

July 10, 2008

MEMORANDUM TO: Richard P. Raione, Chief  
Environmental Projects Branch 2  
Division of Site and Environmental Reviews  
Office of New Reactors

FROM: Thomas L. Fredrichs */RA/*  
Environmental Projects Branch 2  
Division of Site and Environmental Reviews  
Office of New Reactors

SUBJECT: TRIP REPORT – CALVERT CLIFFS SITE ENVIRONMENTAL AUDIT  
AND SCOPING MEETING MARCH 2008

The attached report summarizes the activities of the site audit performed in response to Unistar Nuclear's combined license application (COL) for Calvert Cliffs Unit 3. The audit took place on March 17 through March 20, 2008. The Calvert Cliffs site environmental audit included document reviews, staff discussions, and onsite observations. Document reviews and detailed discussions with the applicant's staff were performed at an offsite location in Solomons, Maryland. The staff made extensive walkdowns of the Calvert Cliffs site to observe areas that will be impacted by the project. In addition, the staff conducted two scoping meetings on March 19, 2008. An alternate site visit to the C.P. Crane coal plant near Baltimore took place on March 20, 2008.

This report addresses the site audit activities. A summary of the comments from the public scoping meeting will be developed separately, and an alternative site audit report will address the evaluation of the C.P. Crane site and two other alternative sites.

Docket No.: 05200016

Enclosure:  
Trip Report

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Docket No.: 052-016

Enclosure:  
Trip Report

Distribution:  
TFredrichs                      MParkhurst, PNNL                      LQuinn

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DATE	07/10/08	07/09/08	07/10/08

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Site Audit and Scoping Trip Report  
Calvert Cliffs Nuclear Power Plant Unit 3 COL  
(UniStar Nuclear/Constellation Energy)

March 17 - 20, 2008

The Calvert Cliffs Nuclear Power Plant (CCNPP) Unit 3 site environmental audit included document reviews, staff discussions, and onsite observations. Document reviews and detailed discussions with the applicant's staff were performed at an offsite location in Solomons, Maryland. The staff made extensive walkdowns of the Calvert Cliffs site to observe areas that will be impacted by the project. In addition, the staff conducted two public scoping meetings in Solomons and a visit to one of the alternative sites (C.P. Crane) in Baltimore. This report addresses the site audit activities. A summary of the comments from the public scoping meeting will be developed separately, and an alternative site audit report will address the evaluation of the C.P. Crane site and two other alternative sites.

The U.S. Nuclear Regulatory Commission (NRC) and Pacific Northwest National Laboratory (PNNL) personnel attending the Calvert Cliffs combined license (COL) environmental site audit are listed below. Additional NRC staff attended meetings related to safety.

NRC Team

- Thomas Fredrichs                      Team Lead, Alternatives Sites
- Laura Quinn                              Backup and Principal Support
- Harriet Nash                              Aquatic and Terrestrial Ecology, Land Use
- Dan Mussatti                              Socioeconomics, Need for Power, Environmental Justice, Cost Benefit
- Irene Yu                                    Cultural Resources, Alternative Sites
- Henry Jones                               Hydrology
- Nebiyu Tiruneh                           Hydrology
- Jill Caverly                                Hydrology
- Jay Lee                                      Accidents
- Ed Fuller                                    Accidents
- Jessie Muir                                Shadow
- Doug Bruner                               Shadow
- John Fringer                               Shadow
- Phil Brandt                                Shadow
- Richard Raione                           Office of New Reactors/Division of Site and Environmental Reviews,  
Branch Chief

PNNL Team

- Mary Ann Parkhurst                      Team Lead, Alternatives Sites
- Robin Durham                            Deputy Team Lead
- Corey Duberstein                        Terrestrial Ecology
- Roy Kropp                                 Aquatic Ecology
- Tara O'Neil (offsite)                    Cultural Resources
- Van Ramsdell                             Meteorology, Air Quality, Electromagnetic Effects, Noise, Accidents
- Gene Whelan                             Hydrology
- Lissa Staven                             Health Physics, Fuel Cycle, Transportation, Rad Waste Systems
- Paul Hendrickson                        Land Use, Alternative Energy, Need for Power
- Tom Secrest                               Socioeconomics, Environmental Justice
- Carl Berkowitz                            Shadow Team Lead
- Mike Fayer                                Shadow Hydrology

