropriate members and committees of the Congress.

2. The Western Governors' Association staff shall monitor the implementation of this resolution and provide assistance as may be requested in the conduct of an independent review of the U.S. Department of Energy nuclear waste program.

BOB MILLER
Governor

STATE OF NEVADA

ROBERT R. LOUX
Executive Director

AGENCY FOR NUCLEAR PROJECTS
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August 17, 1993

Mr. Christopher A. Kouts
Acting Director
Strategic Planning and International Programs
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

RE: A PROPOSED ALTERNATIVE STRATEGY FOR THE DEPARTMENT OF ENERGY'S CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM. Task Force on an Alternative Program Strategy, March 31, 1993.

Dear Mr. Kouts:

We have reviewed the subject report, which was first issued by OCRWM Acting Director Lake Barrett, on April 30, 1993, only to those requesting it, and subsequently was issued for Public Review and Comment on July 15, 1993. As the agency responsible for the State of Nevada's oversight of the national high-level nuclear waste program, we have consistently reviewed and commented on DOE proposals, plans, and initiatives regarding the Yucca Mountain potential high-level nuclear waste repository site, and, thus affecting the interests of the State of Nevada.

At the outset, I must inform you that, despite the disclaimer in Lake Barrett's July 15 cover letter stating, "This report represents the views of the Task Force, and not necessarily those of the Civilian Radioactive Waste Management program or the Department of Energy.", we consider this report to represent the current views of the Office of Civilian Radioactive Waste Management since it is the only proposal offered for our comment. We also have reason to believe that it is the only alternative being proposed by OCRWM, since, upon our June 7, 1993, inquiry in this regard, we were informed by OCRWM Acting Associate Director, Office of Geologic Disposal Linda Smith (undated letter) that, "... the report will be considered in the external consultative process of Secretary O'Leary's review of the program. During that external

consultative process, it is possible that other alternative strategies will be proposed from organizations external to the department. (Emphasis added). This can only mean that OCRWM has no other alternative strategy proposal under consideration, and for which it seeks public comment. Long experience with OCRWM tells us that if this proposal did not represent the current views of the Office, it never would have been released alone for public review and comment. We also note that the Task Force report, and no other alternative program strategy, figured prominently in the Review Process discussed in the August 10, 1993, OCRWM Workshop on Developing a Consultative Process, held with over 100 representatives of interested parties, in Las Vegas.

This proposed alternative strategy represents only the latest manifestation of DOE's two greatest failings in execution of a national high-level nuclear waste program: 1) the sacrifice of scientific integrity and democratic principles of fairness and equity to an unyielding, unrealistic, artificially contrived schedule; and 2) the presumption that established policies and regulations always must be subject to change to meet the dictates of DOE's continually evolving program objectives, whether they be scientific, fiscal, or political.

When the masking effect of DOE's excursions into reinterpretation of the Congress's intent in passage of the Nuclear Waste Policy Act of 1982 is stripped away, it becomes clear that the Alternative Strategy is entirely driven by understanding of the nuclear utilities' expectation that DOE will accept their spent nuclear fuel for disposal in 1998, based on the terms of the Nuclear Waste Policy Act. But, under its current program, DOE will have no place to put the spent fuel by that date. In response, DOE has constructed a new program strategy that is maybe its most imaginative yet in perpetuating the two failures described above that have become so characteristic of its nuclear waste program.

The expectations of the nuclear industry are not entirely reasonable, nor has been DOE's response. For instance, 42 U.S.C. 10222(a)(5)(A) requires that DOE-spent fuel generator contracts provide that the "secretary take title to the high-level radioactive waste or spent fuel"... "following commencement of operation of a repository." Any contract provision or DOE action to the contrary contravenes the statute. In its Standard Contract for disposal (10 CFR 961), the DOE has failed to include this provision as a constraint on its performance that is, in effect, a prerequisite to beginning disposal of waste not later than January 31, 1998. (42 U.S.C. 10222(a)(5)(B)).

To the extent that the expectations of the nuclear industry might have reason, so too did the expectations of the State of Nevada before DOE and nuclear industry proponents encouraged statutory amendment to alter the basic bargain of the 1982 Nuclear Waste Policy Act by casting aside fair and equitable repository

site selection, scientific site screening, and stringent generally applicable repository safety standards in favor of political expedience.

Most of the alternative strategy now proposed by DOE is illegal under the Nuclear Waste Policy Act, even as now amended, and additional amendments will be required to implement the alternative strategy. For example:

1. The NWPA and required siting guidelines do not permit reliance on engineered barriers for the Secretary's determination of site suitability, and NRC's concurrence in these guidelines was conditioned on this issue, yet the alternative strategy clearly provides for such reliance in its "robust repository safety concept" proposal. The new concept, in fact, represents a blatant rejection of NWPA policy and the nearly fifty-year history of understanding that the basis of geologic disposal is that the natural conditions of the site constitute the primary barrier to loss of waste isolation.

2. The proposed refocusing of site studies to the "safety concept" rather on factors specified in the NWPA and required guidelines would require statutory amendment.

3. The proposed waste packaging R & D facility is not authorized by the NWPA, and because of its apparent intended function in waste receipt, in essence it would function as a monitored retrievable storage (MRS) facility in a manner requiring statutory amendment.

4. The proposed receipt and storage of waste at the repository site in multipurpose containers, as described in the alternative strategy represents just a MRS by another name, however the NWPA specifically prohibits locating the MRS within the same state as the repository site.

Rather than amending the Nuclear Waste Policy Act to permit an alternative strategy which continues to put Nevada and the environment at risk, it is now time to amend the Act, instead, to declare that DOE's timely (1998) performance on its waste acceptance contracts is impossible, and that the contracts must be amended to provide for waste acceptance <u>only</u> "following commencement of operation of a repository."

Not only is the proposed alternative strategy illegal under the Nuclear Waste Policy Act, but it is also inconsistent with established Nuclear Regulatory Commission licensing procedure. In essence, the DOE is proposing, contrary to NRC rules, that NRC initiate licensing of the repository now before site

characterization of Yucca Mountain is even complete, and that the licensing be conducted piecemeal. This is accomplished through the alternative strategy proposal that DOE and NRC have earlier, more formal interactions resulting in "preliminary findings" of a topical nature. The alternative strategy concludes that "DOE would proceed with a license application as soon as it became clear through formal interactions with the NRC that a reasonable case for overall compliance [with NRC and EPA license requirements] could be made." The clear intent of the DOE proposal is that the "preliminary findings", prior to license application, have the effect of determinative "findings", which under current licensing rules can only be made through the formal licensing process, with its legally established roles for all parties, not just the DOE and NRC.

We find it especially alarming that the DOE proposes subverting the established licensing process, for no other purpose but added expedience and certainty in demonstrating licensed disposal at Yucca Mountain, at a time when the site's suitability for a license application, under the NWPA and DOE's rules, cannot even be demonstrated.

The Nuclear Waste Policy Act clearly specifies that NRC authority to issue a construction authorization to DOE depends upon Presidential recommendation of the site for repository development and Congressional disposition of any "notice of disapproval" by the State of Nevada, both subsequent to a finding of site suitability by the Secretary of Energy. The DOE's alternative strategy puts the cart before the horse and seeks to remove the legal and political protection, albeit meager, which remains for the State of Nevada, the potential repository location.

DOE's alternative strategy also obviously intends to build momentum for its repository construction program, now under way in the guise of site characterization, outside of the NRC's licensing aegis, thus limiting NRC's ultimate objectivity should denial of the construction authorization be warranted on the merits of DOE's application and proof of reasonable assurance that the repository would operate safely and perform in compliance with environmental standards.

