Volume 1 of 3

FY93
CAG Trip Reports
CAG Memos & Other Products

FY92
CAG Trip Reports
CAG Memos & Other Products

LANL Subcontract 9-X52-Z9658-1

Thu, Dec 15, 1994

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FY93 Trip Reports
To: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9332
Las Vegas, NV, Mon, Sep 13 - Thu, Sep 16, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV Mon, Sep 27 - Thu, Thu, Sep 30, 1993
Tasks: IDS

Trip Summary
Mon, Sep 13, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Tue, Sep 14, 1993
- Met with H Kalia to discuss a proposed IDS meeting
- Met with F Homuth to discuss IDS planning and strategy for the remainder of FY93 and the start of FY95
- Met with Ardyth Simmons and F Homuth to discuss data issues. F Homuth clarified his proposed presentation in the TDB meeting on Wed, Sep 22 in the afternoon session. I brought up a criticism I had discussed with her before concerning lack of DOE monitoring the field data collection process to ensure that testing is being performed in accordance with their expectations. R Oliver is implementing LANL processes for accomplishing part of this task and it may be important that he and A simmons discuss LANL’s role. She is interested in Ron’s activities and this is a good opportunity for the TCO to demonstrate what we are doing in the field and enlist her aid in supporting our test planning activities related to data coordination. A Simmons and others in J Boak’s group are always fiddling with the YMP data management process and it is in our best interest to be near if not close to this process to introduce a sense of reality and be aware early on of what they are planning.

Wed, Sep 15, 1993
- The current CAG subcontract funding has hit a snag. The request for an additional $20K has been processed and received by MAT-4 and the contract modified. The final $50K of incremental funding has somehow been lost between EES-13 and MAT-4. David Holmes is looking into this. F Homuth and I are working on the CAG request for incremental funding during FY94 contract negotiations. MAT-4 seems to be even more distracted than usual for this
time of year and we will need timely EES-13 help to make sure this funding is in place to support October work.

- Discussed YMP DR and Appendix B with C Breeds.
- At the request of R Oliver to F Homuth, F Homuth and I planned an IDS direction letter to the M&O listing our prioritized goals for FY94, direction for the M&O to proceed on these tasks, and some discussion of the activities, plans, and strategies we are expecting the IDS designers to develop.
- Met with F Homuth, B Rosche (M&O), Bruce Carlisle (M&O), and K Gidwani (M&O) and resolved IDS Design Requirements Document (DRD) comments.

**Thu, Sep 16, 1993**

- Discussed the need for FY94 interim funding with A Pratt and D Holmes to prime them for their needed support in the next two weeks. A Pratt had received J Jefferis’s request for a technical evaluation of the CAG proposal, however, he had not forwarded it to H Kalia or N Elkins. I informed him that F Homuth will be the FY94 CAG subcontract Technical Representative and he agreed to fax the MAT-4 request to F Homuth ASAP. I asked D Holmes and F Homuth to bird-dog this activity. We need to respond to this request promptly to get J Jefferis’s cooperation in setting up our interim funding.
- Met with F Homuth and B Rosche (M&O) and resolved IDS Integration Plan (IP) comments.
- At the request of K Gidwani, F Homath and J Hall met with F Lane and B Rosche for an informal discussion of IDS requirements for FY94 tests. We summarized the contents of the planned direction memo to the M&O and clarified FY94 issues. Change from previous informal discussions included the following items:
  1. We directed F Lane to include hard disk data storage in the proposed DAS units. LANL had always assumed and stated that this was to be the case, however, a misunderstanding had developed over inclusion of HD storage that was resolved.
  2. F Lane proposed and made a very good case for distributed DAS units rather than concentrating them in data acquisition shacks. We agreed to this approach and will be working with the M&O to develop the details during FY94.
  3. J Hall proposed that the USGS be approached with the possibility of incorporating software and the Ethernet interface for the RBTs in their measurement control PC. This would eliminate the need for an extra PC for the relatively simple task of IDS polling the USGS data acquisition system for data. F Homath and J Hall will follow up on this with USGS. We discussed the possibility of this kind of interaction with Falah Thamir in an IDS meeting last month. He checked with his PI and verified that we can directly contact the USGS players as long as we keep him and Bob Craig (and the TCO) informed. F Homuth and J Hall will pursue this issue for feasibility before involving the M&O.
- G Hall arrived to work on the TFM database with C Breeds.
- Returned to Carlton, OR.
Contract
See daily notes above.

TFM
Work continues by G Hall to enter data into the TFMDB and check out its performance.

Test Data Coordination
No action

Cy:
N Elkins, LANL, EES-13/LV, MS 527
F Homuth, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
To: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9331
Las Vegas, NV, Tue, Aug 31 - Fri, Sep 3, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV
Tasks: IDS

Fri, Sep 3, 1993
- Finished preparation of M&O IP comments.

Thu, Sep 2, 1993
- Attended TCO office meeting chaired by J Canepa.
- Attended the IDS Status meeting requested by K Gidwani. See meeting notes below.
- Met with F Homuth, B Rosche, F Lane and briefly K Gidwani to discuss changes in IDS procurement strategy for FY94.
  1. Current FY94 procurement strategies do not include support for the LLNL Large Block Test (LBT).
  2. Current FY94 procurement strategies include support for SNL Construction Monitoring Test (CMT). The CMT support strategy is currently schedule driven based on the TBM turning on in June 1994.
  3. Continued preparation of M&O IP comments.

Wed, Sep 1, 1993
- Met with F Homuth to discuss IDS progress.
- Met briefly with N Elkins to discuss the delay in D Holms acting on our request for the allocation of the remaining incremental funding for FY93 I had requested from A Pratt about 1 month ago. He will phone D Holmes to move the process forward.
- Continued preparation of M&O IP comments.

Tue, Aug 31, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.
- Attended TCO office meeting chaired by J Canepa.
- Attended the IDS Status meeting requested by K Gidwani. See meeting notes below.
- Met with F Homuth, B Rosche, F Lane and briefly K Gidwani to discuss changes in IDS procurement strategy for FY94.
  1. Current FY94 procurement strategies do not include support for the LLNL Large Block Test (LBT).
  2. Current FY94 procurement strategies include support for SNL Construction Monitoring Test (CMT). The CMT support strategy is currently schedule driven based on the TBM turning on in June 1994.
  3. Continued preparation of M&O IP comments.
**Contract**

Discussion with J Jefferis resulted in several items on CAG’s FY94 subcontract renewal for the third year of our three year contract:

1. CAG had discussed this renewal with Jefferis 2 months ago and he agreed at that time that if we held to the same rates for FY94 as FY93 we would not have to go through a complete rate review and audit.
2. Jefferis has changed his mind and is now requiring a full review and justification of our rates (sigh).
3. Both CAG and SubTerra rates will be reviewed and audited.
4. This will result in a fair amount of work for CAG and SubTerra and will probably take 2-3 months to accomplish.
5. Jefferis said that he is willing to generate a modification to the CAG contract to fund work until negotiations are completed. Billings during this period will use FY93 rates and will be adjusted after negotiations have been completed based on the negotiated FY94 rates.
6. FIN-4 has informed CAG that they are busy with audits for many subcontracts and will get to us ASAP, no estimated dates (just real soon now).
7. I will write a letter to N Elkins asking him to request interim funding for Oct-Nov 93 to cover a projected negotiation period of Sep-Oct-Nov.

On a separate topic, Al Pratt has requested CAG to provide an estimated total billing amount for September to be used to identify allocated FY93 carry over funds. D Holmes confirmed that this letter will be needed in EES-13 no later than the week of Sep 20, 1993. Accuracy is not critical, however, underestimating costs would be counter productive to capturing FY93 costs in FY93. CAG will draft a letter containing this information to H Kalia with a copy to A Pratt (and others).

**Test Data Coordination**

No action

**IDS**

- *Interface with K Gidwani;* No action

- *IDS schedule;* The M&O is developing an integrated schedule including construction, testing, and IDS. This is a long range effort. F Homuth is proceeding with a simplified (and unofficial) Test-IDS working schedule that we can use for preliminary planning with the M&O.
Meeting Notes
Thu, Aug 2, 1993
IDS Status Meeting
Scheduled duration 8:30am - 10:30am
Suite 820, Room 1

Attendees
Falah Thamir        USGS          303/236-5189
Hemi Kalia          USGS          303/326-
Jim Hall            LANL/CAG      4-7270 or 503/852-7214
Jim Leak            M&O/FD        4-1855
Kumar Gidwani       M&O/FD        4-5371
Frank Lane          M&O/FD        4-1968
Bob Rosche          M&O/FD        4-1970

There was no formal agenda since the meeting was planned around a free discussion. The goal of the meeting was to provide a forum for better understanding of LLNL YMP testing data acquisition activities and demonstrate current IDS design concepts supporting ESF testing. A summary of specific discussion data acquisition system (DAS) issues follow:

(Summary not completed)

Cy: N Elkins, LANL, EES-13/LV, MS 527
    F Homuth, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To:       Hemi Kalia
From:    Jim Hall
Subject: Trip Report FY9330
         Las Vegas, NV, Tue, Aug 31 - Fri, Sep 3, 1993

This Trip Report file was damaged and the text is lost.

Cc:      N Elkins, LANL, EES-13/LV, MS 527
         F Homuth, LANL, EES-13/LV, MS 527
         J Canepa, LANL, EES-13, MS 521
         EES-13/LV, LANL, MS 527
         CAG Files, Carlton, OR
To: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9329
Las Vegas, NV, Mon, Aug 16 - Thu, Aug 19, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV Wed, Sep 1 - Fri, Sep 3, 1993
Tasks: IDS

Trip Summary
Mon, Aug 16, 1993
• Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Tue, Aug 17, 1993
• Met briefly with H Kalia to discuss IDS activities. He discussed the importance of using the test planning process for identifying IDS and felt it is important that F Homuth and I move forward with drafting IDS sections for in progress test planning documents.
• Integrated F Homuth’s M&O DRD comments into CAG comments and submitted those to K Cambern to be formatted into the M&O comment sheets.
• Discussed Flow of Information from IDS meeting plan with A Simmons. This resulted in brief discussions with R Oliver and my preparing a view graph as the basis for my presentation.
• Attended Flow of Information from IDS meeting called by A Simmons (DOE) (Meeting Report below, agenda and handouts in Attachment 1). I had requested that A Simmons convene this meeting as a forum to clarify the M&O’s understanding of IDS data management and deal with the M&O’s focus on responding to NRC interest in some kind of tie between IDS and the NRC LSS database. The result of the meeting was to confirm that LANL and DOE continue to agree on LANL’s IDS concepts and direction for IDS data flow and no NRC connection to the discomfort of the M&O.
• ACTION ITEM; There has been discussion in past years (with Dick Herbst, former LANL TPO) with agreement that LANL would appoint an IDS Common Data PI. This was never done and we now need a Common Data PI or a resolution of the common data issue. I think we should have a technical discussion in the TCO to identify common data and then involve J Canepa, as necessary, for final resolution.
Wed, Aug 18, 1993

- Sent the FY94 CAG Proposal to J Jefferis in MAT-4 and distributed copies to N Elkins, H Kalia, and F Homuth. This proposal will need to be pushed through without delay to have the contract funded to support work in October.

- Got copies of the Request for Revisions to Construction Monitoring in the ESF and Request for Planning Info for the RBT TPP documents to use in developing an IDS test plan contribution. I will continue to interact with F Homuth, R Oliver, and D Boak to keep current with test planning IDS information requirements. R Oliver also indicated that attachments to test planning documents can be used to hold IDS functional requirements for related tests and that these functional requirements can then be sent to the M&O for use as IDS design input. This should solve the problem of generating controlled revisions to the controlled LANL IDS Functional Requirements Doc (FRD). We had a discussion centered on reasons that information contained in the ESF DR is inadequate to describe requirements for planned tests and how the Test participant-TCO-M&O interface is important for developing these requirements and helping the PIs understand current IDS plans.

- Met with F Lane and B Rosche to discuss procurement issues for FY94. LANL shares their concerns about their ability to purchase equipment fast enough to support testing requirements and the problem of continuing to purchase the same equipment in out years to expand the system in a rational and cost effective manner. My recommendation was for them to pursue REECo to get important questions resolved so that a clear and comprehensive procurement strategy can be formed allowing us to move ahead with IDS planning. B Rosche indicated that he will restart these discussions with REECo and include F Homuth in all meetings. My issues are:

  1. Who in REECo and YMPO determine procurement policy? To get what we need we may have to move up the hierarchy to the top.
  2. We will be procuring elements of the system over a 4-5 year period. A mechanism has to identified to support these procurements from a single integrating vendor.
  3. FY94 procurements are critical to test activities. We need a fast track procurement schedule. Is there a “fast track”? We need high level REECo/DOE discussions to verify that REECo’s commitment to speedy purchases is the best that can be done within the constraints of DOE procurement.

- K Gidwani has been on vacation for about 2 weeks and has missed IDS meetings and discussions that occurred during that time. Both of the IDS engineers (F Lane and B Rosche) seem hesitant at continuing their aggressive pursuit of important IDS issues after his return. The engineers are on the right track with IDS; Gidwani is off track and, since he is still in charge of IDS design, we need to continue to encourage him to perceive IDS correctly. His direction will determine what the IDS engineers work on and finally the success of the IDS product.

- Met with F Lane and B Rosche for a second time to discuss the software configuration for the FY94 Construction Monitoring IDS. The main issues discussed were software requirements for the Construction Monitoring Test (CMT) IDS DAS. We worked out the list of software functions and made a preliminary identification of available software (Campbell Scientific applications supporting the datalogger) and one that will need to be provided by the integrator.
We will need to review the draft CMT IDS DAS specifications to be sure that these details are covered. We touched on the need for local storage and a modem at the surface control computer. The next discussions will focus on hardware and software details for Large Block or USGS RBT.

**Thu, Aug 19, 1993**
- Met with H Kalia to brief him on the *Flow of Information from IDS* meeting called by A Simmons. He mentioned that Bob Waters (DOE) has been reappointed (after several years doing other things) to be DOE IDS technical liaison. I knew he had some related new appointment and he was at the IDS meeting. Waters has asked H Kalia to arrange a briefing to bring him up to speed on IDS. Schedule conflicts will delay the meeting until the first week in Sep at the earliest. The new M&O IDS manager (replacing K Gidwani) is scheduled to arrive Tues, Sep 7 and this briefing may be delayed a further week or two to accommodate this new man. An earlier meeting with B Waters would be useful.
- Returned to Carlton, OR.

**Contract**
No action; schedule did not permit planned discussions.

**TFM**
No action

**Test Data Coordination**
No action

**IDS**
- *Interface with K Gidwani*; covered in daily notes and meeting notes.
- *IDS schedule*; No action.

**Meeting Notes**
Tue, Aug 17, 1993
*Flow of Information from IDS*
1:30pm - 3:30pm in the DOE Large Conference Room

<table>
<thead>
<tr>
<th>Attendees</th>
<th>M&amp;O/FD</th>
<th>Phone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larry Engwall</td>
<td>M&amp;O/FD</td>
<td>4-1826</td>
</tr>
<tr>
<td>Jim Hall</td>
<td>LANL/CAG</td>
<td>4-7270 or 503/852-7214</td>
</tr>
<tr>
<td>Jim Leak</td>
<td>M&amp;O/FD</td>
<td>4-7204</td>
</tr>
<tr>
<td>Kumar Gidwani</td>
<td>M&amp;O/FD</td>
<td>4-5371</td>
</tr>
<tr>
<td>Ron Oliver</td>
<td>LANL</td>
<td>4-7095</td>
</tr>
<tr>
<td>Bob Rosche</td>
<td>M&amp;O/FD</td>
<td>4-1970</td>
</tr>
<tr>
<td>Ardyth Simmons</td>
<td>YMP</td>
<td>4-7998</td>
</tr>
</tbody>
</table>
Two presentations, one by J Hall and the other by A Simmons, were planned to outline IDS information flow from test data acquisition to participants, and finally to DOE. The discussion was meant to be high level, suitable for a management or overview of the full range of activities involved without excessive detail in how the processes were accomplished. A secondary issue was resolution of an M&O suggestion that IDS design be modified to include specific capabilities to accommodate direct NRC requests for transfer of IDS data to the NRC Licensing Support System (LSS) database. A NRC spokesman arrived for the meeting, invited by the M&O, and left after A Simmons informed him that this meeting was a DOE information gathering activity. He will be informed by DOE when information had been identified for inclusion in the LSS, however, since the LSS doesn’t even exist at this time it is premature to identify inclusion of IDS data.

J Hall described the basic data flow from IDS input from ESF activities (IDS monitored tests, participant data acquisition, manual data entry, IDS and instrument calibration and configuration files, IDS self monitored data, and IDS event logs) into the IDS database, data distribution from this database to PI test databases, and from the PI test database to DOE. The main elements of the current IDS design and management impacting data flow from tests to DOE are summarized as follows:

1. Responsibility for data processed by the IDS remains with the participant that generated the data. IDS is analogous to a contract data acquisition service for each participant. They give IDS the responsibility to collect their data and IDS in return guarantees to do this job using responsible, controlled processes, to keep each participants data secure and separate from other participants, maintain a secure backup record, and finally, to deliver the data to the participant that is a verifiable copy of data processed and stored by IDS.

2. Participant responsibility for their data is an important attribute of the functional description of IDS data processing and data management. The IDS is not a data policeman looking for bad test data, locking PIs out of IDS operation, or representing PI interests in any way except to collect and store data.

3. Normal ADP security and access measures will be used to verify controlled access to the IDS including participant test personnel, IDS Operations and Maintenance (IDS O&M) personnel, and others. Access to on-line test data stored on IDS will be read only. Participants will not be able to access other participant organization data on the IDS. All data entered into the IDS will be saved. No data will be overwritten. All data files created on IDS will be part of a backup data set and the IDS archive. A certain subset of current IDS data (this subset may include all data) will be available on-line.

4. IDS data management is structured to regularly submit each participants data to that participant’s record center designated for receiving test data. The IDS Data Manager will submit data to others at the direction of DOE. Options to meet specific data transfer requirements are available for the physical media and data formats. Replacement or duplicate distribution data sets are available on request. All archived data is available for use in creating special data sets as needed and requested.
by participants (data available to participants is identified by access privileges for that time period) and/or DOE (access to data from all participants for all time periods).

5. Participants wishing to share data could send the shared data directly from their record center to the requester. In addition, since participants define their access privileges, any participant can designate subsets of their data to be shared with others by granting other participants defined access privileges. This shared data would be distributed according to participant organization access as part of the regular IDS data distribution activity. Data from the Subsurface Safety and Alarm System (SSAS) and common data will be available for distribution to all participants on request.

6. Each participant’s data is accessible on demand, as determined by access controls, in the ESF, at the surface on site, and remotely via modem and/or direct telecommunication links. IDS Data Management regards these transfers as uncontrolled (no QA verification of the process) and should not be relied on for site characterization unless the data sets are verified against controlled data transferred from IDS to the participant record center.

7. IDS input to a participant test records center will be one of several several data sources feeding this records center. Surface test data and laboratory data will also be included. All of these data sources, including IDS data, will be reported to the DOE by participants in similar ways defined by current project data management procedures. The LANL IDS data management plans do not include periodic transfers of participant data to DOE record centers. DOE requests for special data transfers would need to include specific data required and instructions on the mode of transfer and tracking procedures to be followed by the IDS Data Manager.

8. LANL IDS Data Management will be part of TCO test planning and field support activities. Summaries of IDS data monitoring (not the actual data) are planned to be included in the the TCO Test Coordination periodic reporting to DOE and participants. These reports will include notes on IDS activities and events (i.e., test data acquisition started or stopped, kinds of data being monitored, and other related information) for the reporting period. This will allow DOE and participants to regularly review overall ESF data acquisition activities and identify possible data of interest to them. The IDS will also include catalogs and database search capabilities that will support identifying data (source only—not the actual data), equipment configurations, and specific operational details from all IDS monitored tests. This will provide another method of identifying data of interest.

9. Evaluation of preliminary data and development of reported data sets will be accomplished by participant PIs.

10. Although participant data flow is represented on the slide, this diagram is only meant to be a conceptual description of technical data flow in participant organizations. The main issue for IDS data management is that the participant distributes technical data to DOE record centers, databases, and others as directed by DOE under controls implemented by the participants QA program in conformance with DOE data management procedures. IDS plays no functional role in this process.
Ardyth Simmons presented three slides demonstrating current DOE technical data flow and management strategies. The first slide demonstrated that technical data is initiated from study plans or job packages using methods identified for action and funding by PACS. This leads to participant field and/or laboratory data acquisition activities that flow into the participant data archive and then YMPO data tracking, databases, and the CRF under management controls satisfying participant and YMPO procedures. The second slide detailed participant data submittals to YMPO databases and CRF and the third slide detailed the CRF activities involved in managing incoming technical data records packages. It is important to note that none of the YMPO processes differentiates the IDS from participant activities. The method of participant data acquisition is transparent to YMPO.

Cy: J Canepa, LANL, EES-13, MS J521
N Elkins, LANL, EES-13/LV, MS 527
F Homuth, LANL, EES-13/LV, MS 527
R Oliver, LANL, EES-13/LV, MS 527
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
Recently, questions have been raised about the flow of information from the IDS to participants, to the Project Technical Database, Central Records Facility, and eventually to the Licensing Support System. I have therefore scheduled a meeting to discuss these issues and reach a common understanding for the project. The meeting will take place from 1:30-3:00 on Tuesday, August 17, 1993, in the Large Conference Room here at the project office. Please call me at x4-7998 if you are unable to attend.
J Hall's overhead slide (1)
A Simmon's 3 slides
TECHNICAL DATA MANAGEMENT

PARTICIPANT ACTIVITIES

DATA INPUT PDA

COMPLETE TDIF ASSIGN DTN

COMPLETE DATA TRANSMITTAL PACKAGE

TECH. DATA TDIF

META-DATA INTO ATDT SYSTEM

PI COMPLETE SEGMENT OF TECHNICAL RESEARCH
To: Hemi Kalia  
From: Jim Hall  
Subject: Trip Report FY9328
Las Vegas, NV, Tue, Aug 10 - Wed, Aug 11, 1993

Next Scheduled Trips
Jim Hall
Las Vegas, NV  Tue, Aug 17 - Thu, Aug 19, 1993
Tasks: IDS

Trip Summary
Tue, Aug 10, 1993
- Trip from CAG offices in Carlton, OR to Oakland, CA.
- Met with F Homuth and F Lane (M&O IDS hardware designer) to inspect the Hewlett Packard Integrated Systems Division in Sunnyvale, CA hosted by HP personnel Rich Williams, Craig Frey, and John Martinez. The result of the inspection and follow-on technical discussions is that this HP division has been clearly identified as strong technical candidate as IDS integrator, supplying IDS hardware and software. Specific results are listed below:

1. HP understands the phased IDS concept that starts very small with a few DAS units and expands over time to accommodate planned ESF tests.
2. They have the basic equipment to support most of the planned IDS in a cost effective manner.
3. This division is not tied to supplying HP equipment exclusively. We saw several jobs in progress in their manufacturing facility that contained a combination of equipment from various vendors. One production run for for GTE contained only a single hard drive in each system from HP.
4. This division has very flexible working arrangements for support and manufacturing from other vendors (other HP divisions, sheet metal fabricators, printed circuit board manufacturers, and other electronic equipment makers) to support their jobs.
5. They have a flexible manufacturing line that can accommodate occasional rush jobs.
6. This division has a strong hardware and software engineering staff for integration and necessary supporting equipment design.
7. Engineering expertise in other HP divisions is available to be applied to Integrated System Division’s jobs.
8. HP corporate policy is to make available to customers (at added cost) extended srevice contracts on equipment that ensure spares and repairs on all equipment supplied to the
customer whether HP or other non-HP vendor items supplied by HP as part of an integrated system. These guaranteed availability of maintenance contracts can be extended beyond the no-cost 5 year period part of all HP supplied gear, to 10, 15 or 20 years. This could be very important for IDS.