Enclosure

## Schedule of Activities

### Sunday, March 16, 2008

2000 NRC/PNNL Meet at Holiday Inn Select for update and briefing

### Monday, March 17, 2008

0745 Meet at Hilton Garden Inn, Dowell, MD

- Welcome
- Introductions
- Opening Remarks
- Orientation to Calvert Cliffs Site, Health and Safety

0900 General Tour of Site

- Breakout – Socioeconomics & EJ

1130 Lunch

1230 Initial Discussions, Coordination of Breakout Rooms

1300 Specialized Tours and Discussions  
Tours

- Boat Tour (on Chesapeake Bay of intake/discharge structures)
- Cultural & Historical Resources
- Geology
- Meteorological Tower/Air Quality
- HP Monitoring Locations

Breakout Discussion Groups

- Concurrently (those not involved in specialized tours)
- Following the tours (those involved in specialized tours)

1615 NRC/PNNL Progress Review & Staff Data Needs

1700 NRC/PNNL Team Lead

### Tuesday, March 18, 2008

0745 Meet at Hilton Garden Inn  
Quick Review of the Day's Plans

0800 Hydrology/Ecology Tour

- Continue Breakout Sessions

1200 Lunch

1300 Continue Breakout Sessions

1600 NRC/PNNL Status Report and Plans for Wednesday

1645 NRC/PNNL Team Lead status debrief with Unistar

Wednesday, March 19, 2008

0745 Meet at Hilton Garden Inn  
Quick Review of Day's Plans

0800 Continue Breakout Sessions

0900 General Debrief on Status and Needs With Unistar

1000 Gov't to Gov't Meeting  
Breakout Session - Noise

1030 Quick Lunch and Preparation for Open House

1200 Lunch for ongoing Breakout Sessions  
Open House for Afternoon Scoping Meeting

1300 Afternoon Scoping Meeting  
Continue Breakout Sessions

1600 Adjourn

1630 NRC/PNNL Staff Data Needs

1800 Evening Open House

1900 Evening Scoping Meeting

Thursday, March 20, 2008

0730 Leave for Baltimore/Crane

0930 Arrive at Crane Site to Conduct Alternative Site Audit

1130 Closeout discussion with Unistar/Constellation

1200 Depart

## Daily Summary

*March 16, 2008 (Sunday)*

NRC and PNNL staff traveled to Solomons, Maryland, and met at the Holiday Inn Select to discuss trip safety, logistics, and guidelines for interactions with UniStar and its contractors.

*March 17, 2008 (Monday)*

The site audit began about 8:00 a.m. at the Solomons' Hilton Garden Inn where rooms were reserved to conduct document reviews and staff discussions. Introductions and presentations about the site and the proposed action were followed by a health and safety discussion. Afterward, UniStar organized a general site tour that traveled by van to the proposed site of the following:

- the area of the expected construction footprint and laydown areas,
- the cooling tower,
- onsite transmission lines, switchyard and turbine building locations,
- the proposed reactor centerline,
- overlook of cliffs, barge slip, and Unit 1 and 2 diffuser port plume, and
- Camp Conoy area.

Specialized tours to the meteorological tower and radiological monitoring sites and direct radiation sources (independent spent fuel storage installation and resin storage facility) were conducted in the afternoon, and the hydrologists and ecologists took a boat tour on Chesapeake Bay to view from the water the current intake structure and discharge diffuser ports for Units 1 and 2 and the general area of the proposed Unit 3 intake and discharge. Those not involved in tours began their discipline-specific breakout discussions.

*March 18, 2008 (Tuesday)*

Breakout sessions continued. The ecologists and hydrologists made an extensive walkdown of wetlands and hydrologic features likely to be impacted by the construction of a new unit. The walkdown included the following features and structures:

- the headwaters of Branch 1 (Wetlands Assessment Area I)
- the man-made Lake Conoy (Wetlands Assessment Area II)
- the headwaters of Johns Creek (Wetlands Assessment Area IV)
- the barge dock area and intake area and existing fish return area
- Lake Davies

Ecology breakout sessions discussed the environmental impacts of dredging and pipe-laying activities; filling of wetlands and streams; and the locations of the cooling tower, intake, discharge, and fish return. Interactions with the U.S. Army Corps of Engineers (Corps) were also discussed.