We find DOE's self-restraint remarkable in regard to proposing a new scheme for early demonstration of licensed waste emplacement at Yucca Mountain. The DOE would have been more responsive to its obvious intent by proposing a straight forward strategy for statutory and regulatory amendment resulting in a cooperative DOE/NRC licensing and repository development program, beginning now, at Yucca Mountain, and repeal of all Nuclear Waste Policy Act provisions regarding site suitability and acceptability determinations by the Secretary, President, and State of Nevada. Instead, the clear meaning of the DOE alternative strategy proposal is that the suitability and acceptability determinations be pro

forma prerequisites to the ultimately pro forma NRC grant of a repository license authorizing both already completed and new construction, as well as receipt and emplacement of nuclear waste at Yucca Mountain. Given the history of DOE's, and the nuclear utilities' manipulation of the statutory and regulatory framework for the nuclear waste program, we would expect to see the more boldly stated strategy alternative emerge at some future date when frustration over DOE program failures has further increased.

Finally, there is growing understanding, with which we agree, that the nation's nuclear waste policy needs comprehensive, independent review and reassessment. While DOE may believe this to be outside of its own purview, there is no basis for DOE to revise, through its own interpretation, the assumptions and intent of the Congress implicit in the original adoption of the Nuclear Waste Policy Act, and then propose a strategy to achieve the revised goal and objectives.

Increased confidence, as DOE has proposed, in near-term waste acceptance and that DOE will develop and demonstrate early licensed capability for disposal only has meaning to those who have materials they want removed and disposed - the nuclear waste-generating utilities. But the public's confidence in the nuclear alternative, in the safety of radioactive materials, and in the likelihood of a safe nuclear waste repository will not be increased merely by instituting a system where the rights of Nevada and its citizens are further abridged, safety is further compromised, and the credibility of DOE and the nuclear utilities sinks to yet a deeper low.

If there is to be a new strategy for a national nuclear waste program, it must derive from a revised national nuclear waste policy recommended through independent, objective, comprehensive review and assessment, and enacted through open, established democratic processes. It cannot be simply the most recent outgrowth of an admittedly failed DOE nuclear waste program strategy.

It is our hope that Energy Secretary O'Leary will join the State of Nevada and many others in the call for new national nuclear waste policy to assure the safety of ours and hundreds of future generations.

Sincerely,

Robert R. Loux
Executive Director

RRL:CS
cc: Bob Miller, Governor
Nevada Congressional Delegation
Grant Sawyer, Commission on Nuclear Projects

Michigan Public Service Commission
High Level Nuclear Waste Forum

Summary of the Forum Held

June 24, 1993

Prepared by the Staff of the
Michigan Public Service Commission

EXECUTIVE SUMMARY OF THE
HIGH LEVEL NUCLEAR WASTE FORUM

held by the
Michigan Public Service Commission

The high level nuclear waste program is operated by the U.S. Department of Energy on funds supplied by the nation's electric ratepayers. At the forum on this issue held by the MPSC, it was reported that the program has made some significant progress in the last year. It has begun underground excavations at the Yucca Mountain site in Nevada and has started to address other issues recommended for its attention. The Management and Operations contractor is now beginning to show benefits from its being phased in.

However there are major problems with the program that were reported by the TRB, the GAO, the Minnesota representative and the Michigan Staff. The program is many years behind schedule and has failed to meet some of the most important directives of the Nuclear Waste Policy Act (NWPA). The DOE's estimate of future program costs are very high. The nation faces a growing inventory of spent fuel that must be put in dry storage. This latter problem cannot be avoided and will occur without a national plan for its control. In addition, the DOE is not likely to be able to accept spent fuel in 1998 as the Act requires.

Program management is at the heart of the crisis. It has no incentive to control costs because it can adjust the budget at will. Many who appeared concluded that a full program review is necessary and, among others, the TRB recommends that the review be done independent of the DOE. A central problem lies with the use of funds. The GAO finds that an overwhelming per centage of the annual budget goes into oversight so that only 22 per cent of the funds are left for the Yucca Mountain investigation. As a result, the GAO finds that the application of the DOE for a license to use the Nevada site will be delayed from 5 to 13 years. They and Minnesota recommends no resolution of the DOE problems with access to funding until the program's fundamental management problems are resolved.

Minnesota concluded that the DOE has delivered a very poor effort and that costs are out of control. The Michigan Attorney General concluded that the federal government has failed to carry out its assigned obligations. While advising against legal action as an unproductive approach, he and the Consumers Power Company recommended that a coalition of Michigan entities begin a negotiation to arrive at corrective legislation. That would represent the centerpiece of an effort to enlist the national organizations that represent the nation's attorneys general and the PCS's. It would then be offered to the Congress. Some of the citizens who appeared supported this approach.

The Minnesota representative described a new organizational structure that would solve the management problem. He indicated it was designed also to take advantage of the expertise embodied in the nation's utilities and its PSC's.

The State of Michigan has been impacted by the federal program and its failure in three ways. First, its ratepayers have paid over $200 million for spent fuel disposal and will pay at least $1 billion. Secondly, its utilities have and continue to expand storage that ratepayers must pay for. However, the largest financial impact may be the increase in decommissioning costs that the delay in disposal will cause. All three impacts are quantified in the report. Also given is a listing of the state by state payments to the Nuclear Waste Fund and a comparison of the NWPA requirements with the results of the DOE's efforts to meet them.

MICHIGAN PUBLIC SERVICE COMMISSION

HIGH LEVEL NUCLEAR WASTE FORUM

Summary of the Presentations

Prepared by the Staff of the
Michigan Public Service Commission

On June 24, 1993, the Michigan Public Service Commission (MPSC) held a forum to review the federal high level nuclear waste program operated by the U.S. Department of Energy (DOE). The Commission's purpose was to elicit information and opinion on the progress or lack thereof in the federal effort, to receive information on the impact of the delay on Michigan and insight and advice on measures to resolve the long delays and high costs of the federal program that have come to the attention of the Commission and many others.

Agencies who, at the request of the Commission, made formal appearances and their representatives were as follows:

U.S. Nuclear Waste Technical Review Board (TRB)[1]
Dr. William D. Barnard, Executive Director

U.S. General Accounting Office (GAO)
Michael Gilbert

Minnesota Department of Public Service and the State of Minnesota (MNDPS)
Dr. Richard L. Auld, Assistant Commissioner

Michigan Department of Attorney General (AG)
Frank J. Kelley, Attorney General of Michigan

MPSC Staff (MPSCS)
Ron Callen

Consumers Power Company (CPCO)
David P. Hoffman, Vice President

The Detroit Edison Company (DECO)
Douglas R. Gipson, Senior Vice President, Nuclear Generation

Indiana Michigan Power Company/
American Electric Power Company (IMPCO)
Douglas L. Malin, Nuclear Licensing Manager

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[1] Acronym used below for attribution of statements.

In addition to their appearances, the utilities requested that the Edison Electric Institute (EEI) appear. The EEI representative was Steven P. Kraft. The Commission also provided time for public input; there were presentations by 11 individuals. Somewhat more than 100 attended; a commissioner and staff of the Florida Public Service Commission were connected to the forum by telephone.

The Commission requested the DOE to appear but it declined.

In anticipation of the Forum, the Commission asked that set of questions to be used as the focus of the presentations. They were as follows:

(1) utility efforts to minimize the impacts of the federal delays

(2) the nature of the difficulties in the federal program

(3) corrections necessary and the means to achieve those corrections

(4) whether the DOE has complied with the terms of the contracts it had signed with each utility

(5) recommendations for action by the Commission, utilities or others including an assessment of litigation and holding the payments in escrow.

The recent approval of the use of dry storage casks for the Palisades nuclear power plant is related to the federal disposal problem and has been opposed by the Michigan Attorney General and many citizens. It is the subject of a lawsuit filed in federal court. However, the Commission requested that this issue not be the focus of the Forum presentations because it is separable and not the purview of the DOE as is the waste disposal program.