9. HP has available a very broad range of equipment that would support the IDS from humble beginnings through the target full blown IDS without changes in current hardware and software supporting lower tier elements of the system.

10. As part of the business oriented computer peripherals, HP offers a very slick optical disk drive carousel system that can 20 to hundreds of disks offering expandable data archiving capability that is both a simple and elegant solution to maintaining a protected, on-line data archive.

11. This HP division is used to working with engineering teams to produce functional, cost effective assemblis of equipment uniquely configured to meet customer requirements.

12. HP offers a visual flowchart style programming language (VEE) that supports all system components (from HP or other vendors). The IDS would be principally programmed in VEE. This language is straightforward to learn and apply and could be very useful to the M&O for system configuration and maintenance and to PIs for test definition and installation testing activities.

Wed, Aug 11, 1993
- Met with F Homuth and F Lane and LLNL personnel for a planned meeting at LLNL to discuss IDS for the Large Block Test and the ESF heater tests. See LLNL IDS Information Exchange Meeting Notes below.
- The planned meeting with A Simmons and the M&O to discuss data management related responsibilities was postponed by A Simmons until next week. It is currently unscheduled and planned for Tue, Wed, or Thu, Aug 17, 18, or 19. Stay tuned, this should be very interesting.
- Returned to Carlton, OR.
Contract
No action; schedule did not permit planned discussions.

TFM
No action

Test Data Coordination
No action

IDS
- *Interface with K Gidwani;* no action.
- *IDS schedule;* No action.

Meeting Notes
Wed, Aug 11, 1993, 8:30am
*LLNL/IDS Test Information Exchange*
Scheduled duration 8:30am - 4:00pm
XXSuite 820, Room 1

Attendees
Norm Rector     LLNL
Dale Wilder     LLNL
Wunan Lin       LLNL
Jim Hall        LANL/CAG 702 794-7270 or 503/852-7214
Fred Homuth     LANL 702 794-5103
Frank Lane      M&O/FD 702 794-1968

The was organized around the planned agenda including a free discussion of issues. The goal of the meeting was to provide a forum for better understanding of LLNL YMP testing data acquisition activities, including the Large Block Test, and demonstrate current IDS design concepts supporting ESF testing. A summary of specific discussion data acquisition system (DAS) issues follow:

1. W Lin provided background information on the HEATED TEST and presented slides showing the testing activities associated with the test, test installation, turn-on, and demobilization schedules, an overview of the test layout, and a brief discussion of instrument types, and a very preliminary estimate of the quantity of each instrument type. In summary, this large test impact IDS as follows:

   - There will be N XKW controlled heaters (set point controller or PLC) operating in conjunction with individual heater KW transducers. Each heater controller will be regulated to supply a constant, PI selected, power to the heater.
   - A preliminary estimate of instrument types and quantities are as follows:
     Thermocouples or RTDs (maximum temperature = XXX°F)
Multiple Borehole Extensometer (MPBX) anchor points  300
Stressmeter active elements               50

- The heated drifts will be closed and are expected to reach temperatures of xxx°F. This high temperature will preclude IDS DAS equipment from being located in the heated drifts. Discussion centered around locating IDS equipment in environmentally controlled buildings in the test access drifts. Although not directly heated these access drifts will also be at an elevated temperature. The IDS rooms will provide a controlled environment for IDS equipment and will be sized and planned to provide hospitable workspace for PIs.

Cy:    N Elkins,     LANL,  EES-13/LV,   MS 527
       F Homuth,     LANL,  EES-13/LV,   MS 527
       R Oliver,     LANL,  EES-13/LV,   MS 527
       J Canepa,     LANL,  EES-13,       MS J521
       EES-13/LV,    LANL,  MS 527
       CAG Files,    Carlton, OR
Meet with F Homuth, F Lane, and B Rosche to discuss FY94 DAS procurement strategies.

**Wed, Aug 4, 1993**
- Met with J Leak (M&O) and F Homuth to discuss

**Thu, Aug 5, 1993**
- Continued background IDS discussions with F Homuth.
- Met with A Simmons (DOE) and F Homuth to discuss the M&O concerns that IDS should address NRC LSS (Licensing Site Support) data management requirements. A Simmons reminded us that there are two NRC people permanently assigned to the project that have free access to all aspects of project business. In this case there seems to have been some interaction between the M&O and these NRC reps. I explained that the reports on the NRC interest in IDS and the M&O response of "we will look into it" come from intermediate and high level managers that are definitely not tuned into IDS goals and its place in the DOE data management strategies.
- Met with J Leak and F Homuth to discuss the M&O IDS LANL budget allocation. The current IDS budget appears as one line item in the M&O budget package under 1.2.6.8.4 and includes the following rolled up items:

| M&O      | $900K |
| REECo    | $450K |
| LANL     | $350K |
| **Total**| **$1700K** |

J Leak supports the need for a minimum IDS budget of $2000K. He feels that the IDS budget will be able to be restored to $2000K and supports the necessity of this increase to support projected FY94 activities. LANL will need to assist J Leak's budget restore task by helping to develop the Test–IDS–Construction schedule for FY94-95, LANL responsibilities and products for FY94, and help the M&O refine their IDS strategies for FY94-95 to support REECo procurement and installation/operation budget items. The M&O is reluctant to breakout the LANL portion of the budget since they feel this would (of course) interfere with their ability to allocate funds. Our tactic should be to encourage J Beyer to allocate IDS as follows:

<table>
<thead>
<tr>
<th>WBS</th>
<th>Description</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.6.8.4</td>
<td>M&amp;O IDS Task</td>
<td>$1,250K</td>
</tr>
<tr>
<td>1.2.6.8.4.2</td>
<td>LANL IDS</td>
<td>$350K</td>
</tr>
</tbody>
</table>

- A Simmons reported back to F Homuth that she alerted L Engwall that a formal meeting with NRC could only be coordinated through A Simmons (or other DOE interface), that such a meeting would involve an agenda reported at high DOE levels etc, and that such a meeting regarding IDS was inappropriate and DOE does not encourage such a meeting. L Engwall backed off and assured her that the M&O will not pursue the formal meeting with the NRC and encouraged her to talk to K Gidwani to resolve the issue. She told F Homuth that she will pursue a meeting with Gidwani and others in the M&O and LANL on 8/12/93 at 10am. We plan to discuss NRC, DOE processes for IDS generated data, LANL IDS data management, and other interesting and juicy things.
- Met with N Elkins, H Kalia, and F Homuth to discuss contract issues. See contract meeting minutes below.
- Returned to Carlton, OR.

**Contract Meeting Notes**

Thu, Jul 22, 1993, 10:00am

*IDS/USGS Radial Borehole Test Information Exchange*

Scheduled duration 10:00am - 1:00pm
Suite 820, Room 1

**Attendees**

Ned Elkins, LANL, 4-7097
Jim Hall, LANL/CAG, 4-7270 or 503/852-7214
Fred Homuth, LANL, 4-5103
Hemi Kalia, LANL, 4-7094

**TFM**

No action

**Test Data Coordination**

No action

**IDS**

- *Interface with K Gidwani*: none; K Gidwani is on vacation this week.

- *IDS schedule*: Preparation for C Breeds to start participating in planning has progressed to the point that he will start on certain aspects supporting H Kalia next week. This may include the needed IDS schedules. If IDS is not a high priority we will proceed with a less ambitious scheduling effort based on TCO testing schedules during the week of Aug 16. This is an essential schedule for the M&O to use for IDS management and budget planning.

**Cy:**

N Elkins, LANL, EES-13/LV, MS 527
F Homuth, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Trip Report FY9326  
Las Vegas, NV, Tue, Jul 20 - Fri, Jul 23, 1993

Next Scheduled Trip  
Jim Hall  
Las Vegas, NV  
Mon, Aug 2 - Thu, Aug 5, 1993  
Tasks: IDS

Trip Summary  
Tue, Jul 20, 1993  
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.  

Wed, Jul 21, 1993  
- Met with F Homuth to discuss his role in IDS and current strategies for IDS implementation. It is clear we need to have meetings with N Elkins and H Kalia to clarify all TCO personnel roles in IDS.  
- Informed F Homuth that Hall will send a draft copy of the CAG FY94 TCO technical proposal for TCO evaluation next week. It will be important to review this proposal and finalize it so CAG can submit it to MAT-4 early in Aug. This should allow time for the proposal to be processed and the contract to be updated allowing a smooth transition of CAG work over the end of the fiscal year and the start of FY94 in Oct.  
- Met with F Lane to push along preparations for the planned meeting with LLNL. Although this can be regarded as a training session for the M&O participating in interface meetings, I am disappointed with their performance. My opinion is that wLANL should encourage M&O participation in planning meetings (and of course attending). We should reserve the actual details of meeting prep for ourselves. The TCO is in a much better position to interact with the participants, the PIs trust us more than the M&O, we are smarter about the high level technical issues, we know the PIs, it is our job to manage the technical interface for IDS, and we are skillful at it. It is important to note that the M&O is not analogous to LANL or the other Labs. They provide basic body shop support for specific tasks and need high level guidance to minimize risk and attain the best results. We should not do their design job for them. Our job (beyond functional requirements and technical interface management) is to provide the the M&O with project and test plan guidance they lack and keep them focused on conceptually correct outcomes that are consistent with PI needs and project realities (budgets and schedules).
Thu, Jul 22, 1993

- Attended the scheduled USGS/LANL/M&O IDS RBT Information Exchange meeting in LANL Suite 820, Room 1, 10:00am-11:30am. See meeting report below.
- Met with B Rosche and F Lane to discuss the importance of developing the design and identifying a vendor that will be able to integrate the IDS at each phase to provide the currently identified minimum system while also having the capability to provide full support for existing equipment as the next phase is implemented. It will be very important to identify and contract this vendor in mid to late FY94 to support FY 95 activities. DAS units procured in FY94 must be compatible with anticipated IDS vendor capabilities. These details must be considered when drafting the FY94 DAS specifications. The implication for the larger IDS contractor is that their role and important skill will be system integration not selling computer iron. The procurement specs for this integrator must emphasize this aspect. It will be counter-productive to make the DAS a small portion of the proposed IDS integrator work described in the FY94 procurement. This will confuse everybody. We should simply buy the DAS units as efficiently as possible with specs that make sure they satisfy our long term objectives. The surface IDS computer should be a PC desktop class machine with software supplied by the DAS vendor (this software will probably be cheap and expendable). We then work hard in FY94 to get procurement specs ready for getting the IDS integrator on-board in early FY95 for the duration.
- Met with F Homuth and J Leap (M&O IDS budget) to discuss the importance of maintaining an adequate IDS budget to provide the following:
  1. Protect the LANL portion of the budget to enable our participation and support for IDS.
  2. IDS must install 2 SNL DAS units in FY94 and be ready with 2 more units to follow the TBM as it starts in late FY94 or early FY95.
  3. Detailed design and procurement planning must be performed in FY94 to support major IDS procurements in FY95 (=5K Const Mon channels and “skeleton” IDS including an optical fiber data network) and FY96 (refined optical fiber network, a powerful surface workstation or mini-computer with large storage archive data capacity, and the start of large test installations)
  4. Loss of IDS momentum in FY94 will damage (perhaps mortally) the overall IDS concept.
  5. Planned change in IDS design team leadership must not affect the current design commitments and focus of the team on building an identified system from small to large in phases consistent with testing needs and project budget limitations. It would hurt IDS for the new team leader to put the design on hold while he re-evaluated the suitability of the concept, etc, etc.
  6. The formal QA related management work by the M&O IDS team is awful and needs to be improved ASAP to avoid an IDS stop work in some QA audit. A more detailed discussion needs to be held with the M&O to review this item.
  7. The M&O must start making plans for IDS operations during FY94 as a temporary measure, and for FY95 outwards as a permanent operations and maintenance group at the site. If the TBM daylights at the S Portal in FY95, IDS will have installed ~80 DAS units, 40K ft of fiber LAN, and a small surface workstation for data archiving.

Fri, Jul 23, 1993

- Discussed progress on planning the meeting agenda for the IDS/LLNL meeting at LLNL planned for Wed, Aug 11, 1993. Hewlitt Packard’s special system group is located in the east
bay (near Livermore) and they have invited us to come to their facility to evaluate their products first hand during this week and F Lane and I developed a tentative plan to visit their facility on Tue, Aug 10. So far, F Lane and J Leak from the M&O and F Homuth and J Hall from LANL are planning on attending the Wed LLNL meeting. J Leak may not visit HP (or LLNL if his schedule conflicts).

- K Gidwani confirmed that he will be leaving at the end of Sep 1993. His replacement is an engineer from Fluor Daniel, Irvine. The new man will arrive about Sep 1 for some overlap training with K Gidwani. J Leak characterizes the new man as “very good” and a “manager” who will keep interference with technical details to a minimum and concentrate on (currently missing!) management issues. Stay cool, this can be good news! On the other hand, my grandfather used to say chickens don’t lay eggs because they get bragged about.

- G Hall installed the TFM Database (TFMDB) application in the TCO on Jessie Peel’s computer. This is a fully operational TFM management support database (written in Paradox) with reporting capabilities. G Hall has trained J Peel on TFMDB operation and J Peel has started to enter backlogged TFM data. TFM data that has been entered over the last year does not contain all data items specified (by C breeds, TFM Manager) for the TFMDB, consequently certain information is not available for reporting. C Breeds is planning ways to generate missing data items. When a procedure for generating missing data items is implemented, J Peel will (possibly research and) enter this data, updating existing database records.

- Met with F Homuth to discuss his proposed duties in field data coordination and IDS data management. We will discuss these issues in more detail in coming weeks to identify useful CAG assistance and specific data management related tasks.

- Met with F Lane to discuss (again) the importance of the minimal DAS system for next year. Our discussion centered around defining the criteria for procuring 5 DAS units. All of these units will be identical (to support the SNL Const Mon Test) with one unit having expanded front end capabilities to handle a broad range of instruments. This expanded unit will be available as an IDS evaluation unit for the labs, a spare, and finally an SNL DAS.

- Returned to Carlton, OR.

**Contract**

No action; schedules did not permit planned discussions.

**TFM**

TFM Database (TFMDB) delivered and installed!

**Test Data Coordination**

Discussion started with F Homuth to identify tasks.

**IDS**

- *Interface with K Gidwani;* covered in daily notes and meeting notes.

- *IDS schedule;* No action.
Meeting Notes
Thu, Jul 22, 1993, 10:00am
IDS/USGS Radial Borehole Test (RBT) Information Exchange
Scheduled duration 10:00am - 1:00pm
Suite 820, Room 1

Attendees
Kumar Gidwani  M&O/FD  4-5371
Jim Hall  LANL/CAG  4-7270 or 503/852-7214
Fred Homuth  LANL  4-5103
Hemi Kalia  LANL  4-7094
Frank Lane  M&O/FD  4-1968
DeEtte Rashid  LANL  4-7158
Bob Rosche  M&O/FD  4-1970
Falah Thamir  USGS  303/236-5189

The meeting followed the planned agenda. A primary goal of the meeting was to provide a forum for better understanding of USGS YMP RBT data acquisition activities and demonstrate current IDS design concepts supporting ESF IDS. Planned FY94-95 test planning includes currently identified USGS RBT alcoves. F Thamir represented USGS technical issues, provided descriptions of the RBTs, and supported related discussions. A summary of specific discussion data acquisition system issues follow:

1. F Thamir described the RBT test and identified Gary LeCain (303 236-5020) as the PI for RBT and Joe Rousseau (303 236-5183) as a collaborator on RBT. RBTs are regarded as permanent monitoring stations with an indeterminant lifetime that will span years. The RBTs include multiple tests including gas permeability (temperature, pressure, and flow) and water potential measured with thermocouple psychrometers (TPs). Each RBT is initiated by drilling 3 equidistant boreholes normal to the drift. The first test performed is gas permeability. This test measures gas flow between monitored boreholes and runs for about 1-week. This test is dismantled and the water potential test is installed. This test measures the in-situ moisture content of the strata and runs indefinitely over a period of years.

2. The gas permeability test uses 4 inflatable packers to seal off 3 sections in each borehole. The two outer sections are guards to monitor leakage from the pressurized center section on the pressurized borehole and isolate the center section in monitored boreholes. Pressure and temperature are measured in each section and gas flow is measured in the pressurized section. Pressure is specified to be less than 150psi and is expected to be in the range of 60-100psi. Temperatures will be rock temperatures and flow rates are unknown. The PI will use a Campbell Scientific datalogger for monitoring test instruments and sensors. Data will be collected and stored in the datalogger and periodically uploaded to a networked PC (connected to the IDS data transfer ESF network) for storage in IDS. USGS is willing to provide data from the PC in an IDS specified format.

3. The water potential test will use TP strings installed in each borehole in zones isolated by inflatable packers. The TP measurement cycle consists of heating (to drive off condensed moisture), cooling to condense moisture from the air, and shut down to measure the parameter of interest. The
measurement cycle and unavoidable corrosion of the exposed sensor elements tends to weaken the TP and they break or wear out eventually, needing recalibration or replacement. A USGS developed IBM PC based data acquisition system (TPDAS) will be used to monitor the TP strings. This system will be used for monitoring, instrument checkout, data storage, and perhaps eventually for field calibration. Each TP string and packers are removable for maintenance. The TPDAS consists of an array of commercial equipment networked to the host PC via a hard-wired IEEE-488 bus. The TPDAS is entirely driven from the PC by USGS developed and maintained software. USGS is willing to provide data from the PC in an IDS specified format. The measuring equipment consists of the following instruments:

- Kiethley 181 Nanovoltmeter
- Kiethley 706 Scanner
- Kiethley 220 Current Source
- HP Data Acquisition Instrument
- IBM PC with ≈1Gbyte magneto-optical (MO) disk for data storage
- IEEE-488 interface for the PC and connecting cables

The RBT instrument measurement list was not provided at the meeting and is not critical to IDS development. A list of data values from a datalogger upload was provided to demonstrate the datalogger native data format. A copy of the list is provided in Attachment A.

4. USGS has developed their field data acquisition equipment over several years of design and field use. Their TPDAS is satisfactory for their RBT tests. USGS is unwilling to devote their ESF testing resources to major hardware or software modifications to the existing equipment. The USGS is willing to develop software modifications to accommodate IDS data formatting and uploading the formatted data to IDS. The IDS offer to manufacture the USGS design, integrate it into IDS, and install and maintain the equipment will be considered for later tests. For the first RBT located in an alcove in the N Portal Starter Tunnel, an existing TPDAS will be used. IDS will provide the environmental enclosure for the TPDAS and IDS network cables and interface.

5. ACTION ITEMS – All information should be sent to Fred Homuth (702 794-5103) in the LANL TCO Las Vegas, NV. He will distribute copies as appropriate.

- M&O will provide the IDS data format for data uploaded from RBTs.
- USGS will provide a description and sample data for each thermocouple psychrometer (TP) measurement cycle and measurement data rates to enable the M&O to specify data storage arrays, estimate network traffic, and data storage requirements.
- USGS will provide test array and alcove layouts
- USGS will provide data sheets or specific equipment references for planned instruments (TPs, pressure transducers, temperature sensors, etc).

Cy: N Elkins, LANL, EES-13/LV, MS 527
F Homuth, LANL, EES-13/LV, MS 527
R Oliver, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
MEETING WITH USGS TO DEVELOP RADIAL BOREHOLE TEST REQUIREMENTS AND IDS DESIGN FEATURES

Thursday, July 22, 1993
10:00 - 11:30 a.m.  
LANL Conference Room  
Suite 820, Room 1

AGENDA

A meeting is proposed with the USGS to discuss specific requirements for IDS support for Radial Borehole Tests (RBTs) in the ESF and specifically the first RBT located in the north ramp starter tunnel. The agenda is open; items for discussion include:

- IDS role in the USGS RBTs
- Description of the IDS data Acquisition Station (DAS) available for this test
- Instrument type and quantity planned
- Special instrument interfaces affecting IDS
- Data rates and data storage capacity
- Test and data acquisition equipment schedule
- Special requirements (i.e., a local DAS terminal underground, DAS networking, remote DAS operation and monitoring)

ATTENDEES

Proposed Attendees
Falah Thamir  
Debra Edwards  
Jim Hall  
Deirdre Beak  
Fred Homuth  
Ron Oliver  
Robert Rosche  
Jim Leak  
Kumar Gidwani  
Frank Lane  
Hemi Kalia  
Dellie Rashid

Distribution
Michael Chornack  
Robert Craig  
Charles Peters  
Al Yang  
Gary LeCain  
Larry Engwall  
Ned Elkins  

USGS  
USGS  
CAG  
LANL  
LANL  
LANL  
LANL  
LANL
To: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9324

Las Vegas, NV, Mon, Jul 12 - Fri, Jul 15, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV Wed, Jul 21 - Fri, Jul 23, 1993
Tasks: IDS, TFM database installation

Trip Summary
Mon, Jul 12, 1993

- Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Tue, Jul 13, 1993

- In a telephone exchange with Falah Thamir (USGS) we scheduled the USGS/LANL/M&O IDS RBT Information Exchange meeting for Thursday, July 22 from 10am - 1pm in LANL Suite 820, Room 1. F Thamir will be the only Denver USGS rep to attend the meeting. He asked that Mike Chornack be included on the distribution list for the meeting announcement memo. Since Bob Craig (USGS) is in Denver this week, I asked F Thamir to tell him that this meeting is taking place next week.

- Frank Lane (M&O IDS) informed me that the Intellution/Opto22 software/hardware vendor meeting he has been trying to set up is now scheduled for Wed, Jul 21 at 9am. The local rep will present. He will arrange a meeting room and let us know the location later.

- Met with K Gidwani and B Rosche to discuss my comments on the DRD including discussion to clarify various points. Rosche and I worked through the specific comments today. He will review our session and we will meet for a final review of his intent to rewrite the effected sections including comments by others. I will discuss specific hardware comments B Rosche was unable to resolve with F Lane on Wed. K Gidwani is rewriting the introductory sections to include my general comments and comments by others. We plan on continued meetings this week to refine the DRD as changes are made to the document.

- Requested help from A Burningham to develop a strategy that will allow us to issue letter modifications to the controlled LANL FRD. This will allow us to issue new requirements to the M&O without having to revise the FRD continuously. The FRD would then be revised as
needed (probably annually) to incorporate the letter changes. He will think about the problem
and propose solutions before I leave on Thursday.

- Drafted the IDS/USGS RBT Meeting memo and passed it to R Oliver for review and
distribution.

**Wed, Jul 14, 1993**
- Met with R Oliver to discuss the IDS/USGS RBT Meeting memo. He suggested adding Gary
  LeCain (USGS RBT PI) and several others to the distribution list and changed the memo
  format to a standard TCO meeting agenda format. Discussion of the memo led to a brief but
  intensive discussion of the 5 IDS Data Acquisition Stations (DASs) scheduled for purchase
  and installation in FY94. R Oliver correctly identified several items that will need careful attention
  in coming months:
    -> TCO IDS Data Management strategy, plan, and necessary procedures
    -> IDS field operations and maintenance (O&M)
    -> Specific per unit times to accomplish design, procurement, and installation that can be
      plugged in as generic components in planning and scheduling activities.

- Met with A Burningham to discuss his thoughts on FRD updates. In his view we have three
  options:
  1. Revise the FRD each time we make a change with the full review and approval process.
  2. Decontrol the FRD and use it as informal direction for the M&O IDS design.
  3. Observe that we are not making any substantive changes in the FRD and we are furnishing
     only clarifications to the existing document. Revise the FRD periodically to incorporate
     appropriate portions of these clarification items for completeness. Only standard office
     document controls apply to these clarification documents.

   It is clear that we must use the third option and that each document that we issue must include a
   comment that the write-up contains only clarifications to the current FRD revision without
   substantive changes to the FRD contents.

- Continued meetings with M&O IDS to resolve my comments on the IDS DRD. Resolved the
  hardware issues with F Lane.
- Called Jim Beyer (M&O) to request M&O IDS PACS information to be used for TCO test
  planning activities.