*March 19, 2008 (Wednesday)*

Due to the scoping meetings scheduled from noon to 10 p.m. on Wednesday, a closeout meeting with the applicant was held at the beginning of the day's sessions. The discussion covered the primary concerns expressed by the team members.

In addition to a continuation of the breakout sessions, a government-to-government meeting was conducted that included the following agency representatives to discuss their concerns:

- Susan Gray                    Maryland Department of Natural Resources
- Diane Mountain            ERM – MD consultant
- Peter Hall                    Metrametrics – MD consultant
- (Rich McLean—            Maryland Department of Natural Resources  
Monday only)
- Marthea Rountree        U.S. EPA HQ
- Kevin Magerr              U.S. EPA Region 3
- Kathy Anderson         U.S. Army Corps of Engineers
- John Nichols (via        NOAA  
phone)

Following the agency meeting, the terrestrial and aquatic ecologists spent the afternoon visiting a protected area adjacent to the Calvert Cliffs site and other sensitive habitats in the area.

An open house was held by the NRC at the Holiday Inn Select Solomons from 12:00 p.m. to 1:00 p.m. in preparation for the afternoon public scoping meeting held from 1:00 p.m. to 4:00 p.m. A second open house was held by the NRC from 6:00 p.m. to 7:00 p.m. prior to the public scoping meeting held from 7:00 to 10:00 p.m. The NRC staff gave a presentation at each meeting covering the review process for the Calvert Cliffs COL application. The NRC staff presentations were followed by open public comment sessions. Both public scoping meetings were attended by PNNL staff in addition to the public.

*March 20, 2008 (Thursday)*

Part of the Calvert Cliffs team drove to the C.P. Crane site northeast of Baltimore for an alternative site evaluation. This site currently hosts an operating coal generating station and was selected as an alternative site during UniStar's site selection review of fossil fuel sites over which it had access. The staff performed a walkdown of the site. A discussion of the merits and questions about the site will be presented in the alternative site audit trip report, which will also include information about the other two alternative sites, the R.E. Ginna and Nine Mile Point nuclear plants, to be visited by the NRC staff during the week of May 5, 2008.

### General Comments

#### Citable Documentation

NRC/PNNL had submitted a list of information needs (233 items) prior to the site audit, many of which requested the data and analysis to support UniStar's impact levels throughout the environmental report (ER). UniStar had drafted responses to many of them and made them available during the breakout sessions. The responses answered many of our questions. However, it was agreed that Unistar would submit the answers in writing using the request for additional information (RAI) process. Additionally, the current UniStar contractors were not

involved in drafting the original ER and, in many cases, will need to verify the bases for impact levels stated.

No documents or other materials were removed from the site with the exception of a site map used during the general site tour and site discussions.

#### Revisions to the ER

Since the ER was submitted in Part 1 of the COL application, a number of decisions about the plant characteristics have changed, including the design of the cooling tower, which will likely include plume abatement. UniStar plans to submit Revision 1 to the ER later this year to capture the changes, but the timing of this revision may be too late to provide information needed to complete the draft environmental impact statement (EIS) on schedule. Unless addressed otherwise, information about these changes will be requested through the RAI process.

#### Government Agencies

UniStar filed a Certificate for Public Convenience and Necessity (CPCN case 9127) application with the Maryland Public Service Commission (PSC) in late fall 2007. If granted, the CPCN would include air and water permits for construction. The application includes many of the field studies that were discussed during the preapplication T-1/T-2 visits but were not referenced in the COL ER. The application to the PSC initiated a process for a Maryland review of the proposed action. The Maryland Department of Natural Resources (DNR), Power Plant Research Program Office (PPRP), is reviewing the application and filing an environmental review document, the draft of which is expected to be completed in June 2008, and a CPCN hearing is expected in August. Documentation in the CPCN application as well as the DNR PPRP's evaluation is expected to provide information that can be cited in the NRC EIS. The DNR would like to take advantage of the information we collect to the extent possible in evaluating the Calvert Cliffs COL application.