This report constitutes a summary of the information and data presented at the Forum. The Commission did not intend to reach any conclusions at the meeting; therefore, there are none suggested or implied here. This report is organized by subject area rather than chronologically. Copies of the transcript of the forum and the written submissions are available from Ron Callen (517)334-6245.

Michigan Public Service Commission
High Level Nuclear Waste Forum

Progress in the Federal Program

The Federal effort has made some important progress recently. It has progressed substantially in characterization at the Yucca Mountain site in Nevada in the last two years and has begun the mining of an exploratory tunnel. To date, there is no evidence that would disqualify the site as a repository. The DOE is beginning to look seriously at the potential advantages of a multipurpose cask for storage, transportation and disposal. (TRB) The nation has learned a tremendous amount in the last ten years about managing and carrying out this program (GAO) and knows more about the technology and the public apprehension. (MPSCS)

The program is finally making some progress. The Management and Operations contractor is phased in and this is showing benefits. (EEI)

Michigan Impacts

Michigan ratepayers have paid $208 million for the disposal program via the Congressionally mandated one mill fee. They stand to pay almost $1 billion over the life of the current nuclear powerplants. They have and will be asked to pay for increased storage due to the delay and anticipated delay in the federal government's receipt of the waste. In addition, the cost of decommissioning the plants will rise because the presence of the spent fuel on site at the time of decommissioning will complicate the process and delay it. See Table 1 for quantification of the impacts.

Michigan utilities are involved in the payments of ratepayer funds to the Nuclear Waste Fund, the assessment of the federal program, the expansion of their storage capability brought on by the federal delays and, directly and indirectly via their national organizations, the improvement of the national effort. The spent fuel is resting in the storage pools at the three reactor sites in Michigan and in dry storage casks at the Palisades site. The failure or delay of the DOE to accept spent fuel will force the additional use of dry storage and the extended use of the pools. Until a national storage or disposal facility is available, no high level nuclear waste will leave the state.

Program Implementation Problems

The major dictates of the Nuclear Waste Policy Act (NWPA) have not been met and have been changed by later actions of the DOE and the Congress, see Table 2. The program is many years behind schedule. Federal estimates made in 1970 stated a repository would be opened in 1980. (MPSCS) The application for a license from the U.S.

Nuclear Regulatory Commission will be delayed five to 13 years. (GAO) Assuming this delay in the repository opening, in the last 23 years the repository schedule may have slipped as much as 40 years. (MPSCS) The 2010 date for the opening of the repository seems optimistic; the repository may not be operational for another 25 years. (TRB)

Funds received from the nation's ratepayers including those held by utilities to date exceed $9 billion. A state by state tabulation of payments is given in Table 3[2]. The Congressional revisions made in 1987 have been a source of financial woe. (MPSCS) The Congress canceled over $1.2 billion of work via the 1987 act. (EEI) The DOE's past expenses to date have exceeded $3 billion and their forward cost estimate has raised Congressional concern over DOE's projected costs. (MPSCS) The estimate for the Nevada site characterization portion of the overall program is to be $6.3 billion (MPSCS, GAO) and represents more than a twenty-fold increase in cost in the last seven years. (MPSCS) The present DOE annual funding request and Congressional appropriation is inadequate to support the as-planned work. The cost of characterization will exceed the DOE's $6.3 billion estimate. (GAO)

The sum raised by the current fee (one mill per Kwh) may not be sufficient for completion of the assigned task. (GAO) The schedule cannot be improved by management or funding changes alone. (TRB)

Even assuming the DOE schedule is met, extended interim storage, i.e. dry storage at the reactor sites, will grow from a few hundred metric tons (MT) at present to 25,000 MT before the end of the nuclear era. Unlike other countries, interim storage after 1998 has been neither anticipated nor planned for in the U.S. program. (TRB) The present policy inconsistently links early removal of spent fuel from the reactor sites to repository licensing. (GAO)

It is not likely that the DOE can meet its date of 1998 when it is to begin receiving spent fuel. (GAO[3], TRB, DECO, IMPCO) One utility has concern as to whether the DOE will provide storage starting in 1998. (CPCO)

Program management is the root of the problem. The DOE has no incentive to control costs. (MPSCS) Many times over many years management has been identified as the most significant problem of the DOE. (MPSCS) The program is large, diffuse and very costly. (TRB) A disproportionate share of funds go to infrastructure and overhead. (TRB and GAO) There are technical problems that must be addressed before increased funding could make improvements in the schedule. (GAO) The DOE's primary problems are a lack of consistent, clear direction, insufficient use of funds and

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[2] Prepared by Jahan Selim, Iowa Utilities Board

[3] The GAO noted that in 1991 it concluded the DOE could not have an MRS available by 1998.

overemphasis on creation of infrastructure. (CPCO) The program could be better managed. (EEI)

Political will at the federal level is lacking. (DECO) There is a built-in conflict between science and technology on the one hand and politics and public perception on the other. Few political subdivisions want any kind of waste storage and disposal. (IMPCO)

Summary Opinions on the Program

The Federal Government has failed dismally in carrying out its obligation. It is questionable that a site can be provided in the foreseeable future. (AG) Siting a repository seems as distant today as it did ten years ago. (GAO as quoted by AG) The long history of the federal effort raises questions as to whether the DOE will ever produce a disposal program. (MPSCS)

The Minnesota experience highlights the urgent need for a uniform national resolution to the issue. The federal government is clearly obligated to assume responsibility for disposal. The DOE effort has been "abysmal" and costs are out of control. Non-accountability in general and the DOE's lack of incentive to control costs in particular are the root causes. (MNDPS)

DOE spending patterns are inefficient and, if continued, could sap billions of dollars. (GAO) DOE decision-making is diffuse and causes high costs. The DOE deals with cost overruns by adjusting the budget. (MPSCS) The problem lies (essentially) with the process and the system.(GAO) In other countries, the program organization is more closely aligned to the utilities. (TRB) Utility and PSC expertise should be used in the conduct of the program. (MNDPS) The utility industry is not prepared to take on the repository, MRS or waste fuel container development programs. (EEI)

The DOE's method of dealing with stakeholders has led to frustration. (MNDPS)

Delay in removing spent fuel from the reactors will increase the cost of decommissioning. (MPSCS) (TRB) (EEI)

Recommendations for Repair

A full review of the program is necessary and it should be carried out independent of the DOE. (TRB) (GAO) The federal program needs restructuring. (CPCO) One issue to be pursued is the obligation of the DOE in 1998 for accepting spent fuel. Others are legislative and regulatory provisions, overall funding levels, organizational structure and management policies. (GAO) (TRB)

Push for federal action. Work for national redress through the National Association of Attorneys General, the National Association of Regulatory Utility Commissioners and the National Governors Association. (AG) The Commission should use its influence with the

Michigan Congressional delegation to pressure the Congress into corrections. (DECO) National organizations should be the centerpiece of the corrective effort but encourages the Commission to monitor and focus public attention and bring suit if the political process fails. (IMPCO) The PSC's have a great deal of leverage and should track the program and address institutional problems. (TRB)

Via a process used successfully in Michigan, in-state stakeholders should enter into a dialogue to produce a legislative solution to the waste program problems. Consider all areas of trouble and provide the recommended solution to federal policy makers. (CPCO)

The DOE must report to an organization that can and will hold it fiscally responsible. To administer the Fund, create a federally chartered corporation composed of representatives of utilities, ratepayer representatives and state and federal governments.