**Thu, Jul 15, 1993**
- Met with K Gidwani and B Rosche to discuss my comments on the DRD.
- Developed a list of priority IDS tasks that need to be followed up in coming months to support
  FY93/94 IDS activities. After a brief discussion with R Oliver they are as follows (not in order
  of priority):
  1. Phone lines to provide off-site data communication for the Construction Monitoring Test
     and Large Block Test
  2. LLNL use of IDS for the Large Block Test
  3. The M&O needs to re-evaluate the FDDI fiber optic network based on the new layout
4. Control room consolidation combining all control room functions into one central control room for economy and to provide operator quality work time
5. ESF electrical designers must include isolation transformers (with the output ground isolated from distribution ground) and constructed grounding systems for each DAS installation
6. IDS operational requirements must be defined to the ESF designers and others impacted including the following:
   a. radio signal problems including hand held & stationary radios & video cameras
   b. limiting radio transceiver locations and wattage
   c. equipment excluded from IDS alcoves
   d. IDS alcove entry limitations
   e. special IDS and test grounding needs
   f. best effort IDS mains power separation from machinery power circuits
   g. data cable separation from power wiring
   h. shielding of IDS alcoves if necessary
   i. space requirements for IDS
   j. and other issues TBD by cooperative effort with the M&O

7. Operations issues need to be defined and a strategy for FY94/95 developed jointly with the M&O
8. Revise the existing LANL/M&O IDS responsibility matrix based on our current experience with the M&O designers
9. TCO makes a simple FY94/95/96 test/IDS/construction event date list to be used by LANL and M&O for IDS planning
10. Develop a FDDI fiber optic network installation during construction model
11. We need a brief write-up from the M&O demonstrating their staged implementation plan from DAS units in FY94 to the full system in FY?
12. M&O procurement schedules for FY94
13. LANL needs to bird dog the FY94 procurement process to make sure that it is minimized by checking on M&O assumptions, verifying REECo policy, checking with DOE for speed-ups
14. IDS data management will be a critical issue in FY94. Plans and procedures need to be prepared for planned test activities.

- Talked to Jim Beyer (M&O budgets) about getting PACS info on the M&O IDS for FY94 as requested by R Oliver. He identified the REECo P&S account as OR684, however, no detailed allocations have been made and sub-account info is not available. He mentioned that the IDS budget is under pressure and further reductions (from $2M->&1.75M) are under discussion. I told him that this is a real concern since testing customers for IDS are increasing (i.e., LLNL Large Block Test maybe and support for Construction Monitoring as the TBM starts late in FY94). He suggested we meet with J Leak next week start to hash these details out (again).
- Met with K Gidwani to discuss IDS issues and he reminded me that he came to this project expecting to stay one year before reassignment within Fluor Daniel. He expects to be reassigned this fall and a new IDS design group leader will be appointed. This information is for this office only and not for general discussion with M&O staff. Stay tuned!
• Met with F Lane to discuss sensor details of vibrating wire, thermocouple psychrometers, and extensometer sensors. One result of the conversation was the observation that we should work with PIs to suggest certain choices of sensor choice, for example linear potentiometers should be ≤1KΩ to reduce noise pickup that will deteriorate measurement quality. Other sensor issues will probably surface as IDS progresses. F Lane emphasized his specification of current as an alternate to voltage excitation, 3 and 4-wire platinum resistance thermometers supported with 4-wire preferred, the full range of thermocouple, all standard strain-gage configurations including constant voltage excitation (remote sensing power supplies), and all the standard digital multimeter sort of measurements.

• Received a tentative FY94 IDS DAS procurement schedule (see Attachment 1) from F Lane. Although the schedule indicates procurements available at the right time in FY94 F Lane and I agree that this schedule is probably too optimistic. We must expedite this process this year.

• Returned to Carlton, OR.

**Contract**
No action; schedule did not permit planned discussions.

**TFM**
No action

**Test Data Coordination**
No action

**IDS**
• *IDS schedule; No action.*

**Meeting Notes**
No meetings this trip

Cy: N Elkins, LANL, EES-13/LV, MS 527
F Homuth, LANL, EES-13/LV, MS 527
R Oliver, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
Attachment 1 – FY94 IDS DAS procurement schedule
To: Hemi Kalia  
From: Jim Hall  
Subject: Trip Report FY9324  
Las Vegas, NV, Tue, Jul 6 - Fri, Jul 9, 1993

Next Scheduled Trip  
Jim Hall  
Las Vegas, NV  
Tasks: IDS Working group review of the M&O DRD

Trip Summary  
Tue, Jul 6, 1993  
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Wed, Jul 7, 1993  
- Met with J Blink to continue discussions of using IDS for the Large Block Test (LBT). The issues we covered were as follows:  
  1. LLNL's present plan is to use Norm Rector (LLNL) to specify the LBT data acquisition system (DAS) and instrumentation. Another person in Rector's group would then build and field the equipment.  
  2. There are internal conflicts in the LLNL electronics engineering group implementing the DAS that worry Dale Wilder (LLNL).  
  3. Dale Wilder is not satisfied with the high cost of the EGG EM DAS proposed by N Rector.  
  4. Wunan Lin (LLNL LBT PI) made the comment to J Blink that IDS would promise anything but probably not deliver or be very expensive. In addition there are LBT measurements that the IDS probably cannot make (i.e., neutron surveys, microwave cavity resonance, RF spectrum, and possibly others).  
  5. Wunan Lin talked about LabView (National Instruments DAS software front end toolbox) as the system now being suggested by the LLNL electronics engineering group. (This must be an error in understanding since LabView is software).  
  6. There may be a chance for IDS to make routine measurements of certain instruments (i.e., thermocouples) if the IDS equipment is cheap enough.  
  7. LANL should continue to pursue the telephone link allowing LLNL to communicate with the LBT from NTS Area 25, Las Vegas, NV, and Livermore, CA. Keep LLNL informed of progress through J Blink and N Rector.
Thu, Jul 8, 1993

- Met with H Kalia to discuss IDS strategy for the remainder of FY93:
  1. The next 2 months will be critical to identifying IDS equipment procurements for FY94 to support tests started in FY94 and early FY95.
  2. Schedules for these tests is critical to planning FY94 procurements.
  3. Limited resources in the TCO for planning may require that the M&O IDS team help prepare and maintain the needed construction-test-IDS schedule.
  4. The SSAS will be a critical FY 94 procurement and must be operational when the TBM starts excavation in Jun, Jul, Aug..., 1994.
  5. Critical tests for FY94 that need to be included in current planning are as follows:
     - USGS first RBT in an alcove at 200 ft.
     - SNL Construction Monitoring is on-going about every 400-500 ft.
     - Bow Ridge fault at 1000 ft.
     - LLNL Large Block Test at Fran Ridge
     - Other tests related to the progress of the TBM
- The M&O IDS team and managers must buy into a do-or-die program to supply the needed equipment in a timely manner.
- F Homuth will take several months to come up to speed on IDS issues. He must take on IDS tasks during this time while gaining knowledge and experience. A valuable effort would be detailed coordination with REECo to identify the absolute fastest path for the M&O to procure DAS equipment for FY94 and coordinate M&O efforts to arrange IDS installation and operation.
- The TCO IDS team will be stretched to accomplish the needed tasks with our present resources. HK->This may mean that we have the M&O do more participant interactions than currently planned. JH->The TCO needs to stretch to maintain our interface role for testing. The M&O does not yet have the single focus of test support and project savvy to represent and sell IDS to reluctant PIs. We need to tell them what to do, in detail.
- Specific procurement strategies must be developed to service the targeted items.
- Priority actions are:
  - PI meetings with SNL, USGS, and LLNL
  - A simple integrated working schedule for test/IDS/construction
  - Develop a unified FY94 scope supporting testing that the M&O buys into 100%
  - Drive the M&O to develop appropriate procurement strategies

NOTE: Installation and maintenance of these data acquisition systems may require a full time on-site electronics technician. J Blink (LLNL) has suggested that excellent excess personnel (REECo) are available from the test site and LLNL has hired and outfitted a mechanical tech in a trailer machine shop at the site and SNL and USGS have full time electrical (electronic?) techs available at the site. A time share arrangement should be possible with these participants to allow these techs to work on IDS for a minimum budget commitment.

- Met with K Gidwani and B Rosche to discuss my comments on the DRD. The biggest criticism I have is that the document is not focused on what is actually going to be done to make an IDS. This vague focus was intended by K Gidwani who sees the document as more of a Title 1
conceptual description of IDS and a presentation of the various rationals used to develop the concepts. This view is based on frequent requests Gidwani gets from inside the M&O to explain IDS. I think there should be a descriptive IDS document and I have advocated its preparation for the past 3 years. The DRD should not be that document in my opinion. It should briefly describe the high level design requirements derived from the FRD that will be used to develop the detailed specifications used for procurement and related issues. This conflict in viewpoint was finally resolved by agreeing that I would meet with the M&O this week to resolve specific comments and assist as necessary rewriting portions of the document to provide focus. Sigh.

- Attended a M&O IDS sponsored Hewlett Packard data acquisition presentation of their capability to meet IDS requirements (HP business cards attached, Attachment 1).
- Attended a DOE/IRM communications meeting (see attached attendance list, Attachment 2 and follow-up memo, Attachment 3) for discussion of communication issues for the ESF, pads, portals, and site (i.e., Fran Ridge), and offsite (i.e., everywhere!). I only learned about the meeting coincidentally and attended to support FY94 IDS needs. Critical issues include the following:
  1. There is no immediate action in FY93 scheduled for "long term" communications planning at the site. This planning process is in motion, however, and requirements are due in Oct-Nov 1994 to Mary Jones (DOE IRM) to cover FY94 and out year needs if known.
  2. Point of Contact (POC) reps were at the meeting to represent their interests. There was no POC from testing. Although this may seem to be a remote requirement for us, it impacts IDS and participant plans. I strongly recommend that F Homuth be appointed as the TCO POC for testing communications and Mary Jones be advised.
  3. N Rector (LLNL) has identified a Large Block Test need to transfer data off-site via a telephone line. This information (with supporting details) needs to be supplied to Bob Daniel (RSN), the POC for surface based testing, no later than Aug 93 for input to this process.
  4. Underground video requirements supporting testing need to be supplied to Jim Leak (M&O) no later than Oct 93.
  5. The IDS ESF FDDI network is not included in the responsibility of DOE/IRM.

After the meeting I had a brief conversation with J Leak (M&O/FD IDS oversight) about the somewhat negative responses from IDS to the general discussions I raised about testing communication issues. He assured me that a more positive attitude will be forthcoming. J Leak is very new to the project and comes fresh from Hanford. Hanford continues to be mired in paperwork and Fluor Daniel continues to use Hanford paperwork jockeys to write and contribute to IDS documents. Leak may or may not be good for IDS in the long run. He is powerful in the M&O and seems to understand the urgency of the identified work and procurements for FY94. We must help him be our active ally without bypassing the design team’s organization. Stay tuned!

- D Boak’s image scanning software is unstable. I will provide a loan copy of Ofoto v2.0 for her to evaluate with her HP I1p scanner.
- Called N Rector (LLNL) re IDS. He is on vacation through 7/15.
• Left a message for Dale Wilder (LLNL) re communications for LBT. No return call.
• Talked to Falah Thamir (USGS) about IDS support for their first RBT planned for an alcove at 100+ ft. We will work out a meeting for next week. He reaffirmed that USGS will use their own data logger equipment for the first alcove RBT and probably others. This equipment is based on a desktop IBM PC clone and includes a Keithley low level multiplexer and low level DVM interconnected with a IEEE-488 bus. Custom software runs the logger. This software was written and is currently maintained by Mark Curzmack, a USGS programmer based in Denver. Thamir would like IDS to supply an appropriate underground housing for their gear. He does not perceive that IDS offers them any other advantage, however, he is not opposed to a connection from their data logger to IDS and uploading RBT data to IDS archives.
• Discussed with H Kalia two issues:
  1. I proposed a procurement strategy that includes advertising in the CBD on Aug 2 and then proceeding with RFPs in September. He suggested we meet with the REECo procurement people to check on any help they can give to expediting this process then meet with the M&O IDS to push on the procurement.
  2. I suggested that we let the M&O know that we will not revise the FRD this year. We will be providing them with functional requirements for specific tests planned for FY94 in letter amendments to the current FRD. The planned FRD revision has been rescheduled to FY94. If there are FRD issues not resolved by the letter amendments that are holding up design, the M&O must request additional information.

We will prepare an informal (but best guess) testing schedule and work with the M&O to build a interim integrated IDS-construction schedule and maintain it until the TCO is able to prepare a more comprehensive version.

Fri, Jul 9, 1993
• Attended LANL/SNL/M&O-MK construction review meeting. The M&O presented the current “newest” and most likely to succeed underground layout for SNL. The impact on SNL is their ongoing work to verify that ESF layouts and planned work will not negatively impact repository design. They recently completed this analysis for the old layout and must now repeat the analysis for this new proposal. Neither testing nor IDS is negatively impacted by the new layout, however, the proposed FDDI network must be re-evaluated.
• Attended LANL/SNL/M&O-FD IDS requirements meeting for construction monitoring (see meeting minutes below)
• Returned to Carlton, OR.

Contract
No action; schedule did not permit planned discussions.

TFM
No action

Test Data Coordination
No action

IDS
The meeting followed the planned agenda. The goal of the meeting was to provide a forum to provide the M&O IDS designers and the TCO with a better understanding of SNL Construction Monitoring Test data acquisition details, demonstrate current IDS design concepts supporting this test, and confirm the basis for IDS support. A summary of discussions follows:

1. Expected instrumentation includes load cells, multiposition borehole extensometers (MPBXs), and rockbolt load cells. All instruments are vibrating wire (VW) type manufactured by Geokon.

2. Manual measurements of the tunnel opening dimensions (convergence) are made with a tape extensometer measuring between a set of two metal pins set in the rock. At each convergence measurement station, successive sets of pins are installed in rotation around the tunnel circumference to measure convergence on several angularly displaced axes.

3. Each Construction Monitoring test instrument station consists of several distinct instruments and each instrument may contain multiple sensors. Each test station requires 60-70 channels of data acquisition.

4. Instruments currently installed in the starter tunnel are being read with hand-held readout boxes.

5. Current plans include data acquisition by a battery powered, portable datalogger (Campbell Scientific 10RX style) used in conjunction with plug-in vibrating wire multiplexers as the instrument front and interface. The unit has a self contained (embedded) software program that is custom configured by the user for data rates and house keeping chores. Periodically the data is downloaded from the datalogger to a portable or desktop computer for archiving and analysis.

6. Only one portable datalogger (for the starter tunnel) will be procured and installed in FY94. It is planned to replace this datalogger with an IDS data acquisition station (DAS) in about May, 1994. As additional instrument stations will be monitored by adding DAS units. Replacing the installed datalogger with a DAS will allow IDS to gain experience with this test and their new gear before the TBM starts later in the year.

7. As tunneling continues, additional instrument stations will be installed every 400-500 ft. Based on an overall main drift length of \( \approx 40,000 \) ft this could result in 80 instrument stations and 5,000 data channels.
8. Automatic data acquisition data rates are expected to be in the range of 1 reading/hour to 1 reading/day. Higher rates will be associated with newly installed instrument stations in freshly excavated material. Expected initial movements (if any) will be relatively rapid necessitating faster data rates. As the excavation stabilizes, movements will decrease and data rates can be lowered. Over a period of months this rate may decrease to 1 reading/week.

9. Plan location of DAS based on inst sta locations, excav sequences.

10. SNL is interested in remotely monitoring their test from Albuquerque, NM and Las Vegas, NV via a dial-up telephone modem. The success of the test does depend on remote monitoring. It would, however, provide a convenient and timely method for evaluating test results as often as needed especially if priority monitoring requirements were to develop.

11. The SNL YMP testing database uses Ingres database application and the GIS map information data to produce text and graphic test reports referencing GIS coordinates. The graphical user interface uses ArcInfo software running on a user computer to access test and map data stored in Ingres.

12. The SNL YMP testing database uses optical disk storage for backup and off-line storage. It could be helpful to check in with the database personnel about the reliability of these drives and SNL selection criteria.

13. It may be useful to discuss data storage formats with SNL YMP testing database personnel.

14. Action items resulting from the meeting were as follows:

   SNL L Costin will send H Kalia drawings and specifications of the Construction Monitoring test, instruments, datalogger, VW multiplexer, and other details that may be helpful to IDS. LANL will copy and distribute the materials.

   LANL Develop an FRD clarification memo covering IDS requirements for the FY94 and beyond Construction Monitoring test. This will require test coordination input.

   LANL Continue to develop requirements for an ESF telephone link allowing data transfers by dial-up telephone modem.

   M&O Evaluate Construction Monitoring hardware and software planned for SNL procurement and installation for integration into the IDS DAS units to be supplied in FY94.

   M&O Develop (in cooperation with LANL) a representative description of the proposed IDS DAS for SNL.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    F Homuth, LANL, EES-13/LV, MS 527
    R Oliver, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
Attachment 1 – Hewlett Packard IDS Capability Presentation, Business cards

Ed Bernal
Field Engineer
Test & Measurement

John Martinez
District Sales Manager
Test & Measurement

Rich Williams
Integrated Systems Division

Craig Frey
R&D Project Manager
Integrated Systems Division

Hewlett-Packard Company
5130 Masthead Northeast
Albuquerque, New Mexico 87109
505/823-6106
Voice Mail 505/823-6262, Ext 6106
Fax 505/823-6129

Hewlett-Packard Company
5130 Masthead, Northeast
Albuquerque, New Mexico 87109
505/823-6197
Voice Mail 505/823-6262 Ext 6197

Hewlett-Packard Company
1266 Kifer Road, Building 101
Sunnyvale, California 94086
408/746-5550
Fax 408/746-5880

Hewlett-Packard Company
1266 Kifer Road
Sunnyvale, California 94086
408/746-5145
Fax 408/746-5571
Attachment 2 – DOE Communications Interface Meeting Attendance List

**ESF BRIEFING ROOM (F-280)**
**ATTENDANCE SHEET**

<table>
<thead>
<tr>
<th>NAME</th>
<th>ORGANIZATION</th>
<th>DATE</th>
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</thead>
<tbody>
<tr>
<td>Bob Daniel</td>
<td>RSN Comm-Electronics</td>
<td>7/6/93</td>
</tr>
<tr>
<td>Reba West</td>
<td>RSU</td>
<td>&quot;</td>
</tr>
<tr>
<td>Richard Greenfield</td>
<td>RSU</td>
<td>&quot;</td>
</tr>
<tr>
<td>Bob Rosche</td>
<td>M&amp;O - FD</td>
<td>&quot;</td>
</tr>
<tr>
<td>Kumar (W סיונא)</td>
<td>M&amp;O - FD</td>
<td>&quot;</td>
</tr>
<tr>
<td>Frank Lane</td>
<td>M&amp;O - FD</td>
<td>&quot;</td>
</tr>
<tr>
<td>Keith Roberts</td>
<td>M&amp;O</td>
<td>&quot;</td>
</tr>
<tr>
<td>James Bishop</td>
<td>M&amp;O</td>
<td>&quot;</td>
</tr>
<tr>
<td>Kelley Martin</td>
<td>NASA</td>
<td>7/18/93</td>
</tr>
<tr>
<td>Ed Jorgensen</td>
<td>WESTON (4-7511)</td>
<td>7/18/93</td>
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<tr>
<td>Larry Ensign</td>
<td>M&amp;O</td>
<td>&quot;</td>
</tr>
<tr>
<td>Robert Howard</td>
<td>M&amp;O</td>
<td>7/18/93</td>
</tr>
<tr>
<td>Jon Schenk</td>
<td>M&amp;O</td>
<td>7/18/93</td>
</tr>
<tr>
<td>W.K. Kapatchuk</td>
<td>RSU 4-7014</td>
<td>7/18/93</td>
</tr>
<tr>
<td>Mary A. Jones</td>
<td>DOE/CRM 4-7038</td>
<td>7/18/93</td>
</tr>
<tr>
<td>Jim Hall</td>
<td>LANL</td>
<td>7/18/93</td>
</tr>
</tbody>
</table>

Comm: 1300 AM - 7-8-93

Name of Meeting

Hours of Meeting
Attachment 3 – DOE Communications Interface Meeting follow-up memo

TO: Conferees
FROM: R. C. Greenwald
DATE AND TIME: July 8, 1993; 1:30 p.m.
SUBJECT: Communications Interface

CONFEREES:
Department of Energy (DOE/YMPO)
M. A. Jones
Management and Operating Contractor (M&O)
J. R. Bishop
L. G. Engwall
K. Gidwani
R. E. Howell
F. Lane
J. Leak
K. W. Roberts
R. T. Rosche

Technical and Management Support Services (T&MSS)
R. Hardwick

Los Alamos National Laboratory (LANL)
J. N. Hall

Weston
E. Jorgensen

Raytheon Services Nevada (RSN)
B. D. Daniel
R. C. Greenwald
W. C. Kopatch
R. G. Musick
AGENDA:

Keith Roberts opened the meeting and explained that the purpose was to coordinate all the communications needs of all Yucca Mountain Project (YMP) participants and establish points of contact (POC). Mary Ann Jones is the POC for DOE/JRM, John Gandi, who has the responsibility for interfacing with the Nevada Operations Office to provide the necessary upgrades or extensions of all communications systems required to serve the YMP.

The following persons were appointed as POC’s with responsibilities as noted:

- Jim Leak is to establish the communications interface from the Exploratory Studies Facilities (ESF).
- Bobby Daniel is to establish the communications interface from the General Support Facilities and Surface-Based Testing. He is also the POC for providing the Nevada Test Site main communications line to the YMP.
- Larry Engwall has overall responsibility for the ESF requirements.
- Kumar Gidwani has the responsibility for design of the IDAS system requirements.
- Roger Hardwick has the responsibility for coordinating the "Common Facilities" requirements for DOE.
- Ralph Musick has overall responsibility for coordinating the General Support Facilities design.

Both Jim Leak and Bobby Daniel will provide data, voice, and video requirements to Mary Ann Jones.