The issue of the preconstruction activities was of interest to the Corps representative. The change in the definition of "construction" in NRC regulations meant that the EIS prepared by NRC would consider the impacts of preconstruction activities in a cumulative impact evaluation. The preconstruction activities, such as site grading, would likely have an impact on wetlands under Corps jurisdiction. Unistar planned to begin preconstruction activities in December 2008, if it receives the necessary permits from the Corps and the State of Maryland. The Corps conducted its wetlands jurisdictional determination and is considering whether to participate with NRC as a cooperating agency or develop its own EIS.

The National Oceanic and Atmospheric Administration (NOAA) participant is interested in obtaining the Essential Fish Habitat assessment to be conducted by NRC/PNNL and has a package of information to contribute to this evaluation. He also expressed his concerns about evaluations of dredging and tributary alteration.

## Summary of Issues or Concerns by Technical Discipline

### *Meteorology/Air Quality/Accidents/Noise*

An updated description is needed of the climate based on Calvert Cliffs and Patuxent River data.

A description and specifications for the revised cooling tower design that incorporates plume abatement is needed to evaluate air.

The design basis accident analysis and severe accidents analysis need source terms identified by isotope. A full description of input parameters for the accident codes is needed to evaluate the calculations and conclusions. Risk breakdown by release category has yet to be provided.

Noise and pile driving regulations need to be provided.

### *Hydrology*

Although questions remain after discussions of the onsite and nearby hydrologic characteristics, the COL application's proposed plans for a desalinization plant and description of the existing surface water supply suggests that sufficient fresh water is available for operations. The primary question yet to be addressed by UniStar is the source of water during the construction phase. A water mass balance discussion or diagram needs to be developed for the construction phase to indicate how much fresh water will be provided by additional pumping from the Aquia Aquifer and how much water will be brought in from offsite.

A secondary issue being evaluated is the impact to Johns Creek and downstream waters from construction and operation, specifically, the impacts to the creek and areas offsite: (1) due to loss of the surficial aquifer (Johns Creek is spring and runoff feed) and (2) during high precipitation events (flows now diverted toward the creek).

About 70 specific hydrological items were discussed during the site audit and will form the basis for RAIs related to hydrology.

### *Aquatic Ecology*

The final design and location of the intake system (and fish return) have not been finalized and the final location of discharge pipeline has not been determined.

Impingement and entrainment data that were presented are old and need to be evaluated to determine whether they are still relevant to conditions in Chesapeake Bay today. Benthic data to calculate extent of scour and resultant community effects are almost 30 years old; more recent data need to be available for evaluation.

No data were presented to allow ecological characterization of several streams onsite that will, or may, be affected by the new plant. Examples include Branch 1, Branch 2, much of Goldstein Branch, and the main headwaters of Johns Creek.

The NOAA representative mentioned several important species that were not considered by UniStar.

Significant parts of small headwater streams onsite will be removed or strongly impacted by the new plant. The potential downstream impacts of this action, especially those that might occur offsite, have not been fully evaluated and considered by the applicant.

Two tributaries, Branch 4 and Laveel Branch, appear to be State, "Ecologically Significant Areas." No information about the tributaries was presented, and they were not included in the Wetlands Assessment Study.

### *Terrestrial Ecology*

Extensive cut-and-fill activities may alter surface and shallow subsurface water flow dramatically and influence wetlands. The impacts of these actions were not discussed in the ER. The tours provided an opportunity to observe these areas and discuss impacts and mitigation. The tours also provided the opportunity to observe the flora and fauna onsite around the wetlands and the headwaters for Wetlands Assessment Areas I (Branch 1) and IV (Johns Creek). During information gathering immediately before the site audit, the eastern narrowmouth toad was identified as a potential issue. The distribution and habitat preference indicates that this Maryland State Endangered species is present in the county and may be on the Calvert Cliffs site.

### *Socioeconomics/Environmental Justice*

Issues discussed with UniStar and its contractors included the basis for the population projections and growth rates and, particularly, the need for the population and growth rate data to be consistent between the ER/EIS and FSAR.

An issue raised by the NRC safety side was whether the population density near the plant and projected increases within the next five years might exceed the guidance of Reg. Guide 4.7 for siting a plant. Reg. Guide 4.7 includes the following statement, "Preferably a reactor would be located so that, at the time of initial site approval and within about five years thereafter, the population density, including weighted transient population, averaged over any radial distance out to 20 miles (cumulative population at a distance divided by the circular area at that distance), does not exceed 500 persons per square mile." It also states that "Population growth in the site vicinity after initial site approval is normal and expected and will be periodically factored into the emergency plan for the site, but population increases after initial site approval will not be a factor in license renewal or, by itself, used to impose other license conditions or restrictions on an operating plant."