The Commissions should support full use of the funds for their intended purpose. The Fund should be put in a revolving fund arrangement. (IMPCO and EEI) Do not take the program "off budget". (MNDPS) As a single corrective, taking the program off budget is not advisable. (GAO)

The Secretary of Energy should conduct her own review to improve the agency's efficiency. The DOE should focus on both permanent and temporary storage, develop an MRS and, to allow utilities to plan their responses, publish any failures to meet its deadlines. (CPCO)

The DOE should bear the costs of its own delay.(MNDPS) It should pay for post-1998 at-reactor storage costs. (MNDPS) (IMPCO)

Improve political will. Remove Nevada's ability to frustrate DOE policy. Remove the linkage in progress required between the MRS and the repository. (DECO)

The industry has encouraged the DOE to proceed with a universal spent fuel container design and to develop storage capability at federally owned sites. (EEI)

<u>What Not to do</u>

Do not sue; that will bring years of conflict with no results. (AG) Suit would be difficult and bring negative publicity. (MNDPS) Litigation is premature and leads to adversarial relations. (CPCO) If the new Administration does not produce acceptable action in a reasonable time, one utility would pursue litigation. (DECO) Litigation and holding the payments in escrow are premature because they would interrupt the new Administration's working toward a solution. Will continue to monitor and consider litigation and holding the payments in escrow. (IMPCO)

TABLE 1

MICHIGAN IMPACTS

Utility Payments to the Nuclear Waste Fund
(Millions of Dollars)

	Big Rock Point	Palisades	Fermi 2	D.C. Cook
Collected to date plus interest owed	13	112	30	233
Estimated payments through plant end of life	19	215	262	463
Lifetime Total for all Michigan Plants	$960 Million			

AT-REACTOR STORAGE

	Big Rock Point	Palisades	Fermi 2	D.C. Cook
Spent fuel pool, percent filled	67	91	28	74
Rate of filling, percent per year	3.9	5.0	6.2	5.1
Year Filled	1999	1993*	2017**	2009***

* Two earlier modifications of pool made; cost 9.1 million dollars.
Dry storage casks in use.
** Assumes pool to be further modified.
*** Assumes pool modified; cost 13 million dollars.

DECOMMISSIONING COST INCREASE
DUE TO SPENT FUEL REMAINING ON SITE
(current utility estimates)

Millions of 1992 Dollars

	Big Rock Point	Palisades	Fermi 2	D.C.Cook Fuel Disposal Begins 1998	D.C.Cook Fuel Disposal Begins 2010
Total Decommissioning Cost	164	315	225	588	1102
Cost due to spent fuel on site	44	50	NA	213	727
Percent of Total	27	16	NA	36	66

Holding the payments in escrow is premature (CPCO and IMPCO) or inadvisable because it may be illegal. (DECO) Do not withhold funds; that would provide the DOE with an excuse, (AG) and threaten the Fund's viability and the program's goal. (CPCO)

Do not take the program "off budget". (MNDPS) As a single corrective, taking the program off budget is not advisable. (GAO) The states and utilities should resist any fee increase. (IMPCO)

Do not deny the utilities' recovery of at-reactor storage costs; that would threaten continued plant operations. (MNDPS)

Public Appearances

Eleven individuals responded to the Commission's offer to hear from the public. The persons and the organizations they represent are:

Tanya Cabala, Lake Michigan Federation
Michael Keegan, Coalition for a Nuclear-Free Great Lakes
Paul Prickett, Michigan Environmental Defense
Mary Sinclair, Don't Waste Michigan
Joe Dudak, Association of Businesses Advocating Tariff Equity
Mary M. Johnston, Safe Energy Coalition of Michigan
Mark Farris, Monroe Environmental League
Kay Haffner, Palisades Watch
Corrine Carey, Don't Waste Michigan
Ken Richards, Palisades Watch
Dayle Harrison

Individual comments were that Cabala and Dudak supported the recommendation of a state-wide dialogue to develop a solution for the Congress and requested to be involved. Prickett, Haffner and Carey supported a national solution coalition. Other individual recommendations were to escrow future funds, use the expertise of the national laboratories and keep the plants on line; and for the MPSC or state to review the federal preemption, disallow utility recovery of storage expansion costs, produce an environmental impact statement, involve the Legislature and recognize the possibility that costs may increase.

As for general comments, many of the citizens mentioned the seriousness of the safety issue, the need for public involvement in the solution process and to redefine the DOE's mandate, and requested that the Commission order the closure of all in-state nuclear powerplants. In response to this latter recommendation, the Commission challenged each person to provide recommendations that did not presume non-existent Commission authority. Despite the Commission's requirement for all participants to focus on the national problem only, several focussed on the issue of the use of dry storage casks at Palisades.

TABLE 2

REQUIREMENTS AND RESULTS OF THE NUCLEAR WASTE POLICY ACT

REQUIREMENT	RESULT
First Repository:	
Evaluate three sites, pick one	Abandoned three-site approach, Congress picked Nevada 1987 (NWPAA)
Begin under ground investigation by 1987	Began 1993
Open repository by 1998	Earliest date is 2010
Second repository:	
investigate site	Abandoned 1987 (NWPAA)
MRS:	
Open by 1998	MRS abandoned, 1992; can't meet 1998 date, will use federal facility
Program Director:	
Presidential appointee	Position occupied less than 60% of the time, empty now
Mission Plan:	
Develop and use	1987 draft, now obsolete
NW Fund:	
Establish and use	Established on time, used $3.5 billion to date

TABLE 3

RATE PAYER PAYMENTS TO THE NUCLEAR WASTE FUND THROUGH 3-31-93
(MILLIONS OF DOLLARS)

STATE	PAYMENT	INTEREST EARNED	TOTAL PAID	DEBT*	LIABILITY TOTAL
AL	$258.8	$72.9	$331.7	$0.0	$331.7
AR	$90.4	$25.5	$115.9	$94.4	$210.3
AZ	$56.0	$15.8	$71.8	$0.0	$71.8
CA	$362.7	$102.2	$464.9	$44.4	$509.3
CO	$0.2	$0.1	$0.3	$0.0	$0.3
CT	$124.4	$35.1	$159.5	$195.5	$355.0
DE	$18.0	$5.1	$23.0	$0.0	$23.0
FL	$344.1	$97.0	$441.1	$0.0	$441.1
GA	$166.5	$46.9	$213.4	$0.0	$213.4
IA	$108.6	$30.6	$139.2	$24.6	$163.8
IL	$539.0	$151.9	$690.9	$498.8	$1,189.7
IN	$87.6	$24.7	$112.2	$125.4	$237.6
KS	$35.8	$10.1	$45.9	$0.0	$45.9
KY	$55.5	$15.6	$71.1	$0.0	$71.1
LA	$76.1	$21.4	$97.5	$0.0	$97.5
MA	$129.5	$36.5	$166.0	$88.8	$254.8
MD	$161.9	$45.6	$207.5	$0.0	$207.5
ME	$34.0	$9.6	$43.6	$63.6	$107.2
MI	$78.4	$22.1	$100.6	$108.0	$208.6
MN	$160.7	$45.3	$206.0	$0.0	$206.0
MO	$75.9	$21.4	$97.3	$4.3	$101.6
MS	$56.1	$15.8	$71.9	$0.0	$71.9
NC	$556.1	$156.7	$712.9	$0.0	$712.9
ND	$7.3	$2.0	$9.3	$0.0	$9.3
NE	$89.4	$25.2	$114.6	$0.0	$114.6
NH	$15.3	$4.3	$19.6	$13.1	$32.7
NJ	$239.3	$67.4	$306.7	$107.3	$414.0
NM	$16.3	$4.6	$20.8	$0.0	$20.8
NY	$255.9	$72.1	$328.0	$275.8	$603.8
OH	$127.9	$36.0	$163.9	$17.8	$181.7
OR	$77.8	$21.9	$99.7	$0.0	$99.7
PA	$401.1	$113.0	$514.1	$36.3	$550.4
RI	$2.3	$0.6	$2.9	$3.4	$6.4
SC	$246.2	$69.4	$315.5	$0.0	$315.5
SD	$0.6	$0.2	$0.7	$0.0	$0.7
TN	$113.9	$32.1	$146.0	$0.0	$146.0
TX	$96.0	$27.1	$123.1	$0.0	$123.1
VA	$287.9	$81.1	$369.0	$0.0	$369.0
VT	$40.6	$11.4	$52.0	$77.2	$129.2
WA	$44.4	$12.5	$56.9	$0.0	$56.9
WI	$220.4	$62.1	$282.5	$0.0	$282.5
TOTAL	$5,858.6	$1,650.9	$7,509.5	$1,778.8	$9,288.3
FED	$19.8	$5.6	$25.4	$0.0	$25.4
INDUS	$16.8	$4.7	$21.5	$0.0	$21.5
	$5,895.2	$1,661.2	$7,556.4	$1,778.8	$9,335.2