The meeting was adjourned at 2:30 p.m.

cc: Attendees
    J. G. Gandi, DOE/YMP
    J. M. Replogle, DOE/YMP
    Log Copy
TO: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9323

Las Vegas, NV, Tue, Jun 22 - Fri, Jun 25, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV, Tue, Jul 6 - Fri, Jul 9, 1993

Trip Summary
J Hall activities unless noted
Tue, Jun 22, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Wed, Jun 23, 1993
- Initiated an IDS strategy discussion with K Gidwani (FY94 activities) and F Lane (how to support SNL in FY94).
- Had a second discussion with N Elkins, including C Breeds, concerning CAG FY94 TCO support subcontract. The results are as follows:
  1. N Elkins wants a CAG proposal for FY 94 including J Hall, IDS and computer information system support (consult with R OLiver and D Boak for details), C Breeds, geotechnical engineering support and TFM transition to the M&O, and G Hall (or other appropriate person) for complex database support. TFM and database support tasks may be small or non-existent and are included for completeness to reflect this years activities (easier to put in and not fund than add later).
  2. C Breeds will pursue a separate subcontract with the M&O for TFM and geotechnical engineering support in areas that do not conflict with TCO activities.
  3. A straw-man proposal and cost estimate will be prepared for N Elkins for discussion during the week of July 6.
  4. The results will be incorporated into a draft proposal to be discussed with Fred Homuth when he returns to the TCO during the week of July 19.
  5. The final proposal will be submitted to MAT-7 during the week of July 26.
- N Elkins asked me to meet with L Engwall in response to a telephone message from Engwall to Elkins about FY94 IDS budgets.
Thu, Jun 24, 1993

- G Hall reinstalled the broken Paradox program on Jessi Peel’s computer. It is not clear why the program and/or TFM data entry application failed. J Peel is continuing to enter TFM data this week to try to repeat the failure.
- G Hall worked with C Breeds to identify the TFM database generated reports to be delivered with the TFMDDB Rev 1.0 application later in July.
- Met with Larry Engwall to discuss the budget resulting in the following:
  1. The latest M&O submission to DOE include the following IDS line items:
     - M&O engineering staff $950K
     - Capital, LANL, & Support $1050K
     - IDS FY94 Total $2,000K
  2. The M&O continues to be a strong IDS supporter (not yet tested by severe budget cuts). J Nesbitt has been given a new, higher level, assignment and may now report to D Faust. Nesbitt has hired Jim Leak from Fluor Daniel, Irvine to oversee the entire electrical distribution activity and IDS.
  3. L Engwall called J Leak, suggested that he call me on the phone to discuss my concerns about IDS planning strategies for FY94.
- Received a call from J Leak (M&O, Flour Daniel, Irvine). I introduced myself and he confirmed his duties were as detailed by L Engwall. I outlined my IDS strategy and he supported it and seemed savy about DOE project issues and computer related tasks. Our contact included the following discussion:
  1. The most important tasks for FY94 are the procurement items included in the FY94 budget (SSAS & SNL Construction Monitoring Test support DAS units).
  2. The overall design and procurement specs for the final IDS should be worked on in a way that does not impact planned FY94 procurements.
  3. It is vital to IDS long term success that the identified FY94 procurements be purchased, installed, and operated in a timely manner to support SNL tests and tunneling activities.
  4. He agreed that the first meeting to develop a comprehensive M&O IDS strategy for FY94 and out years should take place during the week of Jul 6. I will initiate this meeting during that week.
- Talked to Les Sheppard (SNL) about following the planned SNL/LANL/M&O excavation meeting tentatively scheduled for Jul 9 with a 1-2 hour IDS meeting to finally define IDS requirements for the Construction Monitoring Tests. I will coordinate this meeting with N Elkins (the meeting organizer) and the M&O.

Fri, Jun 25, 1993

- Discussed the SNL IDS meeting with N Elkins. He is unclear about the schedule and he will continue to pull the meeting together, hopefully during the week of Jul 6.
- Met with N Elkins to initiate preparation of an IDS/testing schedule. Elkins is aware that IDS needs this schedule. He is committed to providing a relatively high-level integrated construction-test-IDS schedule that forms an ESF scheduling basis for all project related tasks. He feels that the separate scheduling efforts by each participant used now are inconsistent, but no one including LANL is funded or commissioned by DOE to act as the integrated scheduler. Without the DOE mandate he is unwilling to put in any effort to create yet another schedule (IDS or any other). This means that for the time being IDS will have to put together their own schedule based on one of the available choices (DOE management, construction (M&O), or...
testing ( LANL)). Sigh! We should work to resolve this dilemma soon by supporting the LANL integrated high-level solution with the M&O. This would tie everything together under LANL's responsibility for high level planning and yet allow all participants full responsibility to develop their own lower level details.

- Met with Jim Blink ( LLNL) to discuss the LLNL/IDS meeting ( Norm Rector LLNL) held recently and to review action items from that meeting, data acquisition for the large block test, and the current status of the LLNL testing program. Our discussion is summarized as follows:

  1. LLNL has not progressed very far in designing the Large Block Test ( LBT)
  2. Senior staff is performing PI functions for the identified tests at this time. As the testing program develops new PIs will pickup individual tests and be grouped under senior staffers. Wunan Lin is the senior staffer and PI for the LBT and underground heated tests at this time.
  3. Abe Ramirez has returned to the LLNL YMP group and will be involved in test instrumentation issues.
  4. LLNL has not been decided to use LLNL engineering staff to provide LBT data acquisition. They will contract with the electronics engineering group for this support if they use internal resources. Their is a feeling that this will be expensive and the equipment proposed equipment hack ( an NTS EG&G EM design) may not be totally satisfactory. If IDS can do a good job, provide some cost saving to LLNL, and be ready on time LLNL could be very interested. I will pursue this with the M&O during the week of Jul 6.
  5. The action item (from the LLNL N Rector meeting) to write a letter to DOE requesting a communication link for the LBT from the test site to LLNL and YMP LV offices was interesting to Blink. I explained that DOE has supported a group ( Harza last I knew) that was designing ( many times over) telecom systems linking the site, Las Vegas facilities, and participant facilities. We should now make an issue of DOE coming through with the goods. He felt that N Rector and I should continue to work up the letter and then have the LLNL TPO send it to Bill Simecka ( DOE) for action. He will let the TPO know we are working on this letter.

- Met briefly with John Peters to check on the progress of SSAS requirements definition. He feels that his IDS issues are starting to smooth out with the intervention of an M&O electrical engineer working with K Gidwani. He reminded me of our control room discussion of 2 weeks ago and went on to say that he is now an enthusiastic supporter of the unified control room concept that would combine IDS, tunneling operations, communications, and others needing operator controlled activities. This concept would provide economy by combining operator tasks, reducing the number of operators, increasing the quality of support by relieving operator boredom ( providing the operator with a variety of things to do), provide 24-hr operators, and a provide trained backup when an operator is absent. We should formally support this option with a letter to B Simecka ( DOE) and ask that the operations facility be reviewed and revised to include this concept.

- Returned to Carlton, OR.
Contract
See daily notes for details of the CAG FY94 Proposal preliminary writeup preparation.

TFM
Covered in daily notes

Test Data Coordination
No action

IDS
- *Interface with K Gidwani*; covered in daily notes and meeting notes.
- *IDS schedule*; No action.

Cy: N Elkins, LANL, EES-13/LV, MS 527
F Homuth, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
Trip Report FY9322

Las Vegas, NV, Tue, Jun 15 - Wed, Jun 16, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV  Tue, Jun 22 - Fri, Jun 25, 1993
Tasks:  IDS, TFM database

Trip Summary
Tue, Jun 15, 1993

- Trip from CAG offices in Carlton, OR to Las Vegas, NV.
- Met briefly with Ardeth Simmons. She mentioned that C Newbury is planning a follow-up TFM meeting sometime near the end of June. I asked D Boak to follow-up with C Newbury next week (C Newbury is gone this week) to coordinate the meeting date so there is no conflict with TCO attendance.
- Met with H Kalia to discuss IDS tasks
- Met briefly with K Gidwani, F Lane, and B Rosche to monitor their progress on the DRD and planning FY94 procurements to support SNL Construction Monitoring tests. K Gidwani shared with me their latest IDS budget update including the following items:

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<td>Total FY94</td>
<td>2,500</td>
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<td>LANL IDS Support</td>
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<td>Capital Procurements</td>
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<td>M&amp;O IDS Engineering</td>
<td>650</td>
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All amounts shown in table are X$1,000s

The $450K Capital Procurements item in the current budget is the actual minimum that will allow the Subsurface Safety and Alarm System and IDS data acquisition stations for SNL construction monitoring to be supported with IDS designed equipment. I would guess that...
Gidwani has increased his engineering budget to include an engineer to take over some SSAS engineering duties as well as anticipated expanded work scope. Their present team has not been fully chargeable for FY93 and some of the increase for FY94 may reflect added support from Fluor Daniel, Irvine, etc. used this FY and anticipated for FY94.

Wed, Jun 16, 1993
- Worked on notes from the Jun 3, 1993 IDS Information Exchange Meeting
- Attended the IDS/LLNL IDS Information Meeting
- Returned to Carlton, OR.

Contract
A CAG proposal for FY94 work supporting the TCO is being prepared and will be submitted early in July 1993.

TFM
No action

Test Data Coordination
No action

IDS
- Interface with K Gidwani; covered in daily notes and meeting notes.
- IDS schedule; No action.

Meeting Notes
Thu, Jun 16, 1993, 10:00am
IDS/LLNL Information Exchange
Scheduled duration 10:00am - Noon, 1:00pm - 2:00pm
Room P114

Attendees
Kumar Gidwani M&O/FD 4-5371
Jim Hall LANL/CAG 47270 or 503/852-7214
Frank Lane M&O/FD 4-1968
Norm Rector LLNL 510 422-3994/L-154
Bob Rosche M&O/FD 4-1970

There was no formal agenda since the meeting was planned around a free discussion. The goal of the meeting was to provide a forum for better understanding of LLNL YMP testing data acquisition activities and demonstrate current IDS design concepts supporting ESF testing. A summary of specific discussion data acquisition system (DAS) issues follow:

Participant’s initials are used to identify discussion items.
NR sharing some general observations on LLNL data acquisition experience;

- The user interface will always be somewhat vague. Recommends that IDS require users to specify and supply their own special purpose interfaces such as vibrating wire multiplexers.
- Most measurements in the Climax Spent Fuel Test (Climax) were high temperature thermocouples.
- 90% of these measurements were made with a simple reed relay multiplexer (MUX) and a digital voltmeter (DVM).
- No amplifiers or filters were included in the measurement system outside of those built into the DVM. These items add complications in calibration, maintenance, and reliability.
- Climax data acquisition equipment was located in a controlled environment alcove maintained at 72°F ±2°F and 50% RH.

ALL There was general agreement that it will be necessary to environmentally control the ESF data acquisition equipment located underground in small buildings or special cabinets.

JH The ESF IDS is a substantially larger system than the Climax DAS. These differences in scale and complexity will lead to alternative YMP approaches to solving certain specific details of implementation.

KG Are there components we could use in IDS from the EGG EM design supporting nuclear testing now being completed at NTS?

NR There are significant differences in the approach for the NTS system making it unsuitable for the ESF IDS;

- The user interface is not suitable for the YMP task
- It is a different kind of system designed for a dissimilar task
- If NR was designing an IDS it would look pretty much like the M&O design

FL The high quality front end data converters (and supporting input amplifiers, filters, and scaling, good common mode rejection (CMR)) planned for the IDS is critical to system performance and is essentially a DVM or DMM in a different form as described by N Rector.

NR using amps preceding the DVM is bad because there must be 1 amp per channel increasing complexity, calibration, etc.

NR Does not use or specify thermistors and strongly encourages PIs to avoid using them due to his experience of poor long term stability. Recommends 4-wire RTDs best, 3-wire RTDs as good, thermocouples only OK due to the need for individual calibration and long term stability, and thermistors are NG.

KG Is front end design useful activity for IDS or should PIs provide their own front end equipment?

NR Recommends that several different types of underground DAS be implemented by IDS and the appropriate type used for simple and more complex measurements.

JH IDS is a user utility in the ESF and IDS maintenance may include providing a variety of services for different PIs. Some may want to be in control of their instrument interfaces directly (LLNL) and others may want IDS to provide all equipment up to the sensor (SNL). At a later time certain instrument maintenance work may also be assumed by IDS (at PIs request). The basic design of IDS and the planned capabilities must include provision for all of these eventualities.

KG We should have a meeting at LLNL to discuss the specific LLNL ESF test requirements including YMP IDS and LLNL engineers and PIs.

NR Good idea, however, coordinating all of the LLNL participants will take some planning.

FL we need to establish known system interfaces including hardware and software to participant
boxes so that when the IDS is delivered it will recognize these interfaces and perform as expected. IDS will store raw data (when available) as well as converted engineering unit data for the convenience of users. We expect each participant to supply their own conversion algorithms or approve IDS supplied conversion algorithms.

FL IDS may need detailed interface documents to define user requirements.

NR Detailed info may not be available for some time (years). It would be helpful if there was a way for IDS to utilize the interface specifications developed as tests are better defined to generate new or modified IDS user interfaces.

FL How about just saying that IDS will provide fixed (16-bit) accuracy measurements? Would that eliminate the need to discuss the accuracy needed for each individual measurement?

NR If you press us we will specify very high accuracy requirements for measurements we have not yet fully defined. Since we don’t have specifications yet, we will over specify accuracy requirements for all measurements to be sure that those measurements (if any) that will finally require high accuracy are available.

NR Here is a brief description of how LLNL did data acquisition at the spent fuel test (Climax).

DAS measurement references included 1mV, 1V, 100Ω, 0°C standards wired into operating channels. The alarm limits were set very close to the expected value be sure to flag even small deviations in standard channel performance. This turned out to be a very good idea since there was only one DVM making all measurements for this test.

Functional responsibilities and responsibilities for Climax test data acquisition were as follows:

<table>
<thead>
<tr>
<th>LLNL</th>
<th>NTS</th>
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<tbody>
<tr>
<td>Design</td>
<td>Build up functions</td>
</tr>
<tr>
<td>QA</td>
<td>check user</td>
</tr>
<tr>
<td>incoming inspection</td>
<td>installation</td>
</tr>
<tr>
<td>calibration</td>
<td>calibration</td>
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<tr>
<td>database</td>
<td>calibration files database</td>
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<tr>
<td></td>
<td>item name tag mnemonics (i.e., SAT131)</td>
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<td></td>
<td>alarm log</td>
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</table>

Data was stored on magnetic tape at the site. The tapes were then sent to LLNL for analysis. The remote operating site at LLNL enabling PIs to monitor and control the test from LLNL was very useful. Communications for a number of NTS test sites are provided by microwave link. This can (and will if there is no alternative) be used for the large block test.

JH Asked NR to request a dedicated phone line at YM to support remote test monitoring for the Large Block Test. This will be very useful for other planned IDS supported tests.

NR YMP should consider a satellite communications link. Agreed!

KG what are the characteristics of the large block test DAS currently being planned by LLNL?

NR The large block test is intended to support LLNL characterization of “hot repository” modeling work with a field study program. Only the most general details of the actual test are known at this time. The modelers are actively attempting to evaluate the test to the extent necessary to have confidence in selecting block test procedures and instrumentation strategies.
FL  what are the characteristics of the heater controllers used at Climax that N Rector would find useful today for the same task in the ESF?

NR  The principal features of the heater controllers used at Climax are as follows:
- there were 77 separate heaters drawing a total of 500KW of power
- each individual heater had a separate, stand alone, set point controller
- each set-point controller's set point could be changed from a remote computer terminal
- the remote computer could ramp each controller between set points
- once at the set point, the controller's function was to regulate constant watts to the heater. Regulation of heater wattage did not involve controlling the set point.
- A watt transducer was used on the output of each controller to supply set point feedback. The controllers used zero-crossing control and the wattmeters were not rated for this duty. Each watt meter had to be individually calibrated to provide the correct feedback over the rage of expected control.

Close out
The meeting was very successful in accomplishing the goal of technical interchange of information relating to IDS, the LLNL Climax Spent Fuel Test, and a preliminary introduction to the upcoming YMP LLNL Large Block Test. Continued meetings were identified as a priority for maintaining this interface to discuss additional details of the Large Block Test and planned LLNL ESF tests. Although the Large Block Test instrumentation and data acquisition is being handled by LLNL (Norm Rector), it was clear from this meeting that there will be a significant IDS role in LLNL ESF testing.

Action Items
1. Frank Lane will look into Internet connections for the M&O IDS design team at the Bank of America Center. Norm Rector suggested that it would be useful for the IDS team and LLNL to have Internet access as one mode of communication. Norm Rectors Internet address is rector2@llnl.gov.
2. Frank Lane and Norm Rector will work out the preliminary technical details for our next interface meeting planned to be within the next month at LLNL.
3. Norm Rector will coordinate with LLNL, identify potential meeting dates, and discuss the details with Kumar Gidwani.
4. Kumar Gidwani will coordinate the meeting with YMP participants and set the final meeting date with N Rector.
5. Kumar Gidwani will prepare the meeting notice and agenda and distribute them.
6. Jim Hall and Norm Rector will work on drafting a letter from LLNL to YMP requesting a telephone line for site data communications to support the Large Block Test. IDS will also make this request.

Cc: N Elkins, LANL, EES-13/LV, MS 527
    F Homuth, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
Next Scheduled Trip

Jim Hall
Las Vegas, NV

Tasks:
IDS meeting with LLNL Wed, Jun 16

Trip Summary

Mon, May 31, 1993

- Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Tue, Jun 1, 1993

- Met with H Kalia to discuss strategy for this week's work and the Thu, Jun 3 IDS Participant Interface Meeting.
- Met with L Engwall to verify the details on the M&O budget meeting scheduled for today to support their full FY94 budget presentation to DOE Fri, Jun 4. Today’s meeting has been cancelled and probably the Fri presentation also. The M&O has received feedback from the TBM manufacturer that the proposed drill-and-blast tunneling to Bow Ridge Fault to form a TBM starter tunnel has too steep a slope (-2 to -3%) to control moving the assembled TBM into place from the pad assembly area and they are recommending =0.5% slope max. The M&O and DOE are meeting with the TBM manufacturer on Thu, Jun 3 to get more details on this issue. The M&O will then rethink their tunneling plans and schedule a new budget meeting.
- Added comments to the IDS monthly report.
- Added comments to C Breeds response to C Newbury’s draft WI, TI, and TFM memo.

Wed, Jun 2, 1993

- Met briefly with R Oliver to discuss F Homuth’s availability to participate in the planned (with F Homuth) and approved (by N Elkins) IDS Information Exchange meeting with the TCO, participants, and M&O IDS designers scheduled for Wed, Jun 3rd 1:00pm.
- Met with N Elkins for a brief discussion of the current proposed (by J Hall) M&O strategy for supplying IDS data acquisition stations (DASs) by mid FY94 (Apr 1995).
Thursday, June 3, 1993

- Attended the scheduled IDS Information Meeting called by the TCO as a preliminary contact meeting between the M&O IDS designers and participant testing groups currently planning ESF tests for FY94-96.

Friday, June 4, 1993

- Met with John Peters and Fred Homuth later joined by K Gidwani and N Elkins to discuss mine safety system status, requirements, and the associated design requirements interface.
- Returned to Carlton, OR.

Contract

Further discussions with Al Pratt (EES-13) confirmed the new (and correct) contract ceiling has been identified to MAT-7, however, $50K in funding has been held back just in case it is excess budget for this subcontract and would not be spent in FY 93. Pratt anticipates that CAG will need the $50K in August and plans to allocate the funds at that time. Fancy financial planning at the top.

TFM

Covered in daily notes

Test Data Coordination

No action

IDS

- Interface with K Gidwani; covered in daily notes.
- IDS schedule; No action.

Meeting Notes

Thursday, June 3, 1993, 1:00pm

IDS Information Exchange

Location: Bank of America Center, Suite P125, Room 10
Scheduled duration: 1:00pm - 4:30pm

Attendees

<table>
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<tr>
<th>Name</th>
<th>DOE/ M&amp;O/ FD</th>
<th>Phone</th>
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<tbody>
<tr>
<td>Ted Petrie</td>
<td>DOE</td>
<td>4-7961</td>
</tr>
<tr>
<td>Larry Engwall</td>
<td>M&amp;O/ FD</td>
<td>4-1826</td>
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<tr>
<td>Tom Fortner</td>
<td>DOE</td>
<td>4-7576</td>
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<tr>
<td>Kumar Gidwani</td>
<td>M&amp;O/ FD</td>
<td>4-5371</td>
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<tr>
<td>Jaime Gonzalez</td>
<td>DOE</td>
<td>4-7337</td>
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<tr>
<td>Jim Hall</td>
<td>LANL/CAG</td>
<td>4 7270 or 503/852-7214</td>
</tr>
<tr>
<td>Fred Homuth</td>
<td>LANL</td>
<td>4 7097</td>
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<tr>
<td>Hemi Kalia</td>
<td>LANL</td>
<td>4 7094</td>
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<tr>
<td>Frank Lane</td>
<td>M&amp;O/ FD</td>
<td>4-1968</td>
</tr>
<tr>
<td>Pat McKinley</td>
<td>USGS</td>
<td>303 236-5781</td>
</tr>
</tbody>
</table>
The meeting followed the distributed agenda. A summary of specific discussion issues follow:

*H Kalia* presented opening remarks, reiterated the meeting goal of a free exchange of ideas supporting ESF data acquisition activities and introduced the first participant presenter.

*Larry Engwall, YMP M&O/FD* provided a recap of M&O YMP responsibilities and confirmed M&O support for their IDS design team to meet test PI and Project Office goals.

*John Pott, SNL* described SNL data acquisition general requirements for Construction Monitoring and other planned ESF tests. Each test has an individual installation and duration schedule and are expected to continue from time of installation for a few days, weeks, or years. Specific issues were as follows:

- Anticipated maximum accuracy for any measurement will not exceed ±0.2%
- There are no detailed test descriptions available for most planned tests. Only general planning documents are available at this time.
- No new estimates for IDS test measurement requirements are available at this time.
- As part of the test and IDS configuration inventory, instrument type, name, serial number, and model number must be included.
- Each instrument will be calibrated through the complete IDS using a field calibration fixture underground to load the instrument and a local IDS terminal to monitor the process. The resulting calibration results would be stored in a calibration file.
- Certain tests will involve heated drifts creating a hostile environment (=200°F).
- A preliminary identification of some sensors expected to used has been done, however, the selected units may change before the test is implemented.
- In the past SNL PIs have proposed to do concurrent monitoring of instruments connected to IDS. This is still being considered.
- The fastest measurement rates vary for each test and will probably slow down with time for certain tests. Fastest rates are expected to be 1-reading/sec to 1-reading/minute.
- Slowest data reading rates are expected to be 1-reading/day to 1-reading/week.
- The number of channels/test will vary widely with expected numbers from 1 - 1000 channels/test.
- The Construction Monitoring Test is currently being supported by clipboard. Anticipated scan rates are ≈1-reading/10sec.
- Written responses to the M&O IDS questions will be prepared and are expected to be delivered in late July or early August, 1993.

*Norm Rector, LLNL* (filling in for Wunan Lin) described his involvement in providing instrumentation and data acquisition for the upcoming Large Block Test planned for the surface in
Due to the short preparation time this data acquisition system (DAS) will be based on an NTS system specified by LLNL and designed and installed by EG&G EM based on CAMAC modular equipment. N Rector showed slides describing the NTS installation. He stated that the planning for the large block test has not progressed to DAS and instrument specifications and the ESF tests are very much further behind. Firm specifications for the ESF tests may be years away. He agreed that some technical interchange meetings between LLNL and IDS would be helpful for IDS to better understand the Large Block Test and start basic planning for IDS support for ESF tests. No written response to the M&O IDS questions are planned.

Falah Thamir and Pat McKinley, USGS Perched Water Tests will not need IDS support primarily because the test location can’t be predicted. Extending the ESF drifts to the Calico Hills sequence will result in repeating all tests except the Excavation Effects Test. Radial Borehole Tests (RBTs) involving thermocouple psychrometers for rock water content measurements will be active for from days to months. Permeability Tests will acquire data at \( \approx 1\)-reading/sec. Percolation, Excavation Effects, and Bulk Permeability Tests will all have long term data rates of \( \approx 2 \) to 4-readings/day. Controls will be required to regulate gas flow rates and turn solenoid valves on and off. USGS will provide a written response to the IDS questions.

Later discussion identified that instrumentation and data acquisition activities similar to that planned for the RBTs is set up and running in USGS facilities located in NTS Area 25. To arrange a visit we should contact the principal USGS PI for this test, Joe Rousseau, in Denver. The test PI is Gary LeCain and the thermocouple psychrometer DAS programmer is Mark Kurzmack.

John Peters, YMP M&O/MK The Subsurface Safety and Alarm System (SSAS) will be used for tunnel safety monitoring and related controls and mining performance data acquisition and will be developed under the IDS umbrella by the M&O IDS designers. Recent discussion at YMP have identified additional construction related data acquisition and control functions and integrating these items into the SSAS is in process. In addition to measurements concerned directly related to safety (i.e., gas concentration, smoke, fire, ventilation on/off, equipment shut-down) measurements of humidity, ventilation system performance and status, tunnel boring machine (TBM) performance, conveyor performance, electrical distribution performance and status, and other related items will be incorporated into the SSAS. Since the primary function of the SSAS is to verify the safety of the excavation, measurement accuracy meeting conventional mining standards is satisfactory as contrasted to the sometimes higher accuracy scientific test measurements made through the IDS.

There was an active discussion concerning SSAS data by participants interested in accessing the data as verification of their own measurements or as primary data as an adjunct to their test data. It was noted that there is a need for further coordination of SSAS measurements and data availability.