The actual population density needs to be revisited and verified so that the relevance of this potential issue is understood, particularly in light of the existence of two units already onsite and the plant workforce that contributes to this density.

The roles and rates of taxing organizations (state, counties, and incorporated municipalities) needs clarification with identification of the amount of revenue collected by each entity and transfers among the entities. In addition, information about the rate of incidence of police calls per unit of population and tax revenue per household is needed to provide a baseline to socioeconomic tables in Chapter 2 for use in the evaluation of the level of impact from construction and operation (Chapters 4 and 5).

Offsite interviews conducted through the week and telephone interviews conducted before and after the site audit will be described in a separate trip report so that the information gleaned from the interviews and used in impact evaluations may be cited.

### *Cultural Resources*

UniStar has been in consultation with the State Historic Preservation Office (SHPO) and has conducted Phase I surveys under the National Historic Preservation Action Section 106 process. Most of the cultural resource needs for the EIS analysis depend on the results and recommendations of the Unistar Phase II report due in August 2008 as well as the SHPO response letter to Unistar's recommendations regarding mitigation. Additional dialogue and negotiations are likely for several months after the report is released in August. The dialogue and negotiations will be focused on the need for additional field work, evaluation of resources, and mitigation.

Based on conversations during the tours of the cultural resources on the site, it appears that the proposed area of potential effect (APE) may be altered due to the change in laydown areas. This expansion is currently not covered in the Phase 1a and 1b survey reports, nor is it clear if this new APE will be included in the Phase II. The new APE will need to be defined, and the SHPO will need to be consulted regarding survey methods as was done originally before the APE was altered.

### *Radiological/Fuel Cycle/Waste Systems/Decommissioning*

Thermoluminescent dosimeter locations reported around the facilities that are monitored for direct radiation were observed and found to be accurately reported.

The construction worker dose evaluation was very data intensive. A summary and sample calculation that established the logic behind the calculation was requested. References to source documents were missing from key points of effluent and dose calculations and will be included in a request for additional information (RAI). RAIs are expected regarding mixed wastes and pathways.

### *Benefit-Cost*

As stated in the additional information needs list, monetary values associated with many of the cost categories and benefits need to be specified and should be included in any revision of Table 10.4-1 of the ER. Apparently, the plant-specific construction and operating cost calculations were in progress. The baseline assumption for the benefit-cost discussion should be that if the nuclear plant is not built, the cleanest coal-fired units available today would replace the nuclear capacity. Comparisons for costs and benefits can then be done for air quality, environmental costs, health costs, benefits, etc., by using established/accepted values that can be obtained from other sources, such as EPA.

## *Alternatives*

### Alternative Energy

Energy alternative questions were resolved during the course of the site audit, and it was learned that Units 1 and 2 now run as merchant independent power producers.

### Alternative Sites

Discussions of alternative sites focused both on the site selection process and characteristics of the alternative sites. Questions related to available land area at the three sites and population density at the C.P. Crane site dominated the discussion. C.P. Crane is located on a small peninsula. Surrounding land has been designated as a critical area under the Chesapeake Bay Critical Area statute. Adjacent land is predominantly wetlands zoned for resource conservation. There appears to be sufficient land for siting a nuclear power plant, but it appears that sufficient laydown space for construction would require securing additional land. In discussions at the site, we were told that at least one of the land designations relates to the avoidance of subdividing land into parcels of less than five acres and that this designation would not of itself prevent its use as laydown space for the construction of a nuclear facility.