* Fund owned for already burned fuel but not yet paid by utilities (as allowed by DOE contract)

Prepared by Jahan Selim, Iowa Utilities Board

8/24/93

Comparison of DOE's Siting Guidelines and NRC's Technical Criteria

DOE's Guidelines: 10 CFR Part 960

- The Nuclear Waste Policy Act directed DOE to develop guidelines for recommendation of sites for repositories
- The Guidelines (10 CFR Part 960) are made up of 4 System Guidelines and 20 Technical Guidelines
  - The System Guidelines cover broad concerns about how the repository system would (1) isolate radioactive waste for 10,000 years; (2) ensure public and worker safety during the operational period; (3) protect the environment; and (4) be feasible with existing technology
  - The Technical Guidelines cover specific site conditions (e.g. hydrology, geochemistry, tectonics, meteorology, socioeconomics, seismic hazards) that are important in determining if the System Guidelines can be met
- The Guidelines contain a list of disqualifying conditions that must be absent, and qualifying conditions that must be present, in order for a site to be suitable

NRC's Technical Criteria

- The Nuclear Waste Policy Act directed the NRC to develop technical requirements and criteria for approving or disapproving a license application for a geologic repository
- NRC's Criteria (10 CFR Part 60) contain general requirements similar to DOE's System Guidelines, covering 10,000 year waste isolation, worker and public safety during operations, and a requirement for retrievability of the waste
- Environmental impacts are not covered in NRC's Criteria
- There are no disqualifying or qualifying conditions in NRC's Criteria
- There are Siting Criteria (10 CFR 60.122) that served as a model for DOE's Guidelines
  - NRC's Siting Criteria contain favorable and potentially adverse conditions tied to specific site conditions, which can be correlated with DOE's Technical Guidelines

Nuclear Waste Technical Review Board

Statement Before the

Michigan Public Service Commission

William D. Barnard
Executive Director

June 24, 1993

WDB297V8

Background

On behalf of the Nuclear Waste Technical Review Board, I would like to thank you for inviting us to join you today. Unfortunately, Dr. John Cantlon, the Board's chairman, could not be here, so he has asked me to represent the Board on his behalf. I am Bill Barnard, executive director of the Board. Before I get to the heart of my remarks, I would like to tell you very briefly a little bit about the Nuclear Waste Technical Review Board.

The Board was created by Congress in the Nuclear Waste Policy Amendments Act of 1987. That was the same legislation in which Congress designated Yucca Mountain, Nevada, as the sole site to be characterized for its suitability for potential development of a repository.

Our Board is *not* part of the Department of Energy; we are an independent agency, whose role is to evaluate the scientific and technical activities associated with the DOE's program to manage the disposal of commercial spent fuel and defense high-level waste.

The most recent of the Board's seven reports was released in March of this year. It is a special report, and I have brought copies with me and hope that you will take the time to review it, especially if you have any questions about the Board's conclusions. My remarks today are based on what the Board said in that report, but they have been structured in such a way as to address the issues being discussed here today.

Recent progress in site characterization

Before I summarize some of the Board's recent conclusions about the program, I would like to say that during the last two years there has been substantial progress in the DOE's efforts to characterize the site at Yucca Mountain, Nevada. So far, no technical or scientific reasons have been identified that would suggest the need to abandon Yucca Mountain as a potential repository site. Surface-based testing is well under way. And the Board is very pleased to see the DOE finally breaking ground at the north portal, the entrance to the underground exploratory studies facility. The Board is also pleased that the DOE is beginning to look seriously at the potential advantages of the multipurpose container concept for storage, transport, and disposal.

Unrealistic schedules

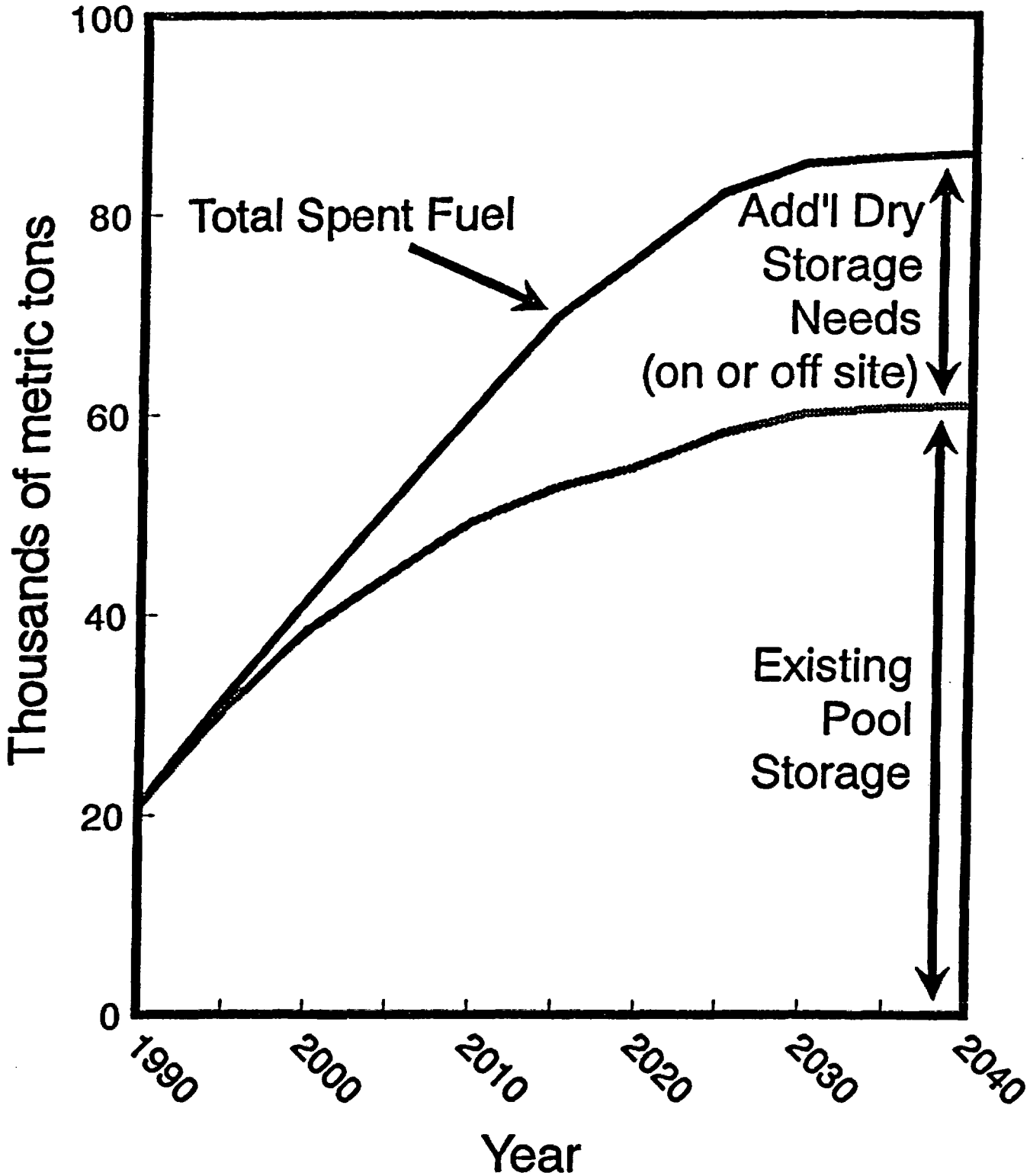
However, as you are well aware, not all aspects of the program are encouraging. You are holding this meeting today because of your concerns about progress toward important target dates in the current schedule.