After lunch the meeting resumed.

Kumar Gidwani, YMP M&O/FD Provided an overview of the IDS design concept, scope, and tentative schedule based on the current construction schedule. The IDS design is based on individual self contained data acquisition stations (DASs) of different sizes as needed located near the tests, and interconnected by a general purpose fiber optic cable high-speed data network to the IDS surface computer. The surface computer will archive the test data and provide computer terminals and support
for users. The general purpose fiber optic network will support IDS, voice communications, video, and have space for other needs defined later in the program. IDS procurement plans for next year include five small DAS units to be supplied to SNL to support Construction Monitoring Tests. Although the full IDS will not be fully implemented for several years, these DAS units will be able to be used as stand alone data acquisition systems or linked with a local area network (LAN) to a desktop computer located at the surface for setup and data archiving.

Frank Lane, YMP M&O/FD Described the proposed IDS Data Acquisition Station (DAS) concept, instrument interface designs, and the fiber optic network. The DAS design includes the capability for stand alone data acquisition system with a local terminal interface and adequate hard drive space for long term data storage. Standard instrument interfaces include volts, amps, ohms, counts, and period, with specialized front ends for industry standard thermocouples, RTDs, strain gages, and others. Analog to digital converters will have a resolution up to 16-bits with higher resolution available as needed. ESF equipment will be housed in environmentally controlled cabinets or portable buildings. Each DAS will be connected to an uninterruptible power source (UPS) for continuous monitoring during power disruptions.

Bob Rosche, YMP M&O/FD Described the conceptual software design for the IDS archiving computer to be located in the surface IDS computer center. The configuration includes files and logic to create and control DAS configuration, instrument inventory, calibration, disposition, tracking, DAS inventory, component calibration, disposition, and tracking, exception logs, performance logs, raw data archives, raw data on-line, and engineering-unit data on-line. In addition the system will support operation and maintenance consoles, user work stations in the computer center, user work stations in the ESF on the network, printing and plotting facilities, and a dedicated computer power conditioner and UPS. Standard IDS formats will be used for uploading DAS test data, instrument calibration data, and other DAS files into the archiving computer. Additional work needs to be done to establish these standard format for user data upload formats or add additional user formats to the IDS library.

The following action items were identified:

1. LANL will develop planning networks that specifically support the IDS schedule in terms of test and construction schedules.
2. PIs must include IDS support for tests in test plans as they are developed.
3. The M&O and LANL will jointly develop a description of the fiber optic network to help participants understand its purpose and capabilities.
4. The M&O will schedule an initial meeting with LLNL to discuss the Large Block Test and planned IDS support for LLNL underground tests.
5. LANL will schedule an initial meeting with SNL to discuss IDS support for Construction Monitoring Test.
Thu, Jun 4, 1993, 1:00pm

Subsurface Safety and Alarm System (SSAS) Discussion
Location: LANL Suite 820, Room 1

Attendees
Ned Elkins LANL 47097
Kumar Gidwani M&O/FD 4-5371
Jim Hall LANL/CAG 47270 or 503/852-7214
Fred Homuth LANL 4-7270
John Peters M&O/MK 4-1970

There was no formal agenda. The goal was a free discussion to better understand current and future M&O tunneling data acquisition requirements and monitor the M&O IDS designer support.

The meeting started with introductions and a brief description by J Peters of the current status of the subsurface safety and alarm system (SSAS). Kumar Gidwani joined the meeting just as we were starting the discussion. J Peters briefly explained the miner’s current assessment of their requirements to monitor the mining processes including the TBM (voltage and current at the cutter head) and conveyer activity including start stop controls. K Gidwani explained that this was incredibly difficult using the existing system and would require extensive design effort impacting IDS budgets and scope. He even offered to give Peters an individual tutoring session on program logic controllers (PLCs) used by the conveyer manufacturers to show why it was not practical to implement his tentative requirements. J Peters observed that these functions seem to be included as part of the mine safety data acquisition systems he has worked with in the past without much fuss. I pointed out that these two items had been included in the TCO mine safety system requirements, were part of the monitoring capability of the commercial Mine Safety Apparatus (MSA) equipment we had targeted for this task, and furthermore I didn’t think there was much extra work involved in servicing Peter’s request. K Gidwani strongly disagreed indicating that the requests implied significant extra effort. I thanked Gidwani for his input and asked him leave the meeting at this point. Soon after this N Elkins joined the meeting (we were meeting in the conference room). After the three of us explained that what had just happened and identified the interchange with Gidwani as an example of ineffective communication between the M&O IDS and M&O Tunneling I asked Elkins if this was not an appropriate data acquisition interface for us to reopen. Elkins reaffirmed he still held to his earlier request that this interface be abandoned by the TCO. J Peters and F Homuth pointed out that participants in the Thu, Jun 3 IDS meeting had specifically requested that tunneling data be available and/or the decisions on monitoring certain items be coordinated between the testers and M&O tunneling. After some discussion, Elkins revised his limitation on the M&O IDS - M&O tunneling interface to include limited participation by the TCO to make sure it works in accomplishing M&O tunneling goals in an efficient and effective manner.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    F Homuth, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Trip Report FY9320

Las Vegas, NV, Mon, May 24 - Thu, May 27, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV Mon, May 31 - Fri, Jun 4, 1993
Tasks: IDS

Trip Summary
Mon, May 24, 1993
• Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Tue, May 25, 1993
• Met with N Elkins to update him on and/or discuss the following items:
  1. I have been having difficulty in contacting A Simmons to follow up on her requested TFM and M&O data management meetings. I will continue to make the effort to talk to her this week.
  2. We discussed the planned arrival of the newly hired IDS engineer from Los Alamos, Fred Homuth (505 667-1003). Elkins explained that F Homuth will start to work next week, arriving on Wed, Jun 2. He will be in Las Vegas the following week (Jun 7 also). I will not be in Las Vegas the week of Jun 7. I will be attending a seminar. After the week of Jun 7, F Homuth will be on vacation in Europe for 3 weeks and back in Las Vegas in mid July.
  3. I reported that the CAG subcontract Modification 5 revising the subcontract upper limit of funding to cover TFM work has been completed. A remaining problem is that the EES-13 paper work improperly identified funding for the remainder of FY93 causing the contract to be funded $50K short of the new upper limit. I am working to resolve this problem with D Holmes.

• Confirmed with D Holmes (EES-13 financial planner) that the latest CAG contract funding snafu has been corrected and that full funding is available for FY93. J Jefferis in MAT-7 has been advised by D Holmes to modify the CAG subcontract to reflect the increased (correct) allocation. As of Tue, May 25 J Jefferis had not received this advisement from D Holmes.
• Met Jessie Peel the new secretary who is replacing K Quintana. Neither K Cambern or J Peel are sure about how data entry for TFMs will be handled. I suggested that since G Hall will be
in Las Vegas next week it might be helpful for her to train the TFM data entry person in the data entry procedure during her visit.

- Met the new secretary Barbara Mitchell.
- Had a brief conversation with Claudia Newbury to understand her progress on TFM within her current responsibilities. She has been asked by R Dyer (YMP RSED) to consider and document site characterization information flow including data contained in GENESIS including the TDB related to resolving issues associated with a recent site work CAR. Her principal interest is data referenced by the SCP, however other impactive data (i.e., TFMs) are included in this planning exercise. She related the following items:
  1. The flowchart she is working on is at a higher level than just TFM information. It is meant to include all site characterization data included in the test planning process that is within license application impact. She has finished a draft flowchart and given a copy of the draft transmittal memo (addressed to R Dyer) to N Elkins for the TCO to informally review.
  2. A Simmons is definitely in charge of data entered into the TDB and it is appropriate for us to continue to deal with her in the matter of the details of what data will be transferred to the TDB from the LANL TFM database.
  3. C Newbury does not yet have details of TFM data usage that would provide specific definition of requirements for anticipated YMP reports or data retrieval strategies. Although no formal reporting of TFMs from GENESIS has been defined (by YMP), our minimum proposed TFM data transfer containing proposed the identified TFM, approved used constraints (with planned and approved values replaced by as-built values as actual field usage data becomes available), and one set of target spatial coordinates per TFM occurrence was the only data that C Newbury could think of using for SCP support.

Based on this discussion it appears that C Newbury sees TFM data stored in GENESIS as an as-built record for supporting the SCP. This does not include the very important functions of TFM tracking (interesting to LANL and RSED), currently approved TFMs (for planning and design work), and a baseline record of TFM activities (LANL procedural interest for reporting to participants and the Project Office). I think it is important to minimize the importance of TDB reporting from GENESIS for everyday TFM activities that are best handled through the LAN TFM database. This will minimize duplication of effort and the inevitable foul ups resulting from attempting to keep the TDB up-to-date with last minute information from LANL. It is not particularly important to LANL how the TDB information is used as long as we have strong support for our internal TFM database. It is my opinion that it is of primary importance to LANL that we are identified by YMP as the “one-and only” TFM data manager for all ESF and surface activities to ensure an effective and efficient TFM tracking activity. Confirming this central responsibility and identifying specific TFM funding for the TCO should be our primary TFM goals with DOE.

- Met with K Gidwani, B Roschehe, and F Lane to discuss LANL responses to M&O FRD questions.
- Met with Ardeth Simmons to encourage her to contact N Elkins and work with him to arrange her proposed TFM and M&O data management meetings.

*Wed, May 26, 1993*
- Revised the draft CAG responses to M&O FRD questions and distributed the draft to the
M&O IDS designers in preparation for a final resolution discussion today or tomorrow.


**Thu, May 27, 1993**

- Met with B Rosche for a final discussion of LANL responses to M&O FRD questions.
- In cooperation with B Rosche, I prepared the list of IDS questions for the IDS Participant Interface meeting scheduled for Thu, Jun 3, 1993.
- Met with K Gidwani (M&O IDS), L Engwall (M&O), Ralph Dresel (M&O), and later Jack Nesbitt (M&O) to discuss M&O in-process FY94 IDS budget planning. I made a strong case for supporting mine safety, construction monitoring, possible testing at the Bow Ridge Fault, and supplying participants small IDS data acquisition stations for use in their labs during instrument evaluation tests and general test preparation activities. J Nesbitt seemed to understand the need to support these tasks in FY94 and stressed his familiarity with long range planning for IDS based on his ADP experience before joining the YMP. He stressed that there will certainly be some negotiation over the final budget numbers. K Gidwani will need to carefully evaluate the minimum possible IDS budget to accomplish absolutely essential FY94 goals to provide useful backup for the negotiation process. K Gidwani’s proposed FY94 IDS budget includes the following items:
  1. $250K REECo IDS installation and field support in the ESF
  2. $550K LANL IDS support
  3. $750K M&O IDS engineering
  4. $1000K IDS hardware and software procurement

There will be an M&O budget planning meetings held this afternoon, attended by K Gidwani & L Engwall, that will adopt IDS as a line item with a supporting description in the M&O target budget item list for presentation to DOE next week. There is a final M&O budget planning meeting next Tue, Jun 1 to finalize the details including actual line item costs, etc for the DOE presentation. K Gidwani will be out of town on Tue, Jun 1 and I plan on attending the meeting to represent LANL budget interests and help identify the need for IDS support.

The basic IDS strategy for FY94 and beyond must include the commitment by the M&O to meet participant requirements for equipment needed in FY94. This can be accomplished by the M&O procuring the same equipment that the participant has identified for his use in the absence of IDS or it could be an IDS DAS unit. Long range IDS design issues must not be allowed to impact participant support from IDS.

- Returned to Carlton, OR.

**Contract**

Negotiations between MAT-7 and CAG for the change (CAG FY93 subcontract Modification 5) to include additional ≈$150K face value to the subcontract for TFM (Task 1) and engineering support (Task 3) have been completed. The EES-13 response to J Jefferis questions supporting Modification 5, included erroneous instructions for funding allocation of ≈$100K for the
remainder of FY93. D Holmes confirmed on Tue, May 24 that he had sent revised instructions to J Jefferis last week correcting the error and allocating the full funding increase of ≈$150K. Stay tuned.

TFM
Covered in daily notes

Test Data Coordination
No action

IDS
- Interface with K Gidwani; covered in daily notes.
- IDS schedule; No action.

Cy: N Elkins, LANL, EES-13/LV, MS 527
F Homuth, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Trip Report FY9319  
Las Vegas, NV, Mon, May 10 - Wed, May 12, 1993

Next Scheduled Trip  
Jim Hall  
Las Vegas, NV  
Mon, May 24 - Thu, May 27, 1993  
Tasks: IDS

Trip Summary  
Mon, May 10, 1993  
• Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Tue, May 11, 1993  
• Met with H Kalia to discuss long term IDS strategies and planning  
• Met with D Boak to discuss office database and networking protocols  
• Drafted memos to limit my participation in field data coordination  
• Attended TCO staff meeting  
• Attended the DOE/LANL/M&O IDS Briefing meeting  
• Discussed office networking protocols with Doug Weaver

Wed, May 12, 1993  
• Prepared memos and reports.  
• Returned to Carlton, OR.
equipment. T Petrie advised no more than a 2-day determination of the feasibility of sole sourcing and then proceeding with the viable alternative.

3. K Gidwani complained that his schedule is being impacted by REECo’s reluctance to proceed with the procurement until the source of funding has been identified. T Petrie suggested that he move with more resolution to resolve the problem.

4. K Gidwani asked who in DOE would need to approve the proposed procurement and release funds for mine safety equipment. T Petrie commented that if the funding has been allocated no further DOE approvals are required to proceed with the procurement. If no funding has been allocated or the allocation is inadequate, a standard request to DOE for increased funds should be initiated. In this case, he felt that new funds would not be forthcoming and the procurement would have to be covered from existing M&O budgets by reallocation of existing funding.

5. K Gidwani is concerned that delays in procurement of the mine safety equipment will result in the IDS team missing internal M&O scheduled milestones. Suggested strategies for dealing with changes in schedule were as follows:
   a. M&O must evaluate planned schedule IDS impacts
   b. Specific schedule problems are identified, impacts detailed, and related issues evaluated
   c. Discuss schedule impacts and issues with principals (LANL, MK, DOE)
   d. Revise schedule or resources or both with the concurrence of principals
   e. Revise resource requirements as needed and alert M&O management

6. The M&O made a commitment to have an IDS trailer available at the N Pad to house the mine safety equipment and support the SNL construction monitoring activity. What is the status of this trailer? When will it be available for SNL use? No response during the meeting.

7. T Petrie commented that it is inappropriate to have ESF system labels refer to a “mine”. The name of the mine safety system should be changed. K Gidwani suggested Subsurface Safety and Alarm System (SSAS).

8. K Gidwani reported that the IDS Design Requirements Document (DRD) is about 60% complete. Outstanding items needed before the DRD can be completed include clarification of certain functional requirements by LANL and testing PI inputs to refine requirements including current testing plans.

9. T Petrie asked the K Gidwani for to identify IDS design definition documents in the Project document hierarchy. No M&O knowledge of the document hierarchy is available at this time.

10. There was some confusion about M&O document distribution for the mine safety procurement requests and the proposed M&O IDS ADP procurement Implementation Plan outline. DOE personnel present at the meeting were not on distribution for these documents and were unfamiliar with the documents or their contents.
11. The proposed M&O IDS ADP procurement Implementation Plan outline shown at the meeting was developed with the help of Mary Ann Jones (DOE).

12. K Gidwani raised the issue of providing on-site certified (NIST level) calibration for IDS components and test instruments. Although availability of an on-site calibration facility is specified in the IDS Functional Requirements Document (FRD), a calibration facility is not part of currently identified IDS design activities. Clarification of the M&O IDS design teams role in calibration is needed. Others observed the following related items:
   a. SNL was identified as the primary calibration lab for YMP about four years ago. Subsequently the SNL cal lab refused to participate in the SNL YMP QA program.
   b. About one month ago the SNL primary standards lab in Albuquerque, NM accepted QA controls administered by the SNL YMP QA group and agreed to calibrate instruments used in the SNL YMP testing program. These facilities may again be available for participant testing groups.
   c. USGS has on-site calibration facilities for its equipment.

There needs to be a better understanding of the calibration issue before LANL can provide direction to the M&O concerning IDS calibration.

13. K Gidwani reported that the M&O IDS team has had discussions with J McNeely (SAIC, 5-5927) regarding suitable signal and power cables for use underground. Personnel safety from cable combustion products is a very important concern in case of an underground fire. K Gidwani’s current intent was to use MSHA rated IDS cables. T Petrie and others felt that the MSHA label was not necessary and a search should be made to identify less expensive cables that meet MSHA cable combustion emissions standards (or better).

14. K Gidwani expressed concern about the roles of IDS participants in M&O IDS design activities and it was agreed that a chart or matrix will be prepared by LANL identifying each IDS participant, their role, and relate each identified activity to WBS and P&S account numbers.

Action items resulting from the meeting are as follows:

1. LANL develops an IDS and PI instrumentation calibration strategy, implementation, and provides resulting requirements to the M&O IDS designers as needed.
2. LANL will prepare a responsibility matrix per item 14 above.
3. The M&O will resolve the SSAC funding and procurement strategy and proceed with the procurement.
4. The M&O IDS will pursue the SSAC installation schedule with the John Peters (M&O/MK) and Tom Fortner (DOE) and develop new schedules and strategies as appropriate.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
Trip Report FY9318
Las Vegas, NV, Thu, May 6 - Fri, May 7, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV  Mon, May 10 - Wed, May 12, 1993
Tasks:  IDS

Trip Summary
Wed, May 5, 1993
• Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Thu, May 6, 1993
• Met with K Gidwani to resolve remaining issues in the final draft of the M&O IDS Engineering Plan. Gidwani indicated that he would welcome major comments for inclusion in the next draft that he plans for Sep-Oct 1993.
• The second phase of the TFM database application was installed on K Quintana’s computer.
• Attended the scheduled TFM meeting convened by Claudia Newbery

Fri, May 7, 1993
• Reviewed the final draft of the M&O IDS Engineering Plan.
• Checked with N Elkins that H Kalia’s reply to J Jefferis questions regarding approval of Modification 5 to the CAG LANL Subcontract was approved and transmitted to D Holmes.
• Returned to Carlton, OR.
Contract
The final draft of H Kalia’s response to J Jefferis questions regarding the CAG proposal for additional funding and added work within the current subcontract scope were discussed with H Kalia and N Elkins.

TFM
See daily summary and TFM meeting notes for Thu, May 6.

Test Data Coordination
No action

IDS
- Interface with K Gidwani; covered in daily notes.
- IDS schedule; No action.

Meeting Notes
Thu, May 6, 1993, 1:30pm
DOE TFM Meeting

Attendees
List attached

The meeting followed a loose agenda of scheduled speakers and question and answer sessions to acquaint DOE (C Newbury) with the state of LANL TFM activities and links to analysis and the TDB. Specific agenda points and related discussion to TFM database issues follows:

- C Newbury is preparing a TFM process flowchart that will define TFM responsibilities. She will have a preliminary flowchart ready for informal review during the week of May 17, 1993.
- The three TFM categories presented by C Breeds (unconditionally accepted, conditionally accepted, and unacceptable for use under any circumstances) were accepted.
- There are SAIC field jobs with no TPP or JP numbers. The TCO TFM manager will be able to assign a TFM database unique control number for each separate job.
- J Blink recommended that the LANL TFM reporting form be included in the DOE “Forms Book” so that each participant will know where to find the most current update when needed.
- C Newbury stated that TCO TFM database application software will never need QA control since it is not SCS software.
- It was suggested that the TCO respond to TFM submissions to acknowledge having received them to the sender.
- Many agreed that submissions to the TDB would not include requests or planned TFMs.
- Approved TFM information will be uploaded to the TDB.
- TFM usage will be uploaded to the TDB as available. The newest useage information will replace older entries so that there will always be just 2 entries for a particular TFM use; approved and
current usage. The last usage information submitted to the TDB will as-built TFM usage.

- C Newbury stated that TFM information transfers from the LANL TFM database to the TDB will not need TDIFs since TFMs are not controlled by SCP requirements.
- It is important that the analysts receive all information they use for a particular analysis at one time.

Cy: N Elkins, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Phone</th>
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<tr>
<td>Claudia Neshur</td>
<td>RSED</td>
<td>4-7942</td>
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<tr>
<td>Bill Distel</td>
<td>MD/MTS</td>
<td>4-1827</td>
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<tr>
<td>Gregory Fehr</td>
<td>TMS3</td>
<td>4-7124</td>
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<td>Steven Smith</td>
<td>TEM55/EMIC</td>
<td>4-7729</td>
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<td>Edward Fitch</td>
<td>BNL</td>
<td>4-7551</td>
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<td>James M. Rensil</td>
<td>RECO</td>
<td>4-725B</td>
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<td>Eric Stuedad</td>
<td>RSED</td>
<td>4-7567</td>
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<tr>
<td>Chin Borth</td>
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<tr>
<td>Gillian Halls</td>
<td>LANL/CAG</td>
<td>4-7270/602-839-3557</td>
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<td>Peter Hastings</td>
<td>M&amp;O</td>
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<td>Jim Beckett</td>
<td>ESF/C/RF</td>
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To: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9317
Las Vegas, NV, Tue, Apr 27 - Fri, Apr 30, 1993

Next Scheduled Trip
Jim Hall
Las Vegas, NV Thu, May 6 - Fri, May 7, 1993
Tasks: IDS, TFM

Trip Summary
Tue, Apr 27, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Wed, Apr 28, 1993
- Met with H Kalia and K Gidwani (M&O IDS) to discuss the M&O Draft Engineering Plan (EP) received by DOE (Bill Simecka) for signature.
- Met with Ardeth Simmons (DOE Data Management) for discussion of DOE requirements for LANL field support of test data collection.
- Prepared a quick, informal review of the IDS EP for H Kalia.
- Met briefly with D Boak to discuss her progress in defining TCO tasks that are candidates for database data management and report generation.
- Met briefly with R Oliver to share details of my conversation with A Simmons concerning ESF field data and M&O data management issues.

Thu, Apr 29, 1993
- Finished a quick, informal review of the preliminary M&O IDS Design Requirements Document (DRD).
- Met with K Gidwani (M&O IDS), B Roshe (M&O IDS), and F Lane (M&O IDS) for an informal discussion of the preliminary DRD and related IDS design issues.
- Continued with responses to M&O requests for specific FRD issue clarification.
- Installation of the second phase of the TFM database was started on K Quintana’s computer.
- Checked in with D Boak on her & R Oliver’s progress in defining database report generator tasks for the TCO. This is a preliminary task to identify specific targets and start feasibility and
scope discussions. The preliminary list has been prepared, is under review by R Oliver, and will be finalized later in the month. CAG will delay comments on recommended TCO database application and networking recommendations until we have received the list and assessed related impacts.

**Fri, Apr 30, 1993**
- Installation of the second phase of the TFM database on K Quintana's computer was unsuccessful. Several program files were corrupted during the install and not recoverable. It was not possible to resolve the problem. The data currently entered is OK. The problem is being worked on and this part of the database application will be reinstalled next week.
- Met with K Gidwani to discuss revisions to the IDS Engineering Plan.
- Continued work on document preparation.
- Returned to Carlton, OR.

**Contract**
I have alerted N Elkins and H Kalia earlier that the April CAG billing will be larger than usual reflecting the increased level of effort involved in supporting the TFM task. The revised FY93 Cost Plan submitted to Jim Jefferis (505-667-5331) in MAT-4 covering the increased effort has not yet been approved. Current funding is nearly exhausted (~$15K left after the April '93 billing). Additional funding allocation to this contract will have to be in place by the end of May to cover anticipated billings for the remainder of FY93. I suggest that the revised contract be fully funded through September 1993 as part of this modification.