Calvert Cliffs Site Audit Attendees and Disciplines

Topic	Representatives			
	Unistar	Unistar Contractor Support	PNNL	NRC Staff
Group 1 Aquatic & Terrestrial Ecology	Gerry van Noordennen	Warren High (MACTEC), Richard Harmon (MACTEC), Peyton Doub (TetraTech)	Corey Duberstein, Roy Cropp	Harriet Nash
Group 2 Hydrology/ Water Use/ Geology	Steve Strout Jim Freels	Mustafa Samad (BCP), Yifan Zheng (BCP), David Fenster (BCP), William Elzinga (MACTEC),	Gene Whelan,	Henry Jones, Jill Caverly, Gerry Stirewalt, Dogan Seber,
Group 3 Meteorological Tower/Air Quality	George Wrobel	William Burch (MACTEC), John Snooks (Areva)	Van Ramsdell	
Group 4 Health Physics/ Uranium Fuel Cycle Accidents/ PRA/Effluent Dose/ Construction Worker Dose/ Transportation	Stan Day	Clint Lamerson (BCP), John Keller (BCP), Barbara Hubbard (Areva)	Lissa Stavan (Phil Dahling – evaluation of transportation; conducted separately)	Ed Fuller (PRA/ SAMMA), Jay Lee (Accidents), Sara Bernal (Cons Worker Dose), George Cicotte (Effl Dose)
Group 5 Socioeconomics/ Environmental Justice/ Land Use/ Demographics	John Price	Paul Jacobson (Alion Science)	Tom Secrest, Paul Hendrickson	Seshagri Tammera, Kazimineras, Daniel Mussatti, Harriet Nash
Group 6 Alternatives (Sites, Cooling Systems, Generation), Need for Power, Decommissioning, Cost Benefit, Related Federal Projects/ Cumulative Impacts, Transmission Lines	George Wrobel	Tamar Cerafici (formerly of CH2M Hill)	Paul Hendrickson, Tom Secrest	Irene Yu, Daniel Mussatti
Group 7 Historical/ Cultural Resources	Rod Cook	Pat Garrow (MACTEC) Barb Munford (GAI) Ben Resnik (GAI)	(Tara O'Neil – by phone)	Irene Yu

Participants /Observers

UniStar Nuclear Energy

Tom Roberts	Project Management
Mark Hunter	Project Management
Ray Schiele	Project Support
Mike Wysocki	Project Support
Richard Mervine	Project Support
Gerry vanNoordennen	Licensing
John Price	Licensing
Rod Cook	Licensing
Stan Day	Licensing
George Wrobel	Licensing
Steve Strout	Licensing
Jim Freels	Licensing
Joe Mihalcik	Licensing
Tom Konerth	Engineering
David Murphy	Project Support
TBD	Ameren/Rizzo – Observers
Carla Logan	CEG Environmental

AREVA

Martin Owens	Project Management
Barbara Hubbard	Environmental
John Snooks	Environmental
Ted Messier	Meteorology
Mark Strum	Radiation
TBD	PRA

Bechtel Power Corporation

Scott Close	Project Management
David Murphy	Project Engineering
John Keller	Construction
Clint Lamerson	Construction
Greg Monica	Civil Engineering
Jim Ryan	Civil Engineering
Shankar Rao	Mechanical Engineering
Randy Kelly	Mechanical Engineering
Gerald McLane	Geohydrology
Yifan Zheng	Hydrology
Mustafa Samad	Hydrology
David Fenster	Geology
Dan Patton	Environmental
Mary Richmond	Environmental

Contractors / Other Participants

Michael Lukey	MACTEC – Air
William Burch	MACTEC – Air
Richard Harmon	MACTEC – Wetlands
Patrick Garrow	MACTEC – Cultural Resources
Warren High	MACTEC – Aquatic/ Terrestrial
William Elzinga	MACTEC – Water Use
Edward Sabo	MACTEC – Water Use
Peyton Doub	Tetra Tech – Aquatic/ Terrestrial/ Wetlands
Paul Jacobson	Alion Science – Socioeconomics
Tamar Cerafici	Ballard Spahr – Need for Power
Barbara Mumford	GAI – Cultural Resources
Ben Resnik	GAI – Cultural Resources

NRC Safety Reviewers

Person	Organization	Function
John Rycyna	NRO	Safety PM
Seshagiri Tammara	NRO/DSER	Demographics, FSAR Sec. 2.1 & 2.2
Kazimineras Campe	NRC	FSAR Sec. 2.1 & 2.2
Gerry Stirewalt	NRO	Geology
Alice Stieve	NRO	Geology
Dogan Seber	NRO	Geology
Jay Lee	NRO/DSER	Accidents
Ed Fuller	NRO	PRA-SAMA
Henry Jones	NRO/DSER	SW Hydrology
Jill Caverly	NRO/DSER	GW Hydrology
David Ball	NRO	