Let me summarize briefly the Board's major concerns about the current schedule. As most of us know, the DOE hopes to begin receipt of spent fuel at a centralized storage facility in 1998 and to begin repository operations in 2010. However — with the advantage of hindsight — it is becoming clear that these dates were much too optimistic for a first-of-a-kind program such as this. But, even if the 1998 and 2010 goals could be met, the Board believes that *substantial* amounts of spent fuel will remain on site at reactors for decades. And — if an option for off-site storage cannot be found — *all* of the nation's spent fuel will remain in pools or in dry storage at reactor sites until a repository can begin operating.

Let's look first at the 2010 date for repository operation. As a result of its evaluation of the DOE's technical program, the Board concluded in its *Special Report* that given all of the necessary scientific, regulatory, and institutional activities required for repository development, it seems optimistic to assume that a repository for spent fuel will be operating by 2010. To produce the needed information, some tests, such as thermal tests, must continue for very long times — perhaps as long as a decade. Then after the tests are complete, another decade will be required for licensing review and repository construction. As a result, there just may not be enough time to complete the essential technical activities needed to design and license the repository. This means that a repository for spent fuel disposal may not be fully operational for another 25 years. By the way, most other countries visited by the Board during its examination of other waste management programs have set tentative goals for repository operation for 2020 or later.

Now, let's look at the 1998 date to begin federal receipt of spent fuel from the utilities. This is the date of immediate concern to you here today. The U.S. Office of the Nuclear Waste Negotiator, also created by Congress in the 1987 Amendments Act, was charged with identifying a volunteer to host a centralized interim storage facility. Although several Indian nations currently are evaluating the possibility of hosting such a facility, the former negotiator, David Leroy, has expressed his concern during the past four years that 1998 is unrealistic. Not even the DOE has much faith in finding and developing a storage facility at a volunteer site by 1998. As we know, the DOE has been

Spent Fuel Storage



Assumes no new orders, 40-yr licensing, no relicensing, and pool reracking.

Adapted from Spent Fuel Storage Requirements 1991-2040, DOE/RL-91-54, Dec. 1991

Other countries have designed their waste management systems very differently. From the beginning, they have recognized the need and planned for extended interim storage. They have developed and successfully implemented a variety of extended interim storage options, and, therefore extended interim storage is not a controversial issue in these countries.

This is not the case in the United States. Even though the Nuclear Regulatory Commission, in its Waste Confidence rulemaking proceeding, concluded that spent fuel can be safely stored on or off reactor sites for at least 100 years, *extended interim storage beyond 1998 has been neither anticipated nor planned for in the U.S. program.*

The Board has stated several times in its past reports that it is imperative that the DOE develop a comprehensive, well-integrated waste management plan based on a systematic assessment of options related to storage, transport, *and* disposal. The multipurpose container is one important option that should be considered as part of that plan.

Program management

In its *Special Report*, the Board also expressed its concerns about the large and diffuse nature of the DOE's program. The program also is very costly, and for a number of reasons, program integration remains a major problem. The Board believes that the DOE has directed a disproportionate amount of funds to infrastructure and overhead, rather than to important testing, research, and exploration. This may already have contributed to delays in the program. As a result, the Board has recommended that an *independent* evaluation be undertaken of the organizational structure and management of the Office of Civilian Radioactive Waste Management.

Obviously, solving fundamental management problems and reducing the program's overhead are important steps toward achieving a more efficient and cost-effective program. However, I would like to emphasize one point: *Neither improving the management structure nor increasing funding to the program is going to allow us to significantly accelerate the schedule for testing at a repository site without seriously jeopardizing its licensing.*

Concluding comments

Resolving the various outstanding issues related to the U.S. waste management program will not be easy. It will involve the consideration of a number of economic, political, and institutional issues. Although the Board is not in a position to offer you any easy answers, we do believe that the ratepayers have a great deal of leverage over this program. As a result, it would probably be worthwhile for you to actively track programmatic progress at Yucca Mountain and to address some of the program's underlying institutional problems.

However, I think the most important point *I* can make today is that with or without off-site storage, over time, utility after utility will most likely have to provide additional dry storage capacity for increasing amounts of spent nuclear fuel at their reactor sites. At Palisades, for example, this process is just beginning.

I would like to say, in closing, that the Board believes there are no technical reasons why we cannot design and implement a safe system to manage the storage, transport, and disposal of all the nation's spent fuel and high-level waste. However, because of the first-of-a-kind nature of this program and because of the related scientific and technical challenges, the repository development program cannot be rushed. The Board fully supports the need for schedules with target dates for intermediate goals to measure programmatic progress. But the target dates must be realistic. And they also must be flexible enough to allow for program adjustments as new information becomes available and as institutional issues inevitably arise.

Finally, I would like to emphasize that developing a safe and well-integrated system to manage the storage, transport, and disposal of spent fuel is a broad and complex challenge of national importance. The Board believes that everyone involved with this program should work together in an atmosphere of constructive cooperation to meet that challenge. Because of their unique roles, the utilities and public service commissioners should be key players in this venture.

I thank you very much. If you have any questions, I will certainly try to answer them.

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(202) 483-8491
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Comments of Martin Gelfand, Research Director, Safe Energy Communication Council

presented before the

Workshop to Review U.S. Department of Energy's Nuclear Waste Repository Program

Pahrump (Nye County), Nevada August 24 & 25, 1993

Representative Richard Lehman, chairman of the House Subcommittee on Energy and Mineral Resources.[5]

The Safe Energy Communication Council (SECC) and other national environmental organizations that have watched the DOE's efforts call on President Clinton to immediately initiate a comprehensive and independent review of the United States' nuclear waste programs. Secretary of Energy Hazel O'Leary recently announced her intention to conduct a review of the financial issues regarding the high-level radioactive waste program.[6] SECC applauds Secretary O'Leary's initial announcement. However, the troubled U.S. radioactive waste program needs more than that.

We seek to ensure that a full, independent review will be broadly defined to encompass all aspects of the civilian high level waste program, as part of a comprehensive examination of all radioactive waste generated in both the civilian sector and weapons complex. A broad evaluation is necessary in addition to the limited inquiry into the financing of the high-level radioactive waste program.

To ensure that the evaluation process will be designed and conducted in an unbiased and apolitical manner, we urge that an independent commission be established separate from the DOE. The membership of said commission should include a majority of members who are not affiliated with nor have a vested interest in the utility, nuclear power or radioactive waste management industries. To prevent further waste of taxpayers' funds while a thorough, independent review is underway, we recommend that the program activities at the Yucca Mountain site be suspended for the duration of this review.

Under the 1987 Nuclear Waste Policy Act Amendments, Congress focused its full attention on Yucca Mountain in Nye County, Nevada, as the only prospective site for a permanent repository. However, the law stipulates that the Yucca Mountain site must be characterized and found suitable for permanent storage of highly radioactive materials prior to its DOE seeking a license for acceptance of the nation's nuclear waste.

Under these circumstances, there are conflicting pressures over the nature of the process. On the one hand, there is the need to comply with the law and conduct an objective, scientific analysis of the site without regard to specific interests that would speed up the process. On the other hand, there is pressure within some sectors to look beyond characterization toward a quick resolution of the radioactive waste problem.

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[5] Rep. Philip R. Sharp and Rep. Richard Lehman, personal correspondence to Hazel O'Leary, Secretary, Department of Energy, August 5, 1993.