**TFM**
See daily summary and the notes on my discussion with Ardeth Simmons.

**Test Data Coordination**
See daily summary and the notes on my discussion with Ardeth Simmons.

**IDS**
- *Interface with K Gidwani;* covered in daily and meeting notes.
  Received the following items from the M&O IDS group:
  - IDS Implementation Plan Format (a preliminary outline), Bill Richards (Fluor Daniel, Irvine), 4/27/93, 3-pgs
  - IDS DRD Questions, Frank Lane, 4/27/93, 3-pgs.
  - IDS DRD Changes, Bob Roshe, 4/28/93, 15-pgs
- *IDS schedule;* No action.
Meeting Notes
Wed, Apr 29, 1993, 10:30am
*Discussion with Ardeth Simmons concerning DOE field data support issues*

Our discussion followed an informal agenda to starting with A Simmons explaining her expectations of the flow of ESF field test data from the test to the participant to the TDB. Her description followed the idea that each participant will control their own data up to the time it is submitted to the TDB. The TDB will more closely resemble an as-built record than a baseline. Even after submission to the TDB revised submissions are expected that will replace earlier versions. No actual data structure for records submitted to the TDB was discussed. DOE expects functional baselines to be implemented through participant and DOE record centers. Participants perceived by the TCO as having “weak” field data monitoring plans and related data management capabilities are formally on their own except for DOE directed process changes and interventions. A Simmons suggested that advisements from the TCO of field data problems could be useful, however the routing and implementation of such recommendations is not clear to her.

At this time the only formally identified LANL data management functions are for data generated from the LANL test program and IDS. LANL test data management is not identified as a Las Vegas office task at this time. IDS data management will be defined by the TCO. A Simmons mentioned that DOE plans to have field engineers devoted to monitoring testing activities in addition to the omnipresent QA hawks. Part of planned TCO field data coordination should include specific interaction with these DOE field engineers as a TCO-DOE field interface. Our discussion was brief and hurried between HLW Conference sessions and I did not explore this issue further. I will continue discussion on this issue next week in Las Vegas. A summary of our discussion follows:

- A Simmons reaffirmed her position that LANL field test coordination activities have no data monitoring role. She feels that existing DOE directives for participant work, DOE and participant data management procedures, and planned DOE field watchdog activities are adequate to ensure that needed data will be placed in the TDB.

- A Simmons asked that LANL plan and schedule a TFM information meeting for late May or early June to briefly explain the TFM process and the TFM database and participate in planning for transferring TFM information to the TDB. As part of this meeting she wants to develop TFM process requirements describing the content and structure of resulting TDB TFM information. The agenda should be developed by LANL with input from A Simmons. Attendees should include LANL personnel, A Simmons, perhaps Jim Gardener, and others LANL or DOE might think appropriate for a small working meeting.

- A Simmons asked that LANL plan and schedule two back-to-back data meetings in one day to consider more general data issues. The first meeting (2-hour session) would consider ESF data issues including LANL’s concern about potential “lost data” and plans for IDS data management. Other appropriate discussion items include the following items...
a. DOE has certain process in place (DOE and participant QA procedures, QA field reps, DOE data sentinels, and probably others) to address perceived field data issues; are they adequate?
b. Are there marginal data generating activities (i.e., not currently identified in DOE or participant data management strategies) not conforming to current DOE field data collection intentions and/or the expected data management model?
c. Does the LANL TCO have an ESF data collection and/or data monitoring role?
d. Are there any field data issues impacting TDB contents (planned or actual) that effect LANL field test support activities.

The agenda will be prepared by LANL in cooperation with A Simmons. First meeting attendees should include LANL personnel, A Simmons, perhaps Tim Sullivan, and others LANL or DOE might think appropriate for a small working meeting.

The second meeting (2-hour session) would consider M&O data issues including DOE concerns transmitted to other participants in recent meetings. LANL’s role would be as a semi-passive participant commenting on the process during the meeting and/or later to A Simmons. The agenda will be prepared by DOE. Second meeting attendees should include LANL personnel, A Simmons, Steve Bodner, and others DOE might identify for this meeting.

Meeting Notes
Thu, Apr 29, 1993, 9:30am
M&O IDS Preliminary Design Requirements Document

Attendees
Kumar Gidwani M&O/FD 4-5371
Bob Roshe M&O/FD 4-1970
Frank Lane M&O/FD 4-1968
Jim Hall LANL/CAG 4 7270 or 503/852-7214

The meeting followed an informal agenda to discuss the first rough draft of the IDS Design Requirements Document. Because of the nature of this preliminary document no formal comments were developed or presented. Discussion ranged from minor editorial items to substantial technical issues. The next revision is due about Wed, May 12, 1993 and formal comments will be prepared for this version.

Cy: N Elkins, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS 521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Trip Report FY9316  

WIPP Visit (Carlsbad, NM), Tue, Apr 6 - Thu, Apr 8, 1993  
Las Vegas, NV, Fri, Apr 9, 1993

Next Scheduled Trip  
Jim Hall  
Las Vegas, NV       Thu, Apr 28 - Fri, Apr 30, 1993  
Tasks: IDS, TFM database phased delivery #2 of 3, and test data coordination

Trip Summary  
Tue, Apr 6, 1993  
- Trip from CAG offices in Carlton, OR to Albuquerque, NM, and then to Carlsbad, NM.

Wed, Apr 7, 1993  
- The YMP group consisting of, H Kalia (LANL), J Hall (LANL/CAG), Wunan Lin (LLNL), Falah Thamir (USGS), Kumar Gidwani (M&O Fluor Daniel, IDS), Frank Lane (M&O Fluor Daniel, IDS), Bob Roshe (M&O Fluor Daniel, IDS), and Bill Reed (M&O Fluor Daniel, ESF Electrical), met with Andrew Orrell (SNL, WIPP Test Support) and Susan Pickering (SNL, WIPP QA) for planned meetings covering SNL WIPP test program data acquisition issues outlined in the LANL TCO agenda for this visit.

- I did not register a portable computer carried in my briefcase when entering the site (no indications from WIPP personnel that this was necessary). During a routine exit search, as I was leaving the site in the evening, security guards identified my computer as “potential” WIPP property. Their rules made it necessary for my escort to get a pass allowing me to remove my computer from the site. This took about 30 frantic minutes and was only possible by luckily finding the right blank form in an office that normally keeps all forms locked up after the office is closed. The lesson for me from this experience is to get my briefcase looked at by security on the way into the site to be sure that my property is properly identified so that I can easily carry it off-site later in the day without security problems.
Thu, Apr 8, 1993

- The YMP group met with Ray Currasco (Westinghouse, WIPP) for planned meetings covering Westinghouse construction monitoring, mine safety, ventilation, and operations programs outlined in the TCO agenda for this visit.

- The group had a brief wrap up contact with S Pickering and we left the site.

- Trip from Carlsbad, NM to Albuquerque, NM and then to Las Vegas, NV.

Fri, Apr 9, 1993

- Received a call from Bruce Cole (Fluor Daniel @ 714/975-3531) concerning revisions to the Mine Safety and Alarm System (MSAS) specifications.

- Met with LANL and SAIC personnel in an informal TFM Data Flow Meeting to discuss TFM data flow from SAIC to the TCO and encourage SAIC to share their surface based testing TFM data with the TCO.

- Met with R Oliver and D Boak to discuss the planned field test report and related office information management issues related to test planning and field test reporting.

- Returned to Carlton, OR.

Contract
No discussion

TFM
Covered in daily notes for Fri, Apr 9, 1993 and Meeting Notes.

Test Data Coordination
Covered in daily notes for Fri, Apr 9, 1993.

IDS

- Interface with K Gidwani; No discussion.

- IDS schedule; No action.
Meeting Notes
Fri, Apr 9, 1993, 9:30am

SAIC TFM Data Flow

Attendees

Deirdre Boak: LANL: 4-7160
Chris Breeds: LANL/SubTerra: 4-7271 or 206/
Jim Hall: LANL/CAG: 4-7270 or 503/852-7214
Hemi Kalia: LANL: 4-7094
Steve Smith: SAIC: 4-7789
Greg Fehr: SAIC: 4-7174
John Savino: SAIC: 4-7427

D Boak initiated the meeting to encourage a dialog between SAIC and the TCO about TFM data transfers to the TCO. The meeting followed an informal agenda that touched on a number of TFM issues and resulted in the following main discussion and action items:

- A potentially useful TFM information control would be to include a task hold on field work pending completed TFM request approval or other TFM disposition in the Test Plan, Job Package, or Work Plan. The QA impacts for this hold point would need to be verified before implementation.
- A LANL TFM representative should attend the scheduled weekly SAIC engineering planning meeting held each Monday to represent LANL TFM concerns and answer questions on LANL TFM reporting policy.
- LANL should schedule TFM interface meetings for each task or activity covered by TCO test planning to help participants understand how to report TFMs and firmly associate TFM reporting with the LANL TCO.
- LANL should schedule a TFM overview meeting with identified participant TFM POCs and test PEs to present the current LANL TFM strategy, discuss the new TCO TFM procedure draft, and re-affirm the necessity for all ESF TFM information to flow to the TCO.
- A TFM overview meeting with DOE should be scheduled in the near future to present the current LANL TFM strategy, a draft of the new TCO TFM procedure, discuss the new TCO TFM procedure draft, and re-affirm the necessity for all ESF TFM information to flow to the TCO.
- LANL should draft a response to J Savino’s TFM submittal and send it to the M&O.
- TCO TFM planning, database development, and data entry activities should continue to move ahead despite uncertainty over long range TFM plans.

Cy: N Elkins, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
To: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9315
Las Vegas, NV, Wed, Mar 31 - Fri, Apr 2, 1993

Next Scheduled Trip
Jim Hall
Carlsbad, NM WIPP visit Tue, Apr 6 - Fri, Apr 9, 1993
Tasks: Review data acquisition, instrumentation, and test data management

Trip Summary
Wed, Mar 31, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.
- Met with H Kalia to discuss the upcoming WIPP trip and the status of CAG activities.
- Received two M&O documents from H Kalia for review and comments no due date for comments except ASAP):
  * FY93 IDS Engineering Plan Rev 0, Mar 1993, 34-pgs+attachments

Thu, Apr 1, 1993
- Met briefly with F Lane (M&O IDS) to discuss IDS Design Requirements Document issues.
- Met with K Gidwani (M&O IDS) to discuss the Starter Tunnel Mine Safety and Alarm System (MSAS) procurement specification. He asked for some informal comments.
- Finished draft documents to support up-coming IDS meeting plans.
- Finished draft meeting notes for the M&O IDS Budget/Work Scope Meeting.

Fri, Apr 2, 1993
- Finished written review comments for the MSAS specification document and passed on an “information only” copy with a marked up specification document to K Gidwani.
- Met with F Lane to discuss IDS Design Requirements Document (DRD) issues.
- Returned to Carlton, OR.
Contract
I alerted N Elkins and H Kalia that the March and April CAG billings will be larger than usual reflecting the increased level of effort involved in supporting the TFM task. A revised FY93 Cost Plan has been submitted to Jim Jefferis (505-667-5331) in MAT-4. He estimates that if the technical reviewers cooperate he should be ready to negotiate the change in 2-3 weeks. Additional funding allocation (particularly for travel) to this contract will have to be in place by the middle of May to cover anticipated billings for the remainder of FY93.

TFM
No discussion

Test Data Coordination
No discussion

IDS
• Interface with K Gidwani; covered in daily notes.

• IDS schedule; No action.

Cc: N Elkins, LANL, EES-13/LV, MS 527
     J Canepa, LANL, EES-13, MS 521
     EES-13/LV, LANL, MS 527
     CAG Files, Carlton, OR
To: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9314

Las Vegas, NV, Mon, Mar 15 - Tue, Mar 16, 1993

Next Scheduled Trip
Jim Hall
Carlsbad, NM
WIPP visit
Tue, Apr 6 - Fri, Apr 9, 1993
Tasks: Review data acquisition, instrumentation, and test data management

Trip Summary
Mon, Mar 15, 1993
• Trip from CAG offices in Carlton, OR to Las Vegas, NV.
• Met briefly with F Lane (M&O) to discuss IDS Design Requirements Document issues.
• Met with K Gidwani (M&O) to discuss the state of the IDS Engineering Plan and Design Requirements Document. I also requested IDS meeting slides presented by K Gidwani and F Lane for inclusion in the YMP-WIPP information sharing meeting write-up. He also provided copies of several M&O memos relating to work planned for this year.
• H Kalia asked me to draft a response to the M&O memo he had just received requesting additional FRD information; FRD: Items Requiring Clarification, R Sandifer to H Kalia, 3/4/93, 11-pgs with cover memo.

Tue, Mar 16, 1993
• Provided LANL travel plans for the travel and WIPP visit Apr 6-8 to K Gidwani for reference in planning M&O staff travel to WIPP.
• Attended the scheduled M&O IDS Budget/Work Scope meeting
• Met with R Oliver to review current test plan data coordination write-ups.
• Met briefly with N Elkins to clarify data coordination task.
• Delivered copies of current CAG trip reports to the TCO.
• Picked up copies of K Gidwani’s & F Lane’s slides that were shown as part of their presentations at the YMP-WIPP Information Exchange Meeting held on Fri, Feb 25, 1993.
• Returned to Carlton, OR.
Contract
No discussion.

TFM
No discussion

Test Data Coordination
Resulting from a request to R Oliver I received the following test planning documents for review of test data coordination issues:
- JP 92-20D, Construction Monitoring in the Starter Tunnel
- WP 92-20A Rev 0, Underground Geologic Mapping
- WP 92-20B Rev 0, Perched-Water Testing
- WP 92-20D Rev 0, Construction Monitoring
- TPP 92-10, Underground Geological Mapping in the ESF
- TPP 92-11, Perched-Water Testing in the ESF
- TPP T-93-2, Construction Monitoring in the ESF

IDS
- **Interface with K Gidwani;**
  A major IDS procurement planned for Nov ‘93 may be impacted by a DOE requirement to prepare a procurement plan for DOE review and approval. The current estimate is that approval of this plan will take approximately 8 months from the time DOE starts their review until DOE authorizes procurement to start.

  K Gidwani passed along two memos related to his preparation for Starter Tunnel work this FY as follows:

  * **Sole Source Justification for Mine Safety and Alarm System, 2/19/93,** R Sandifer (M&O) to J Gandi (DOE), 2-pgs w/2-pg attachment.
  * **Fund Appropriation and Release for Mine Safety and Alarm System (Subsystem of IDS), 2/26/93,** R Sandifer (M&O) to J Replogle (DOE), 2-pgs w/1-pg attachment.

  * **IDS schedule;** No action.
Meeting Notes
Tue, Mar 16, 1993, 9:00am
M&O IDS Budget/Work Scope meeting

Attendees
Ned Elkins     LANL        4-7097
Larry Engwall  M&O/FD     4-1826
Kumar Gidwani  M&O/FD     4-5371
Jim Hall       LANL/CAG  4 7270 or 503/852-7214
Hemi Kalia     LANL       4-7094
Frank Lane     M&O/FD     4-1968

The meeting followed an informal agenda to develop supporting information for the current M&O IDS budget planning. The agenda points and related discussion follows:

*Number of common data channels, related instrument costs, and engineering manpower requirements;* ESF test related data (i.e., drift temperatures, humidity, air flow, etc.) and IDS diagnostic data are now lumped together as “common data”. H Kalia will recommend that N Elkins appoint a PI to be responsible for ESF test related common data. IDS internal diagnostic common data will be the responsibility of IDS. To avoid confusion with test related common data the internal IDS diagnostic data may need to be renamed or come under the control of the Common Data PI.

Mine safety and alarm system;* Current planning for the mine safety and alarm system includes 1 remote data I/O station with a capacity of 30 channels of mixed analog and digital I/O. Planned expansion into the ESF will include as many as 30 data I/O stations, each station rated for a capacity of 30 channels of mixed analog and digital I/O with a same mix of channels as the planned Starter Tunnel station. This estimates results in a total estimated system capacity of 900 channels. The currently specified system control computer (a desktop IBM PC clone) will have the capacity to support the full expansion of the planned system.

Cabling costs;* Cabling issues discussed included the following items:

- Whose responsibility is cable procurement?
- Cable characteristics can profoundly effect measurement accuracy for low level signals. If IDS is only responsible for cable within a portion of the system, the PIs or cable procurements may specify inappropriate cable and cause deterioration of measurement accuracies outside of requirement specifications.
- Instrument pigtail and IDS extension cable installation can effect measurement accuracies.
- Responsibility for instrument cable termination networks must be determined and cable termination networks specified since these terminations can effect measurement accuracies.
- K Gidwani needs to understand cable procurement responsibilities and physical installations to verify planned procurement budgets.
- Fiber optic (FO) LAN cabling should follow the construction sequences parallel to other ESF
utilities. At this time, FO cable splice cabinets should be located at appropriate planned test sites. Expected test locations can be determined by N Elkins (LANL) for planning purposes. M&O MK should supply the IDS team with current ESF construction schedules for long range planning and near term activity schedules. Actual FO splice cabinet locations will be determined by the M&O IDS to support IDS field installations as test locations are identified in Test Planning Packages (TPPs) by LANL. TPP information will accurately reflect planned testing activities, IDS requirements, and planned test locations. Certain test locations may be different than expected due to variations in geologic sequences containing items to be tested.

**Calibration and certification responsibility:** Diverse points of view were presented during the discussion. It was generally agreed that an on-site calibration facility supporting appropriate portions of IDS will be needed. Extension of this facility to provide PIs with instrument calibration services, although it may seem to be desirable, is not included in the current M&O IDS planning and may not be required by the PIs. Possible test support, budget, and facilities impacts of an on-site test and calibration facility need to be evaluated. Determination of the need or extent of possible PI on-site calibration facility support and related impacts will be followed up by H Kalia in cooperation with the PIs and the Project Office. The results of this follow-up will be reported to the M&O, as appropriate, for inclusion in their IDS support plans. An interesting development in the SNL Construction Monitoring test is that the SNL standards lab has reversed an earlier position of non-cooperation with YMP to allow lab standards and processes used to certify SNL YMP test instrument calibration to be controlled by the SNL YMP QA program. This decision may provide an important facility for the overall YMP testing program. Prior IDS planning had identified this SNL standards lab as the primary calibration standard (directly traceable to NIST) for qualifying IDS on-site standards.

**Who will install all instruments?** An integral part of the PI/IDS interface has always included a demarkation between PI responsibilities including test installation and the IDS. Current planning associates a PI with every test or testing related data collection activity. Each PI is responsible for understanding the application, behavior, and measurement requirements of instrument within their test responsibility. Instrument installation is the PI's responsibility without exception although PIs may designate subcontractors to do the actual physical installation. Instruments may contain internal wiring terminations or built-in extension cables. In either case cables will be used to extend individual sensor signals from the instrument head, physical instrument case, or sensor to the designated IDS termination cabinet. The choice of cable specifications may, in some cases, contribute to sensor signal degradation and impact the ability of the IDS to provide measurements meeting the PIs requirements. Since the issue of cable choice needs to be resolved during IDS and test design processes it should be a topic for IDS/PI information exchanges.

**Information schedule for PI instrumentation requirements (i.e., signal ranges, accuracies, etc.);** It is recognized that Meetings with test PIs are now being planned by the LANL TCO. The present goal is to complete meetings with all participant national labs and the USGS by the end of May, 1993. These meetings will be the forum for M&O IDS specific questions to be asked and resolved to the extent possible. Where issues remain that require additional meetings, LANL will plan the succeeding in cooperation with the participants and the M&O.
Raw data representation: F Lane observed that the way he is writing the IDS Design Requirements Document (DRD), measurement raw data will be represented as the measured transducer output as if there were a meter measuring the intrinsic instrument or sensor signal. If a pressure gage output is in volts (before normalization to pressure) then the raw data is recorded as volts. There is some problem when recording thermocouples and perhaps other transducers where the output voltage is meaningless without some other related measurement. This issue will be clarified later in the development of IDS raw data formats during design activities. The raw data will be archived locally at the IDS. IDS will use PI approved algorithms to automatically convert the raw data values to appropriate engineering units. Thus the pressure gage voltage (raw data) might be converted to pounds-per-square inch (PSI) using a PI approved normalization equation with PI supplied calibration data. These engineering units will also be archived at the IDS in corresponding files to the raw data allowing straight forward comparison of the stored raw data and engineering values.

H Kalia asked the IDS designers to put together a list of questions for PI discussion during planned PI/LANL/M&O IDS meetings. He suggested convening an IDS meeting in the next after the WIPP trip with all PIs invited to hear the current IDS plans and be presented with issues the IDS designers need resolved as part of their planning and design process.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS 521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Trip Report FY9313  
Las Vegas, NV, Tue, Mar 9 - Fri, Mar 12, 1993  

Next Scheduled Trip  
Jim Hall  
Las Vegas, NV  
Tasks:  
Test data coordination task development  
M&O IDS planning meeting on Tue, Mar 16, 9am

Trip Summary  
Tue, Mar 9, 1993  
- Trip from CAG offices in Carlton, OR to Los Alamos, NM.  
- Met with Frank Lane (M&O IDS) to discuss his progress on the hardware description for the IDS DRD.  
- Met with N Elkins and C Breeds to discuss the current state of TFM database work.

Wed, Mar 10, 1993  
- Met with H Kalia and C Breeds for a TFM strategy discussion.  
- Met with K Gidwani (M&O IDS) for an update on IDS activities.  
- Met with H Kalia for IDS discussions  
- Continued with IDS Information Exchange Meeting write up.

Thu, Mar 11, 1993  
- Met with N Elkins, H Kalia, and R Oliver to develop a test data management strategy and direction for J Hall to proceed.  
- Met with B Richards (Fluor Daniel) and B Roshe (M&O) to discuss B Richards development of the M&O IDS Engineering Plan.  
- Provided assistance to C Breeds in preparing draft TFM procedure figures.  
- Got direction from H Kalia to respond to K Gidwani’s Functional Requirements Document: Items Requiring Clarification, dated 03/04/93.  
- Met with R Oliver to review the morning data coordination meeting and discuss meeting issues. Additional meetings with R Oliver and N Elkins are necessary to resolve planning for J Hall’s targeted test data coordination and related tasks.  
- Continued report preparation.
Fri, Mar 12, 1993

- Met with C Breeds and G Hall to discuss TFM database issues. Due to K Quintana’s busy work schedule supporting test package production, G Hall was unable to work with her directly on the TFM database preliminary installation planned for today. G Hall went ahead and installed a CAG copy of Paradox 4.0 on J Canepa’s PC and started to recover the existing corrupted TFM file she received from K Quintana.
- Met with H Kalia for discussion of the proposed monthly test report.
- Continued report preparation.
- Attended the planned TFM planning meeting to participate in TFM database discussions.
- Returned to CAG offices in Carlton, OR

Contract

N Elkins recommended that CAG proceed with the formal submittal of a request for additional funding to cover costs for TFM work. He also asked that CAG invoices be modified to include the B-codes assigned to work performed. Until further notice the following reporting will be used:

<table>
<thead>
<tr>
<th>J Hall</th>
<th>B328</th>
<th>100%</th>
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</thead>
<tbody>
<tr>
<td>G Hall, C Breeds</td>
<td>B329</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>B374</td>
<td>50%</td>
</tr>
</tbody>
</table>

TFM

The planned data entry only front end for the TFM database was installed in the TCO on K Quintana’s PC. This data entry screen includes the presently identified TFM data that will be part of the final product. This installation is a concept test version and will be used until replaced by the next increment of the application near the first of May.

TFM requirements drive the TFM database (TFMDB) design and implemention. To meet the planned TFMDB delivery schedule, changes to the design must be minimized from now until delivery. Several changes to the design surfaced during discussions today. These particular changes can be accommodated and still meet planned delivery dates. Further TFMDB modifications will impact delivery. At this time, CAG recommends that the TFMDB design be frozen to expedite on time delivery. Any additions or changes after this date will be noted in a change pending file to be added after the completed database is delivered. This will allow the TFMDB to be used and tested in a final form while identified changes and/or modifications are added as planned revisions. Databases of this complexity and diverse reporting capabilities are generally revised frequently during early testing and periodically thereafter as bugs are worked out and the operational capabilities are refined to suit current office practices.
IDS

- Discussion with H Kalia Wed, Mar 10, 1993; The planned trip to WIPP has been moved to Wed, Apr 7 - Thu, Apr 8. We have to be at the headframe at 7:30am on Wed. Travel will be Tue, Apr 6 to WIPP, returning on Thu evening. J Hall will draft a memo to B Craig requesting a meeting with the IDS POC and PI(s) for early tests and other testing in the ESF. The memo should include the defining purpose and objectives of the meeting. The objectives should be worked out in cooperation with M&O IDS. Additional IDS meetings need to be scheduled with LLNL, SNL, and LANL to be completed in April or May. One of several meeting objectives will be to develop with the PIs conceptual schematics of each test showing the approximate location in the ESF and the test layout with instruments and constraints identified.

Internally in the TCO, J Hall’s tasks need to be more clearly identified including data management, FRD revision, PI meetings and follow-up, and M&O IDS support.

- Interface with K Gidwani; I received from K Gidwani informational copies of the following TRW IDS related memos:

1. Functional Requirements Document: Items Requiring Clarification, dated 03/04/93, 11-pgs, R Sandifer (TRW) to H Kalia (LANL)

2. Fund Appropriation and Release for Mine Safety and Alarm System (Subsystem of IDS), dated 02/26/93, 3-pgs, R Sandifer (TRW) to J Replogle (DOE)

3. Sole Source Justification for Mine Safety and Alarm System, dated 02/19/93, 4-pgs, R Sandifer (TRW) to J Gandi (DOE)

4. Request for IDS FRD, dated 02/12/93, 1-pg, K Gidwani (TRW) to H Kalia (LANL)

K Gidwani reported that the proposed transfer of mine safety data acquisition equipment from DNA to YMPO being handled by H Gonzales (DOE) has been rejected by DNA. K Gidwani is proceeding with the M&O sole source purchase of MSA equipment for the Starter Tunnel mine safety system and still hopes to make the required system availability date.

- Discussion with Frank Lane;

Calibration: One of F Lane’s was primarily concerns is the best strategy for establishing on-site IDS calibration facilities and establishing IDS and M&O responsibility for exactly which portions of the test equipment IDS operations will be responsible for calibrating. Early IDS planning and the FRD have identified, in addition to the surface computer building, the need for an IDS workshop and calibration facility located in the ramp Pad surface facilities. These facilities should be specifically oriented at IDS maintenance and verification of system calibration. This would be transfer standard lab with primary calibration of the transportable standards performed by the SNL DOD calibration lab or equal. In general the PIs will be responsible for instrument calibration, however, some PIs may need instrument cal lab facilities
on-site. In this case it would make most sense for the IDS cal lab to also provide instrument calibration facilities. If the M&O operates as the common data PI much of the potential instrument calibration equipment required for general test instruments will be on-hand to service the common data instrumentation.

**IDS Sphere of Responsibility:** IDS hardware responsibility ends at the PI instrument pigtail termination. Individual PIs may request the IDS to take over maintenance and calibration of existing portions of their test gear and instrument wiring for a particular test, thus extending IDS responsibility up to the instruments in certain cases. Even in cases where IDS is responsible for instrument maintenance, their responsibility will be passive not proactive. The PI may delegate certain aspects of instrument maintenance, however, the PI always retains the overall responsibility for their test and test support equipment they have installed. In the case that IDS finds or suspects a problem with PI equipment, they will advise the PI (with recommendations as appropriate) and standby for instructions.

**Central authority for IDS related issues:** Another annoying issue is the need for M&O identification of IDS "authority" including system boundaries and rules for integrating participant equipment into the IDS. This is a bona fide M&O concern, however, the concept needs to be tempered to represent the IDS as an interested, responsive, and accommodating partner in the PIs data collection program.

- **IDS Schedule:** No action.

**Meeting Notes**
Thu, Mar 11, 1993, 9:30 - 11:00am
*TCO Test Data Management Planning Meeting*

**Attendees:**
- N Elkins LANL 4-7097
- H Kalia LANL 4-7094
- R Oliver LANL 4-7095
- J Hall LANL/CAG 4 7270(YMP) 503/852-7214(Oregon office)

**Meeting Summary**
After a series of discussions covering various options for interacting with PI test data in the field the following consensus was reached:

- The CAG recommendation that the TCO perform field data coordination work only with a specific DOE mandate including QA and WBS tie-ins was not accepted. There will be no effort to get additional formal direction from DOE for test data oversight beyond the mandate to develop and manage TPP and JP activities.

- A suggestion that the TCO directly intervene in participant data flow from the field to the participant test database to provide DOE with an independently verified record of all field data collected was discussed and withdrawn.
Although there was general agreement that DOE has fears about loss of control of raw data collected in the field, there was no agreement about the actual details of this concern and any implied expected actions DOE might expect from the TCO to resolve these fears.

The current TCO mandate for field data coordination activities is based on the blanket DOE request for LANL to perform test coordination functions implemented through the Test Planning Package (TPP), Job Package (JP), and Validation Plan (VP) process. Until DOE or field experience indicates otherwise this mandate will be sufficient for the planned data coordination activities.

The TCO will monitor and report on field data collection activities, offer assistance to help resolve data collection related field issues, and make recommendations to DOE of actions to improve or resolve field data issues.

It was reconfirmed that the TCO does not generate test data or manage actual data records. In accordance with current DOE direction, the participant organization generating data, own and processes their data. This means that the TCO will not originate test data TDIFs, control test data, or submit test data records to DOE record centers.

With the possible exception of IDS, the TCO will not be involved in test data management.

TCO functions previously referred to as “data management” (except for IDS) should be identified as “data coordination” or other terminology not including the term “management”.

IDS data management including distribution of IDS data is now identified as a TCO task. LANL will require the M&O IDS to develop, as part of IDS functionality, a periodic (i.e., weekly) semi-automatic test data (and supporting IDS data) distribution to participants as part of the TCO strategy for IDS data management. This will exclude the TCO from any direct data record handling and exempt the TCO from all direct responsibility for test data items, test data records, and test data related TDIFs.

The identified LANL IDS data management function in the IDS responsibility matrix should be retained. The strategy to accomplish this task has not been developed at this time, however, this responsibility will provide the TCO with an important tool for high level IDS review and control of IDS data issues.

Reporting on field test data coordination issues will be included in the planned Field Test Coordinator periodic reports and the TPP closeout report. Reported test data information will be supplied by Field Test Engineers during early test activities with a full time data specialist needed as the testing program develops.
A standardized set of data coordination items to be monitored in the field need to appear in the TPP, JP, and VP as follows:

TPP  A short, high level, description of field work and reporting on test data collection supporting identified site characterization parameters (attributes).

JP    Identify data items to be monitored and the mechanism for accomplishing the task.

JP    Verify data item identification and data set tags relating the data to the test and testing conditions.

JP    Verify that the field data enters the participant QA controlled records processing center.

VP    Validate data collection process success in support of attributes identified in the TPP and in accordance with processes invoked by the TPP and developed in the JP.

J Hall has been identified to write the proposed monthly report. The contents of the proposed report were briefly outlined in the meeting, however, the target content and scope need clarification and coordination with R Oliver and H Kalia to identify components from the field to be included.

J Hall needs clarification from N Elkins on the assignment to write the field testing summary report. Primary responsibility for the report would seem to belong to the Field Test Coordinator (R Oliver). A more suitable task for J Hall would be developing the report outline and format as outlined above. CAG could also contribute to this task by developing a database and/or expanding the planned TFM database to include information supporting the generation of this (and possibly other) TCO report(s).

J Hall will coordinate with R Oliver to review the data coordination sections of TPPs and JPs in progress.

Thu, Mar 11, 1993, 11:00am - 12:00noon

IDS Engineering Plan Meeting

Attendees:
Jim Hall  LANL/CAG  4 7270(YMP) 503/852-7214(Oregon office)
Bob Roshe  M&O  4-1970
Bill Richards  Fluor Daniel

Meeting Summary

The M&O identified specific Engineering Plan (EP) issues from earlier CAG draft EP comments that needed some further discussion that are listed below:

QA references: I recommended (again) that specific references to M&O QA plans and procedures be included to cover all planned IDS activities. This is part of the strategy for this version of the EP. This new team is having to take extra time to identify existing plans and procedures and evaluate their applicability to IDS.

Participant responsibilities: There is a need to identify each participant organization’s responsibilities to IDS development activities. For the TCO this should be satisfied by the existing responsibility matrix. The M&O is going to put together a comprehensive matrix including all
testing organizations as well.

*Work and planning schedules:* The M&O have decided that they cannot include firm scheduling information in this version beyond FY93. They will include a note that out year schedules will be developed this year for FY94 and beyond. The EP will be updated (early) next year to reflect the planning completed in FY93. Planned yearly revisions will be used to keep time scheduled information up-to-date.

Fri, Mar 12, 1993, 2:00pm - 2:45pm (I left the continuing meeting at 2:45PM to catch my flight)

**TFM Planning Meeting**

**Attendees:**

- N Elkins, LANL, 4-7097
- H Kalia, LANL, 4-7094
- C Breeds, CAG/SubTerra, 4-7217(YMP)/(206) 868-8327 (Washington office)
- G Hall, CAG, 4-7270(YMP)/(602) 839-3557 (Arizona office)
- J Hall, CAG, 4 7270(YMP)/(503) 852-7214 (Oregon office)

**Meeting Summary**

C Breeds summarized the new TFM draft procedure content based on his cover report as follows:

- Change the order of item 5 ES&H analysis to follow item 2.
- Need to establish an action matrix based on the summary bullets under 1. Introduction.
- AP 5.21 is being revised and C Breeds recommends adding the 2nd bullet under the note on pg 2 of this report to the AP.
- Current submittals to the analysts include duplications since each TFM request is submitted as they come in without cross checking that this TFM may already be in analysis. We will live with this and expect this situation to improve as testing develops and the TCO has more experience with TFM management.
- Verification of TFM usage will come into the system via PE field reports.
- Discussion of responsibility for detecting TFM usage exceeding the amount requested by the PIU or allowed by the analysts resulted in identification of the need to bring DOE up to speed on this problem with a project strategy recommendation drafted by the TCO. C Breeds has come close to the a proposed white paper to support these discussions with DOE. He needs to revise the cover report to delete detailed references to the proposed LANL draft procedure with an emphasises on program level interactions for a sucessful TFM program and include LANL’s recommendations.
- M&O analysis has been unresponsive with several outstanding and overdue TCO requests for analysis and no acknowledgement of planned M&O action.
- The only groups that should be specifically named in the TFM report or procedure are LANL, YMPO, and the M&O.
- The surface testing program TFM activity is out of control in terms of our current TFM strategy. The M&O may be doing some analysis on proposed and in-use TFM's without the TCO being aware of their activities or included in task definitions of results.
- R Oliver will continuing to handle Fran Ridge TFM's.
• Warehoused items are beginning to show up in TFM inventories. The exact usage will be monitored by the TFMM. Exemption for warehoused items from proposed TFM management activities need to be included in TFM planning documents and procedures.

Discussion continued as J Hall and G Hall left to catch scheduled flights.

Cc: N Elkins, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To: Hemi Kalia
From: Jim Hall
Subject: Trip Report FY9312

Los Alamos, NM, Wed, Feb 24 - Thu, Feb 25, 1993
Las Vegas, NV, Fri, Feb 26

Next Scheduled Trip
Jim Hall
Las Vegas, NV
Tasks: LANL/TCO
Test data management & IDS

Gillian Hall
Las Vegas, NV
Tasks: LANL/TCO
TFM database

Trip Summary
Wed, Feb 24, 1993
• Trip from CAG offices in Carlton, OR to Los Alamos, NM.

Thu, Feb 25, 1993
• Attended LANL YMP QA Orientation Meeting
• Returned to Las Vegas, NV.

Fri, Feb 26, 1993
• Met with R Oliver to discuss current TFM and test data management thoughts.
• Met with H Kalia to discuss next weeks work
• Attended IDS Meeting
• Met with Ardeth Simmons (DOE) to discuss project data management strategies.
• Returned to CAG offices in Carlton, OR
Contract
No discussion.

TFM
The design of the TFM database is nearing completion. A planned data entry only front end should be available for use in the TCO as a concept test version on Fri, Mar 12, 1993.

Test Data Management
DOE not interested in “raw data”; During my discussion with Ardeth Simmons she confirmed the scenario of participants acquiring data at the ESF, transporting the physical data record to their site, having it entered in their test database, reviewing the “raw data”, and submitting an accepted data record that is a subset of the entire “raw data” set to the TDB using a TDIF. Further discussion revealed that she expects copies of all raw data to be entered into the CRF by participant QA organizations as an almost automatic feature of the participant test data base entering PI “raw data” into their records system. The CRF will be required to supply all project records on microfiche at the time of license application. Several questions came up in our discussion:

- If tapes containing “raw data” are entered into the participant test database does a duplicate tape get sent to the CRF?
- There is no microfiche copy of a data tape. Are paper records required of tape based data sets?
- What if the data contained on the tape does not lend itself to the microfiche format?
- How are video tapes copied to microfiche?
- Special, proprietary tape formats may be generated. How will these tapes be maintained (re-recorded) by the CRF tape maintenance facility?

IDS
- Interface with K Gidwani; No discussions this trip
- IDS schedule; No action.

Meeting Notes
Fri, Feb 26, 1993, 9:00am
IDS Information Exchange Meeting - Covered in a separate memo, CAG 889306301.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS 521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To: Hemi Kalia
From: Jim Wall
Subject: Las Vegas Trip Report FY9311, Wed, Feb 10 - Fri, Feb 12, 1993

Next Scheduled Trip
Los Alamos, NM  EES-13, LATA  Wed, Feb 24 - Thu, Feb 25, 1993
Tasks: IDS, YMP orientation
Las Vegas, NV  LANL/TCO  Fri, Feb 26, 1993
Tasks: IDS meeting

Trip Summary
Wed, Feb 10, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.
- Met with J Canepa for an overview discussion of my activities. She asked to be put on the distribution list for CAG IDS, data management, and TFM documents submitted to the TCO.
- Met with H Kalia to discuss this week’s activities.

Thu, Feb 11, 1993
- Met with Ardeth Simmons (DOE) to discuss how TCO data management strategies fit with her needs for project data management. Very positive contact.
- Met with R Oliver to discuss J Hall’s current thoughts on TCO IDS responsibilities and test data management.
- Met with N Elkins to discuss J Hall’s current thoughts on TCO data management.
- Met with H Kalia to discuss J Hall’s current thoughts on TCO data management.

Fri, Feb 12, 1993
- Met with H Kalia, K Gidwani, & Paul Pimentel to discuss Gidwani’s planned procurements for the Starter Tunnel.
- Met with N Elkins and H Kalia to discuss office strategies on test data management. The discussion evolved into broad-based considerations of LANL IDS strategies and more general data management issues.
- Met with J Peters (M&O MK) to finalize details of the Starter Tunnel functional requirements.
- Returned to CAG offices in Carlton, OR.
Contract
No discussion.

TFM
C Breeds was in the TCO Thu, Feb 11 - Fri, Feb 12, 1993. G Hall was in the TCO Fri, Feb 12, 1993 only.

Test Data Management

DOE not interested in “raw data”; In discussion with R Oliver, he mentioned that in his discussions with Claudia Newberry (DOE), she indicated that the Project Office is no longer interested in maintaining records of participant “raw” test data. This was confirmed in my discussions with Ardeth Simmons (DOE). This scenario would result in “raw data” from the field would be transferred to the participant test database and archived. As the data is reviewed, normalized, and approved by the PI, it would be submitted as a record(s) to the TDB under participant procedures within the 45 day DOE limit or on some predetermined schedule. IDS data could be treated consistently with other PI data and transferred directly from the IDS to the participant PI or records center.

IDS

Data Collection and Management Discussions

• Interface with K Gidwani
  Engineering Plan; K Gidwani has identified Bill Richards (Fluor Daniel) in his Irvine, CA office for IDS EP review and perhaps authoring help. Gidwani tells me Richards authored the IMACs plan (an Engineering Plan) for Fluor’s current work at Hanford. I read the IMACs plan several weeks ago and it is excellent work. Since then I have suggested several times that Gidwani hire the author. This is probably the best decision Gidwani has made on the EP. Help of this quality should relieve LANL of any further need to nurse maid draft EP preparation.

• IDS schedule; No action.

• Starter Tunnel mine safety monitoring; K Gidwani moving on the mine safety equipment transfer from DNA to YMP now that Jamie Gonzales (DOE) has contacted him. He is not too comfortable with the process but seems committed to keep it moving. He needs continual encouragement to see the transfer as an equipment windfall AND a vital part of his sole source justification.
Meeting Notes
Fri, Feb 11, 1993, 10:30am
Test Data Management Meeting

Attendees
Ned Elkins       LANL        4-7097
Jim Hall         LANL/CAG    4-7270  503/852-7214
Hemi Kalia       LANL        4-7094
Ron Oliver       LANL        4-7095

No meeting summary was prepared. Meeting results are included as part of CAG Report 93-02

Cc: N Elkins, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Las Vegas Trip Report FY9310, Wed, Feb 3 - Fri, Feb 5, 1993

Next Scheduled Trip
Las Vegas, NV       LANL/TCO       Wed, Feb 10 - Fri, Feb 12, 1993
Tasks:            IDS, test data management

Trip Summary
Tue, Feb 2, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Wed, Feb 3, 1993
- Met with K Gidwani (M&O IDS) to discuss the status of the IDS Engineering Plan (EP). I gave him a draft copy of my informal comments on EP draft#2.
- K Gidwani has recently met with Jieme Gonzales (DOE 4-7337) He works for T Petrie and is assigned to monitor IDS. K Gidwani thought he was very interested in learning all about IDS.
- Met with Bob Rosche (M&O IDS) to discuss the current status of the IDS EP. I gave him a draft copy of my informal comments on EP draft#2. He gave me a copy of the latest EP draft#3 for informal review.
- Drafted memo to Bob Craig (USGS) requesting a meeting with Falah Thamir (IDS POC) and Gary LeCain (RBT PI) to discuss RBT IDS requirements the status of their RBT data acquisition equipment (RBT Organizational Computer).
- Finished M&O Engineering Plan informal review cover memo.

Thu, Feb 4, 1993
- Met briefly with H Kalia to plan Fri, Feb 5 activities.
- Met with K Gidwani and Don Kamer (Kochina Controls the MSA local sales & technical rep) for a brief discussion of K Gidwani’s vision of the Starter Tunnel mine safety system.
- K Gidwani has identified Bill Richards (Flou Daniel) in Fluor’s Irvine, CA office for IDS EP review and possible authoring duties. This is a very good decision.
- Met with N Elkins to discuss J Hall direction for the remainder of FY93 and changes in the current contract ceiling to include addition work being performed by C Breeds and G Hall.
- Met with H Kalia to discuss IDS issues and explore alternatives to the current IDS mandated in the ESF DR and related data management plans.
Fri, Feb 5, 1993
- Met with H Kalia, K Gidwani, & Paul Pimentel to discuss Gidwani’s planned procurements for the Starter Tunnel.
- Met with N Elkins and H Kalia to discuss office strategies for test data management. The discussion evolved into broad considerations of LANL IDS strategies and more general data management issues.
- Met with J Peters (M&O MK) to finalize details of IDS Starter Tunnel mine safety system functional requirements.
- Returned to CAG offices in Carlton, OR

Contract
N Elkins is in agreement with the CAG funding proposal I presented including upward revision of the contract price ceiling to ≈$450K to include the increased work recently identified. He also reaffirmed LANL’s commitment to fund J Hall full time for FY93. However, he will not approve contract funding changes until there is agreement between N Elkins, H Kalia, and J Hall on redirection of J Hall’s FY93 work scope to include more immediate attention to TCO test data management. One of my priorities is to submit a revised FY93 CAG cost proposal to MAT-7 in early March. To accomplish this we (H Kalia, N Elkins, and J Hall) must to develop a single vision of test data acquisition concepts, IDS, and data management strategies and plan J Hall’s FY93 tasks in the next 3 or 4 weeks.

TFM
Planned visits by C Breeds and G Hall were cancelled due to C Breeds illness. Pending getting over the flu, C Breeds has rescheduled to be in the TCO Thu, Feb 11 - Fri, Feb 12, 1993. G Hall plans to be in the office on Fri, Feb 12 only.

IDS
Data Collection and Management Discussions
- High level TCO discussions are in process concerning the relative merit and TCO support for organizational computers (OCs) and autonomous data collection by PIs vs a central IDS and related data management issues.

H Kalia advocates the “traditional” IDS approach. Any participant OCs would be managed components of the IDS, installed, managed, and maintained as part of IDS activities. IDS data would flow only to the LANL data manager who would distribute quality data to DOE via TDIF and participants via existing product transfer procedures. He feels that the M&O can provide IDS and should be pushed to start producing components of the system ASAP. LANL must maintain the same testing support relationship to IDS development as to other testing related activities. This includes continued support for the FRD (at a higher and higher level as the M&O becomes integrated into IDS design) and representing PI requirements, schedules, and assessments of IDS implementation. Autonomous PI data collection is not desirable since
records may be captured into participant’s organization and be relatively unavailable to the project. LANL must have specific DOE supported for its responsibility to collect (or inventory as appropriate) field data physical and electronic records. Products would include physical record distribution to participants and DOE and test data reports for the Project Office and PIs.

N Elkins advocates contingency planning for the possibility that IDS may be late and unavailable for data acquisition from a particular test. This would involve monitoring IDS progress and, if non-performance was indicated, recommending participants develop organizational computers and plan on autonomous data collection to ensure that data acquisition is available on schedule. Past performance of IDS design efforts has been plagued with schedule problems and the current M&O effort may jeopardize the testing program. LANL should not be providing the M&O IDS team with any additional help. All “IDS” related activities should be focused on LANL internal issues (data management and test planning) and PI support. A LANL test data management program should be developed and implemented for tracking participant data whose product would be test data inventory reports for the Project Office and PIs.

Interface with K Gidwani
• K Gidwani has identified Bill Richards (Fluor Daniel) in his Irvine, CA office for IDS EP review and perhaps authoring help. Gidwani tells me Richards authored the IMACs plan (an Engineering Plan) for Fluor’s current work at Hanford. I read the IMACs plan several weeks ago and it is excellent work. Since then I have suggested several times that Gidwani hire the author. This is probably the best decision Gidwani has made on the EP. Help of this quality should relieve LANL of any further need to nurse maid draft EP preparation.

• **IDS schedule**; There is no time frame for the M&O or LANL producing the planned integrated high-level construction/testing/IDS schedule. I am working with Bob Craig (USGS) to schedule a meeting soon with USGS IDS contact Falah Thamir and RBT PI Gary LeCain to get up-to-date data acquisition and data production schedules.

• **Starter Tunnel mine safety monitoring**; K Gidwani moving on the mine safety equipment transfer from DNA to YMP now that Jiemie Gonzales (DOE) has contacted him. He is not too comfortable with the process but seems committed to keep it moving. He needs continual encouragement to see the transfer as an equipment windfall AND a vital part of his sole source justification.