[6] Ed Vogel, "Yucca Site Independent Review OK'd," *Las Vegas Review-Journal*, Las Vegas, Nev., Wednesday June 16, 1993.

demonstrate the site is suitable for licensing is not the task assigned by law and spending appropriated funds on such activities is fraudulent."

General Hall concludes his letter with the following:

> "Lastly, DOE officials responsible for administering hundreds of millions of dollars of public funds each year should be held to the highest ethical standards. Their relationships with contractors should be above reproach ... It is a sad day for our country when the public becomes unjustly cynical about the integrity of public officials. But it is so much sadder when the cynicism is justified. The Yucca Mountain Project falls into the latter category."

The DOE's collusion with industry interests is further spelled out in a confidential campaign document that SECC uncovered in 1991. The September 1991 document, entitled "The Nevada Initiative: A Long Term Program Overview" states:

> "The industry message has been focused, influential Nevadans have been recruited to help advance the industry's objectives and a working political alliance has been established with the Department of Energy, natural allies and other key decision makers. Aggressive coalition building is under way, an in-house scientific response team has been recruited, an industry boiler room operation is functioning in Nevada and a dialogue has been developed with the media."[10]

"The Nevada Initiative" goes further in explaining the usefulness of the DOE toward meeting the industry's agenda:

> "Scientists can convince the public that nuclear energy is safe. Scientists also can help educate the press, both one-on-one and through advertising. DOE must be turned into a proactive force by training its scientists to function as an expert in-house accuracy/response team. ... The last three months have been spent doing this kind of training – and the product is impressive. Over the coming year, these dedicated professionals can advance the industry's objectives more than any other group."[11]

Thus between government contractors calling public attention to fraudulent DOE practices and industry outlining such practices in confidential documents, there is growing justifiable concern over how the Yucca Mountain Project is being run.

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[10] Kent Oram and Ed Allison, "The Nevada Initiative: A Long Term Program Overview," (Washington, D.C.: American Nuclear Energy Council, September 1991), 1.
[11] Ibid, 11.

project is subjected to executive scrutiny that may result in a redirection of the program. In simple terms, this type of effort would "put the cart before the horse."

While DOE managers have insisted that these large expenditures are necessary to meet the goal of having a repository operational by 2010, it is clear to most observers, including the GAO and the Nuclear Waste Technical Review Board, that this rigorous and demanding schedule is both unrealistic and ill-advised. Yucca Mountain's suitability for safe disposal of radioactive waste has yet to be determined by DOE, and there is no contingency plan should the site prove unsuitable or unable to receive a license from the Nuclear Regulatory Commission subsequent to the DOE's determination of viability, should that determination be made.

In reference to questions related to statutory compliance, Secretary O'Leary has the legal authority to order an immediate halt to these two major financial commitments at Yucca Mountain before any further FY-93 funds are expended, and throughout the period that a review is taking place.

It is urgent that the prudent decision be made to defer the very near-term commitments of large expenditures at Yucca Mountain until a comprehensive, independent review of the nuclear waste programs and policies can be completed. It is important to remember that high-level waste financial issues are but one subset of the larger, overall problems confronting the nation's civilian and weapons waste programs. Other issues should include the DOE's management of the project and its ability to separate statutory priorities from those priorities that are contingent upon the outcome of legally-mandated characterization activities.

In a broader framework, an independent review of the program should include examination of the systems of waste classification which currently define waste as "high" or "low" level under federal law. Specifically, most "high" level radioactive waste, with regard to commercial nuclear power plants, is the irradiated fuel-rods. Most other commercial radioactive waste is considered "low-level," despite the fact that some of the so-called "low-level" waste is so radioactive that a 60-second exposure could be lethal and that some of that waste remains highly radioactive for tens and hundreds of thousands of years.

In conclusion, it is the position of the Safe Energy Communication Council and many other national and local environmental and consumer organizations that a complete review of U.S. radioactive waste policy is necessary to responsibly address the country's nuclear waste dilemma. Such a review should be broad-based to include classification, technological options, economics, institutional framework, regulation of long-lived wastes and funding needs.

President Clinton should act immediately to name an independent commission to conduct such a re-evaluation. In order to maintain independence and to avoid conflict of interest, a majority of the members of the commission

August 4, 1993

President William J. Clinton
The White House
Washington, D.C. 20501

Dear President Clinton,

We are writing today to ask you to immediately initiate a comprehensive and independent review of the United States' nuclear waste programs. Secretary of Energy Hazel O'Leary recently announced her intention to conduct a review of the financial issues regarding the high-level radioactive waste program. We seek to ensure that this review will be broadly defined to encompass all aspects of the civilian high level waste program, as part of a larger comprehensive examination of all radioactive waste generated in both the civilian sector and weapons complex. Furthermore, examination of the systems of waste classification which currently define waste as "high" or "low" level should be a prerequisite for a meaningful reassessment of the current "high-level" waste program. The broad evaluation is necessary in addition to the limited inquiry into the financing of the high-level radioactive waste program.

To ensure that the evaluation process will be designed and conducted in an unbiased and apolitical manner, we urge that an independent commission be established separate from the Department of Energy (DOE). The membership of said commission should include a majority of members who are not affiliated with nor have a vested interest in the utility, nuclear power and radioactive waste management industries. To prevent further waste of taxpayers' funds, we recommend that the program activities at the Yucca Mountain site be suspended for the duration of this review.

Problems with the Yucca Mountain Project

Specifically, with regard to the high-level waste program, there is increasing consensus that the policy directing the conduct of the civilian high-level nuclear waste management program under DOE's Office of Civilian Radioactive Waste Management (OCRWM) should be thoroughly and independently reviewed and re-evaluated. This need has been recognized by the U.S. General Accounting Office (GAO); the Nuclear Waste Technical Review Board (NWTRB) which is a statutory Federal Advisory Committee; Representative Phil Sharp, Chairman of the House Subcommittee on Energy and Power; Representative Richard Lehman, chairman of the Subcommittee for Energy and Mineral Resources; and numerous independent analysts such as Keeney and von Winterfeldt at the University of Southern California.

On May 21, 1993, the GAO reported to Congress the results of its study: Nuclear Waste: Yucca Mountain Project Behind Schedule and Facing Major Scientific Uncertainties. The GAO specifically recommended to Congress:

> "In view of the current status of the disposal program, we recommend that the Congress defer consideration of legislation that would change how funds are provided to DOE from the Nuclear Waste Fund for use on the disposal program until (1) the Secretary of Energy has completed the review of the program that we recommended; (2) an independent review of the program, such as that recommended by the Nuclear Waste Technical Review Board, has been completed; and (3) appropriate legislative policy, and/or programmatic changes to the program have been implemented." (GAO/RCED-93-124, p. 48)

The necessity of an independent evaluation and a curtailment of current site activities are of timely importance because the DOE program to characterize Yucca Mountain, Nevada, as the only deep geologic high-level nuclear waste disposal site is about to initiate large, irreversible expenditures at the site that may prove imprudent after objective review.

Two specific activities are imminent: (1) final purchasing of a large, multi-million dollar tunnel boring machine to excavate 25-30 foot diameter repository tunnels beneath Yucca Mountain; and (2) further work on excavation of the starter hole for the 5-mile underground Exploratory Studies Facility (ESF) which is designed to be the first stage of repository construction by the tunnel boring machine described above. The estimated cost of the ESF over the next five years is $850 million, with FY-93 ESF costs budgeted in excess of $49 million, a portion of which has already been spent.

It is clear that the DOE Yucca Mountain project managers are proceeding with great speed to commit as much as possible to irreversible expenditures before the project is subjected to executive scrutiny that may result in a redirection of the program. In simple terms, this type of effort would assure that 'the tail wags the dog.'

While DOE managers insist that these large expenditures are necessary to meet the goal of having a repository operational by 2010, it is clear to most observers, including the GAO and the NWTRB, that this rigorous and demanding schedule is both unrealistic and ill-advised. Yucca Mountain's

suitability for safe disposal of radioactive waste has yet to be determined by DOE, and there is no contingency plan should the site prove unsuitable or unable to receive a license from the Nuclear Regulatory Commission subsequent to the DOE's determination of viability.

In reference to questions related to statutory compliance, Secretary O'Leary has the legal authority to order an immediate halt to these two major financial commitments at Yucca Mountain before any further FY-93 funds are expended, and throughout the period that a review is taking place.

Comprehensive Review Needed

It is urgent that the prudent decision be made to defer the very near-term commitments to large expenditures at Yucca Mountain until a comprehensive, independent review of the nuclear waste programs and policies can be completed. In consideration of this request, we believe that it is important to remember that high-level waste financial issues are but one subset of the larger, overall problems confronting the nation's civilian and weapons waste programs. Establishing an independent commission to completely re-evaluate U.S. radioactive waste classification, technological options, economics, institutional framework, regulation, regulation of long-lived wastes and funding needs is necessary to responsibly address the country's nuclear waste dilemma.

Please let us know if we can be of any assistance or provide additional information. We look forward to the opportunity to discuss this issue soon with you and your staff.

Sincerely,

Scott Denman
Executive Director
Safe Energy Communication Council

Anna Aurilio
Staff Scientist
U.S. Public Interest Research Group

Diane DiArrigo
Radioactive Waste Project Director
Nuclear Information & Resource Service

Bill Magavern
Director, Critical Mass Energy Project
Public Citizen

Harvey Wasserman
Senior Advisor to the Nuclear Program
Greenpeace

Brent Blackwelder
Vice President for Policy
Friends of the Earth

Angela Park
Program Associate
Center for Policy Alternatives

Daniel Becker
Director, Global Warming &
Energy Program
Sierra Club

cc: Vice President Albert Gore
Secretary of Energy Hazel O'Leary
Ms. Kathleen McGinty, Director White House Office of Environmental Policy
Dr. John H Gibbons, Director, White House Office of Science & Technology Policy
Mr. T.J. Glauthier, Associate Director for Natural Resources, Energy & Science, Office of Management & Budget

MESCALERO Apache TRIBE

Wendell Chino, President | Mescalero, New Mexico 88340

August 19, 1993
P2-S2-003A

The Honorable J. Bennett Johnston, Chairman
Senate Committee on Energy and Natural Resources
SD-304 Dirksen Senate Office Building
Washington, DC 20510

Dear Senator Johnston:

In 1991 the Mescalero Apache Tribe was the first community to accept the invitation of the U. S. Congress to step forward and volunteer to study the feasibility of hosting a Monitored Retrievable Storage (MRS) facility on its lands in New Mexico. For nearly two years we've been studying spent nuclear fuel storage technologies and visiting existing facilities. On August 4 of this year we notified the Acting Nuclear Waste Negotiator, Energy Secretary Hazel O'Leary, that the Mescalero Apache Tribal Council is ready to take the next step in the voluntary siting process. We have encountered opposition as we have taken each step in this process. This opposition continues from uninformed individuals and those with alternative agendas.

You are recognized as an expert in addressing American energy problems and a thoughtful leader in Congressional efforts to craft a national energy strategy. You and the members of your Committee know better than anyone how difficult it is to resolve the matter of nuclear waste disposal --- everyone supports disposal and storage in theory, but not in their own backyard. It is clear that any progress in resolving these issues requires leadership. As we understand it, the Congress, recognizing the potency of NIMBY politics and its power to bring any progress to a standstill, adopted the Nuclear Waste Policy Act and its 1987 Amendments. By creating and empowering the Office of the Nuclear Waste Negotiator, and then inviting sovereign states and Indian nations to voluntarily host an MRS, the Congress established a step-by-step process for seeking a solution to the nation's spent fuel dilemma. If this process proves successful, it will ultimately deliver a negotiated agreement to the full Congress for its approval.

The Congress can be pleased with the positive and constructive dialogue which has been initiated through the Office of the Nuclear Waste Negotiator. We have been treated fairly and honestly in this process. We have now identified specific areas within our jurisdiction

for detailed environmental study as prospective MRS sites. We plan to undertake a vigorous public participation and outreach program with neighboring communities regarding the potential impacts of an MRS, under the sponsorship of the University of New Mexico. In accordance with the established DOE program for supporting the voluntary siting process, we have requested additional funding. This funding will provide us with the resources to continue our substantive and constructive participation in the MRS siting process, including the eventual negotiation of a host agreement.

Wild rumors have swirled around our participation in this voluntary siting effort. Simultaneously, groundless charges have questioned the motivations of Congress and the Department of Energy, suggesting that you targeted Indian lands for the nation's nuclear waste. There are those in New Mexico, as well as Washington, who would like to sabotage the process Congress has put in place to reach a mutually beneficial agreement for the temporary storage of spent nuclear fuel at an MRS. These opponents would like to bully Congress or DOE into withholding further funding.

I ask that you disregard these reckless charges and examine the implications of what is taking place. This is a direct challenge to a Congressional program designed to serve the national interest. The Mescalero application sends a clear signal that the federal government still has the opportunity, if it is prepared to move forward, to meet its 1998 obligation to accept spent fuel from nuclear utilities. If NIMBY politics is allowed to destroy this process of voluntary, negotiated siting, whether on the grounds that New Mexico has "done its part" in providing nuclear waste solutions, or, on the even more dubious proposition, that Indian sovereignty should be disregarded in this instance, any future opportunity for Congress or the federal government to appeal to or call upon Indian nations to become partners in solving national problems will be lost. Although Congress will have invited Indian Tribes to participate, when they came forward they will have been rebuffed on the grounds that they just aren't good enough. Simply put, there will be no credibility left if the Mescaleros are abandoned before Congress has the opportunity to be presented with an agreement for its consideration and collective action.

We believe such an agreement is possible. We have taken extensive criticism for our good faith response to the invition extended by Congress. We have been willing to withstand these attacks because we believe this invitation was included in the law as a sincere expression of Congressional intent and that Congress will now keep its word by seeing this voluntary process through to a final conclusion. Both the Mescaleros and the U. S. government are achieving the goal you desire --- a genuine, win-win solution to a vexing national problem. We are ready to pursue an MRS agreement on a schedule that seeks to meet a 1998 date for MRS operations. We have taken every initiative to inform and work with our Governor and Congressional delegation, and we regularly communicate with their staffs. They are opposed to our MRS studies. They claim their constituents oppose an MRS in New Mexico.

I am enclosing the results of a recent opinion survey which indicates that, to the contrary, over seventy per cent of the people in New Mexico are of the opinion that elected officials should cooperate with the Mescaleros in the step-by-step siting process created by

Congress. This poll shows that the people of New Mexico are not afraid of nuclear energy or nuclear disposal — in fact, 55% judge the WIPP project to be a "good" economic development intiative for the state. They also believe the Mescaleros have been good stewards of their lands and they do not believe we will jeopardize them.

We appeal to you to let the voluntary process work. You are in a position to speak to the national interest on this matter. If you believe the Congressional mandate which invited the Mescaleros to participate in the siting of an MRS should be given a chance to succeed, then we ask that you make your voice heard. We are hopeful that a new Negotiator will be nominated and confirmed soon, and, if you believe this new Negotiator deserves an opportunity to make the MRS program succeed, then we once again ask that you make your voice heard.

If we reach a mutually acceptable agreement there will be ample time for public hearings and Congressional deliberation on the details of our proposal and its reasonableness for all concerned. Please accept our sincere assurance that, if given a chance, we will stay the course. We will be in Washington next month on other matters and would be pleased to meet with you, your staff or your committee to explore this matter in greater depth.

Sincerely,

Wendell Chino, President
Mescalero Apache Tribe

cc: Office of the Nuclear Waste Negotiator
Lake Barrett, Acting Director OCRWM
Energy & Natural Resources Committee Members