Meeting Notes
Thu, Feb 4, 1993, 10:30am
**Starter Tunnel Mine Safety System MSA equipment procurement**

<table>
<thead>
<tr>
<th>Attendees</th>
<th>Organization</th>
<th>Phone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Hall</td>
<td>LANL/CAG</td>
<td>4 7270 503/852-7214</td>
</tr>
<tr>
<td>Kumar Gidwani</td>
<td>M&amp;O IDS</td>
<td>4-5371</td>
</tr>
<tr>
<td>Don Kamer</td>
<td>Kachina Controls (MSA rep)</td>
<td>702/791-5667</td>
</tr>
</tbody>
</table>

Meeting Summary
K Gidwani presented D Kamer with his tentative specifications for the Starter Tunnel mine safety system and worked up a list of equipment needed. Kamer strongly recommended that IDS purchase their newest equipment since the older units do not support the current software. The field stations that we saw at NTS Area-12, P-Tunnel were actually a special run of just discontinued gear that MSA was willing to make for NTS but is now completely out of production. The units could be valuable for interchangeable spare parts. All of the NTS gas sensors are still current production units. Since they have been in storage for some time the gas sensing elements may need replacement (these elements are rated from 1-2 years life). This can be determined by Kamer from date codes. The exception is the special CO₂ sensor that has a permanent element. I emphasized the importance of transferring a fair amount of equipment to use as the basis of the sole source justification. Kamer noted that a “normal” NTS procurement >$100K took about 3 months. His experience is that an under $100K procurement should only take about 3 weeks. Normal MSA delivery is 6-8 weeks, however, he has been able to expedite this in the past to days. Gidwani plans to buy equipment, software, software installation and configuration, installation training, and possibly maintenance from MSA. He still plans on using Sam Williams REECo technicians to install and shake down the system.

Fri, Feb 5, 1993, 10:30am
IDS/LANL Data Management Meeting

Attendees
Ned Elkins     LANL   4-7097
Jim Hall       LANL/CAG 47270 503/852-7214
Hemi Kalia     LANL   4-7094

Meeting Summary

Cy: N Elkins, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To: Hemi Kalia
From: Jim Hall
Subject: Las Vegas Trip Report FY9309, Mon, Jan 25 - Wed, Jan 27, 1993

Summary

Next scheduled trip:
Las Vegas, NV        LANL/TCO        Wed, Feb 3 - Fri, Feb 5, 1993
Tasks:              IDS, test data management, contract funding revision

Mon, Jan 25, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.
- Met with K Gidwani to go over his current list of hot items. He complained that I am not in Las Vegas full time as promised by LANL.
- Met with the M&O IDS and A/E to discuss the on-site IDS computer room layout.
- Met with M&O IDS staff for an update on tasks in progress. Arnold Goldford (M&O IDS hardware manager) quit last week and this delayed the preparation of the IDS Engineering Plan. Frank Lane, the newest M&O IDS staff member, is gone for several weeks arranging to move to Las Vegas. These events have delayed most tasks. B Rosche (M&O IDS software manager) has a target of getting an Engineering Plan first draft ready by Wed, Jan 27 and will provide a copy on disk for informal review.
- Met with R Oliver briefly to discuss the scope of IDS data management. The result was the need to redefine the TCO concept of “IDS data” and identify the specific data items collected under the LANL IDS umbrella.

Tue, Jan 26, 1993
- Continued working on Starter Tunnel functional requirements.
- Met with K Gidwani to discuss his plans for replacing A Goldford. I encouraged him to take the time needed to select an engineer who will be sure to stay.
- Met with K Gidwani and L Engwall to discuss IDS scheduling issues.
- Met briefly with John Peters. He will be at SNL through Wed. I will discuss the Starter Tunnel requirements with him on Thu.
- Met with R Oliver to discuss IDS data management. He is capturing data from starter tunnel activities and entering them into project record centers.

Wed, Jan 27, 1993
• Met with H Kalia to discuss needs for coordinating IDS requirements with the M&O and the
testing schedule. H Kalia suggested we put together a high level test/IDS schedule to be used
for planning IDS work.
• Met with K Gidwani to discuss his planned procurements for the Starter Tunnel.
• Met with N Elkins to discuss office strategies on test data management. The discussion evolved
into broad based considerations of LANL IDS strategies and more general data management
issues.
• Received a copy of the latest M&O Engineering Plan for informal review.
• Returned to CAG offices in Carlton, OR

Contract
N Elkins was unable to meet about revising the contract funding. We tentatively scheduled a
contract funding meeting for next week.

IDS
General
• R Oliver and N Elkins have both spoken to me in detail about their concern that I am spending
too much time working with the M&O and not working enough on the test data management
task. I had a mistaken notion of the scope of the data management task held by N Elkins. As I
discussed this issue with him it became clear that my ideas of both the M&O IDS interface (too
broad) and test data management (too narrow) were incorrect. As our discussion developed we
found that we could not easily define my tasks for this FY without further discussions. N Elkins
felt strongly that we needed a high level meeting with DOE to get concurrence with a LANL IDS
and test data management strategy. My understanding of the issues are:

1. LANL supports the need for an integrated test data management activity that catalogs ALL
   "raw" test data.
2. The IDS has failed to deliver in the past. This consistent lack of IDS success, requires
   LANL to pursue an alternate strategy with the PIs (organizational computers) to ensure that
   the tests start on time with effective data acquisition even if IDS fails or is late.
3. LANL has basically supplied all of the available, pertinent IDS information to the M&O.
   They are now on their own. Our M&O IDS interface will be inactive. We will only answer
   questions (and maybe not all of those).

Interface with K Gidwani
• *IDS "hot items"*; K Gidwani is unhappy at the my not being in the LANL, Las Vegas office
full time. He represents that H Kalia "promised" my 90-100% availability to the IDS task and he
interprets this to mean that I should be here in Las Vegas for that time. He is uneasy at using
phone, fax, or modem as an alternative communication when I am in my Oregon office. He
does not use a computer for his own work and he may need face-to-face contact for an ideal
working arrangement.
• *IDS realistic schedule*; Met with K Gidwani and L Engwall to discuss the importance of IDS
proceeding in a timely manner consistent with realistic IDS needs by the PIs. I expressed
concern that designing the IDS at breakneck speed may create problems by not allowing time for the IDS engineers to adequately absorb the existing IDS design material and understand the ESF and PI issues. Early IDS availability for test requirements are USGS radial borehole tests need to take into account that the test includes an organizational computers connected only to the IDS network. The schedule for connecting these OCs to the IDS network needs to be firmed up with the USGS and will determine initial IDS schedules. L Engwall agreed and suggested that his group will put together a draft IDS schedule including M&O IDS, LANL FRD, and PI tests for discussion. There is no time frame for the M&O producing this schedule. I am working with Bob Craig (USGS) to schedule a meeting soon with USGS IDS contact Falah Thamir and RBT PI Gary LeCain to get up-to-date information allowing us to resolve this scheduling issue.

- **Starter Tunnel mine safety monitoring:** K Gidwani does not seem to understand the urgency of the mine safety equipment transfer from DNA to YMP. As far as I can tell he is not taking a proactive stance on this transfer, identifying his purchasing agent, understanding the procurement process, getting high level approval/support (from Foust or others) for transfers or procurements, etc. In spite of our NTS, Area 12 trip to look at the DNA equipment and my harping on using this equipment as the basis for the Starter Tunnel mine safety system, Gidwani is planning to buy the newest components MSA offers since he doesn’t want to use the “old” DNA surplus equipment technology. These attitudes and strategies are not compatible with your proposal to use the surplus equipment and may create delivery and procurement problems for the M&O. I think it is important that we firmly push the total responsibility for arranging the equipment transfer to DOE/M&O, finish the functional requirements, and move away from this task.

**Meeting Notes**

Mon, Jan 25, 1993, 3:00pm

*Operations Building Interior Layout Informal Review Meeting*

**Attendees:**
- Unknown M&O A/E designer
- B Janota M&O A/E designer
- Jim Hall LANL/CAG 4-7270 503/852-7214
- Kumar Gidwani M&O IDS 4-5371
- Bob Rosche M&O IDS 4-5369

**Summary**

This was an informational meeting, part of the M&O fine tuning the site structures. The A/E designers shared that DOE has identified the IDS computer center as the highest security building on-site. It will be windowless, with limited access. K Gidwani has enlarged the building to 5000 sq ft with all necessary facilities provided for including generous workstation area and office space for PIs, visitors from the State of Nevada or elsewhere, and others working with the IDS.
To: Hemi Kalia
From: Jim Hall
Subject: Las Vegas Trip Report FY9308, Tue, Jan 12 - Thu, Jan 14, 1993

Summary

Next scheduled trip:
Las Vegas, NV LANL/TCO Tue, Jan 26 - Thu, Jan 28, 1993
Tasks: IDS

Tue, Jan 12, 1993

• Trip from CAG offices in Carlton, OR to Las Vegas, NV.
• Met with H Kalia to discuss LANL and M&O responsibilities for IDS and LANL IDS strategies for FY93. J Hall will prepare a statement of LANL IDS responsibilities. Preparation of this document will probably take 2-3 weeks.
• Met with M&O IDS staff to meet their new engineer Frank Lane from Fluor Daniel’s Vienna, Virginia office serving Washington, DC. He is currently developing DAS front end specifications and instrumentation lists from the FRD, EG&G Title 1 design, and RSN documents.

Wed, Jan 13, 1993

• Met with H Kalia to discuss M&O IDS developments.
• Attended the M&O sponsored vendor meeting with MSA. MSA presented their latest equipment including the FDS3 and their DANS computer controller. John Peters discussed the concepts of the MK construction monitoring needs for ESF including the starter tunnel.
• Met with A Goldford (M&O IDS) to discuss progress with the IDS Engineering Plan. He is stopped temporarily by the lack of a PC. I offered the use of the PS/30 in my office while I am here in Las Vegas. Belatedly I checked out my offer with N Elkins and he somewhat reluctantly agreed but emphasized that A Goldford only work in the office while I am here.
• Met with H Kalia for a debriefing on TFM work.
• Completed draft of a memo from H Kalia to D Foust, IDS Design Input.
• Met with R Oliver to discuss TFM hardware requirements for FY93 and Macintosh equipment for a new staffer.
Thu, Jan 14, 1993

- Met with K Gidwani (M&O), A Goldford, and B Rosche to discuss the current status of the M&O IDS work, IDS Engineering Plan (EP), and their preliminary draft Design Requirements Document (DRD).
- Finished revised draft memo from H Kalia to D Foust, *IDS Design Input*.
- Received a preliminary copy of John Peters (M&O) Starter Tunnel and ESF mine safety and construction monitoring requirements.
- Returned to CAG offices in Carlton, OR

**Contract**

N Elkins requested that he and I take time on my next visit to complete planning the CAG funding for the remainder of FY93.

**IDS**

*General*

- Based on discussions with H Kalia, J Hall will begin preparation of LANL IDS Responsibilities memo that describes all planned FY93 (and beyond) IDS responsibilities and activities. This description should be coordinated with the M&O to be sure that they agree with our identified tasks and will support our responsibilities in DOE meetings without rancor.

*Problems interfacing with K Gidwani on IDS design issues*

- A brief discussion with A Goldford disclosed that K Gidwani is somewhat paranoid about my meetings with his staff. He apparently debriefs staffers after each meeting with firm instructions not to take direction from me. Other complaints about his insensitivity to personnel matters and inability to delegate authority were also raised. Although sympathetic I explained that I had no way to intervene and suggested A Goldford take his complaint to L Engwal or another M&O supervisor.

*Met with IDS engineering managers*

- I met with the new IDS engineer Frank X. We had a wide ranging technical discussion and I was impressed with his knowledge and familiarity with the high-level nuclear waste program. He will be a good addition to the M&O team.
- B Roshe passed on to me a new draft outline for the IDS DRD. He also shared a copy of a memo directed at LANL resting additional information relating to IDS design.
Meeting Notes
Wed, Jan 13, 1993, 9:00am
Mine Safety Apparatus (MSA) vendor meeting

Attendees:
Dan Burgh MSA 412/776-8732
Don Kamer Kachina Controls (MSA rep) 702/791-5667
Jim Hall LANL/CAG 47270 503/852-7214
Kumar Gidwani M&O 4-5371
Arnold Goldford M&O 4-5369
John Peters M&O 4-1862
Unknown M&O

Summary
This was a informational meeting for MSA present their new safety monitoring equipment. There was an initial description of project mine safety monitoring requirements, the ESF, and other IDS monitoring activities. MSA described their new Model 6000 Field Data Station 3 (FDS3) and existing DANS control computer based on an IBM clone using Intellution software. The FDS3 units are designed to be stand alone units or networked (via a single #18AWG twisted pair) to a DANS computer. A practical configuration for each FDS3 is 24 analog input channels and up to 32 digital I/O points. Up to 40 FDS3 can be connected to a single Interface Line Converter (ILC) and up to 6 ILCs can be connected to a single DANS PC. An interface is available to allow a DANS PC to be connected at any physical location on the network allowing a diagnostic or local control computer to be connected to the network as needed. The network normally runs at 1200 baud (8-16 miles). This rate can be increased to 9600 baud by shortening the network twisted pair wiring or using alternate physical network such as fiber optic cable. K Gidwani and J Peters estimated that a good estimate would be that the entire ESF mine safety and construction monitoring would ultimately need about 1200 channels of analog and digital data. A brief review of these capabilities confirmed that a worst case reporting of any 1 data item would be 6 secs and since the local FDS3 is autonomous it could be programmed to react independently of the DANS computer within 100msec. The MSA equipment provides analog input and digital I/O. Analog output for controlling variable speed drives, valves, etc. would have to be provided through external equipment interfaced to the FDS3. MSA has provided analog output capabilities for other clients and it is a standard optional component for their system. J Peters could not identify a single analog output requirement at this time. A Goldford suggested that the surface meterological monitoring system could be connected to an FDS3 and perhaps some of the common data items. D Kamer (Kachina Controls) invited an environmental engineer now working for YMP formerly at the test site who worked with the MSA systems in N-Tunnel and P-Tunnel. He strongly recommended a single system for mine safety, environmental, and general mine construction monitoring. NTS specified 3 seprate systems for these functions and this created confusion and resulted in less reliable data monitoring. K gidwani confirmed that he will be doing all of the IDS engineering for the mine safety system. D Kamer closed the meeting with a cost example of a system being proposed to a LANL group at the test site.

Action item: Find the responsible SAIC staffer responsible for the surface based meterological station for the M&O IDS team.
Cy:  N Elkins, LANL, EES-13/LV, MS 527  
     EES-13/LV, LANL, MS 527  
     CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Las Vegas Trip Report FY9307, Mon, Jan 04 - Wed, Jan 6, 1993

Summary

Next scheduled trip:  
Las Vegas, NV  
LANL/TCO  
Tue, Jan 12 - Thu, Jan 14, 1993

Tasks:  
IDS

Mon, Jan 04, 1993
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.
- Met with N Elkins (and briefly R Craig (USGS)) to discuss IDS strategies and the LANL role in guiding the M&O design process to reflect actual testing needs.
- Met with R Oliver for clarification of ESF test locations and status of test planning.
- Met briefly with K Gidwani to discuss the status of M&O work on the N Pad & Portal life safety system, the M&O response to LANL’s request for construction monitoring IDS support, the M&O IDS Engineering Plan, and the DRD outline.
- Met with H Kalia to discuss problems interfacing with K Gidwani about IDS design.

Tue, Jan 05, 1993
- Finished comments on the M&O DRD outline for K Gidwani.
- Completed draft of a memo from H Kalia to W Simecka, Starter Tunnel Mine Safety Data Monitoring Equipment Available at NTS.
- Met briefly with the newly arrived this week M&O IDS team engineers Arnold Goldford (hardware), and Bob Rosche (software).
- Met with C Breeds to discuss TFM activities.

Wed, Jan 06, 1993
- Met with C Breeds and G Hall (CAG) for introductions and preliminary TFM database discussions.
• Met with K Gidwani (M&O), A Goldford, and B Rosche to discuss the current status of the M&O IDS work, IDS Engineering Plan (EP), and their preliminary draft Design Requirements Document (DRD).
• Met with G Hall and Jim Beckett (EGG) for introductions and start of preliminary TFM database/GENISES discussions.
• Returned to CAG offices in Carlton, OR

IDS

General
• Clarification of ESF test locations and status of test planning should be checked in various editions and phases of ESF Test Planning Package 91-5 and other planning documents to develop a detailed map showing test locations, estimated number of DAS channels per test, and a preliminary estimate of test and IDS installation dates.
• A revision of the current FRD is needed to:
  1. expand the IDS database requirements to include internal system configuration data
  2. revise obsolete technical details
  3. revise the orientation from a hands-on design group to specification writers.
• Present milestones for getting requirements to the M&O need to be revised to reflect present program needs.

Status of M&O IDS work
Continued discussion with H Kalia on IDS support for construction monitoring resulted in the following decisions:
• LANL IDS data management will receive data from the SNL tests directly and process the data to the appropriate records center. The M&O will not be involved with this test.
• The M&O IDS design team will handle all details of the mine safety data monitoring equipment design, procurement, installation, and operation. The M&O will provide standard (as defined in a to-be-written LANL procedure) data turnovers to LANL IDS data management.

Problems interfacing with K Gidwani on IDS design issues
• During meetings with K Gidwani he maintained his position that his team needs more functional requirement information and PI interviews to develop their design. Later contacts with his two IDS engineers were more positive. They felt that they could go ahead with the present information.
• Discussions about staged implementation of the IDS including minimal or expendable initial installations of IDS equipment to support Project Office and testing schedules ended with K Gidwani refusing to accept this alternative. Additional work with the M&O is needed to develop the concept of modular IDS implementation to include alternate approaches discussed above (whether they need to be used or not) to be sure the IDS designers are committed to meet testing needs and schedules in a credible way and will do what it takes to get the job done in a timely manner.
• K Gidwani has decided to personally engineer the mine safety equipment for the starter tunnel. I am concerned that his work on this task may be inappropriate if it dilutes his management
activities and impacts work on the Engineering Plan and the general planning for the IDS design task for FY93 and FY94.

- Although we discussed task priorities for starting the design I am not sure that K Gidwani has an overall concept of a realistic IDS design process. I will continue to pursue this since I still have the feeling that this team assigns the design responsibility to their subcontractors and envisions themselves as very high level requirements managers leading to

Met with IDS engineering managers
- I met with the new IDS hardware and software engineers several times and I am impressed with their professional manner and technical discussions of IDS issues. Having only been on the job for a brief time they have a meager grasp of project and IDS issues. They do relate well to the job and are quick to understand design implications of IDS issues we discussed.
- I checked their concept for doing this job and they confirmed that they will basically write specs and subcontract the design, installation, and maintenance of the entire system. They stated that Fluor Daniel does not have in-house hardware or software design capability. I am concerned that the M&O IDS designers may be so remote from the actual work that flexible and timely design revisions (especially for software) may not be possible.
- I mentioned the availability of a software/integration subcontractor through the GSA general services software contract for the Las Vegas, NV area.

Cy: N Elkins, LANL, EES-13/LV, MS 527
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
Summary

Next scheduled trip:
Las Vegas, NV  LANL/TCO  Mon, Jan 4 - Wed, Jan 6, 1992
Tasks:        IDS, TFM

Sun, Dec 13, 1992
• Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Mon, Dec 14, 1992
• Met with H Kalia to discuss equipment requirements for N Pad and Portal construction monitoring.
• Met with H Kalia and C Breeds to start C Breeds acceptance of responsibility for the TFM task. H Kalia indicated that he wanted this transition to be as rapid as possible. He will formally disengage from TFM as soon as C Breeds can manage the activity. After this transition, H Kalia will have limited availability as a TFM consultant.
• Met with C Breeds to coordinate his integration into the TFM activity.

Tue, Dec 15, 1992
• Met with H Kalia to clarify the requirements for the proposed SNL construction monitoring.
• Met with H Kalia and C Breeds for continuing TFM discussions.
• Met with C Breeds to coordinate his integration into the TFM activity.
• Met with K Gudwani to discuss the current status of his work and receive from him a Design Requirements Document (DRD) outline.
• C Breeds returned to Redmond, WA.

Wed, Dec 16 1992
- Finished the M&O IDS Engineering Plan review and informal comments for K Gidwani.
- Drafted a memo requesting mine safety and related construction monitoring requirements from the M&O construction manager (MK) and the constructor (REECo).
- Met briefly with R Oliver to discuss current test plan needs for IDS and brief him on progress to date on TFM. He emphasized the need for IDS to capture early data from the planned SNL N Portal construction monitoring test.

**Thu, Dec 17, 1992**
- Trip from LANL TCO offices in Las Vegas, NV to NTS Area 12 to meet with Sam Williams (REECo) to look at their mine safety monitoring equipment installed in P-Tunnel and discuss availability of surplus equipment suitable for YMP N Portal construction activities.
- Met with H Kalia for an extended IDS status and strategy discussion.

**Fri, Dec 18, 1992**
- Met with N Elkins for an update on IDS and TFM activities and a discussion of CAG proposed FY93 subcontract funding changes to include TFM work by SubTerra and CAG.
- Attended a meeting (briefly) with data acquisition and control system development vendor CANUS who presented their capabilities for IDS work. I referred them to K Gidwani for the actual IDS discussion.
- Met with H Kalia for a wrap-up meeting for this trip.
- Returned to CAG offices in Carlton, OR

**IDS**
Continued discussion with H Kalia on IDS support for construction monitoring. The current LANL plan is that SNL will provide their own organizational computer, instruments, and field support for the planned engineering measurements of the pN Pad and Starter Tunnel. LANL expects to receive IDS test data from this SNL test directly without M&O IDS involvement.

**TFM**
C Breeds is still gathering background information for a planned start of TFM activities in Jan 1993.

**Meeting Notes**
Fri, Dec 18, 1992, 10:00am
*CANUS vendor meeting*

Attendees:
- Jim Hall  
  LANL/CAG  
  47270 503/852-7214  
- Kumar Gidwani  
  M&O  
  45371  
- Floyd Ricks  
  CANUS  
  714/855-8852  
- Roger Cates  
  CANUS  
  714/855-8852  
- Ben Kirk  
  CANUS  
  714/855-8852  
- Jay Schneider  
  Computer Products  
  714/855-8852
This was a informational meeting for CANUS in association with CP to present their capabilities as a data acquisition and control integrator. They do the same work as Fluor Daniel and may not have an application since Fluor Daniel is already doing the IDS design. I gave a short introductory background on the project and LANL’s role in IDS and turned the meeting over to K Gidwani. They continued to meet in conference room 820 for the rest of the morning.

Cc:  N Elkins, LANL, EES-13/LV, MS 527
     EES-13/LV, LANL, MS 527
     CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Las Vegas Trip Report 9305, Mon, Nov 30 - Thu, Dec 3, 1992

Summary

Next scheduled trip:  
Las Vegas, NV  
LANL/TCO  
Mon, Dec 14 - Thu, Dec 17, 1992

Tasks:  
TFM, IDS

Mon, Nov 30, 1992
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.
- Met with H Kalia to discuss equipment requirements for N Pad and Portal construction monitoring.
- Met with Kumar Gidwani to plan our interaction during this week. He will provide a draft copy of the M&O IDS engineering plan he is preparing for informal comments on Wed, Dec 2.
- Finished preparing draft comments on H Kalia's IDS paper.

Tue, Dec 1, 1992
- Asked L Engwall to provide N Pad and Portal constructor activity and safety requirements for integration into the requirements document. He will meet with the construction group and provide the requirements in a letter to H Kalia.
- Met with K Gudwani to interview an IDS hardware manager candidate from the Fluor Greenville, SC office. He becomes non-chargable in Jan 1993 and Fluor is anxious to find him chargable work.
- Met briefly with N Elkins to update him on current CAG contract funding and TFM progress.
- Met with H Kalia, K Gudwani, and Glen McCrank (AECL Research, Canada) to discuss AECL data acquisition at Whiteshell Labs Underground Research Laboratory (URL) near Manitoba. G McCrank suggested that we might travel the URL for a site visit mid-winter.
- Met with H Kalia for resolution of comments on H Kalia's IDS paper.
Wed, Dec 2 1992
- Attended the the planned all-day Technical Database Working Group Meeting providing an update to planned YMP data management activities.

Thu, Dec 3, 1992
- Trip from LANL TCO offices in Las Vegas, NV to Fluor Daniel offices in Irvine, CA.
- Met with K Gudwani and >>?? to discuss the preliminary M&O IDS system design.
- Returned to CAG offices in Carlton, OR

IDS
Continued discussion with H Kalia on IDS support for construction monitoring. The latest revision of the SNL N Portal instrumentation and monitoring proposal is expected to arrive Thu or Fri.

TFM
I checked in with N Elkins to let him know that C Breeds has started reading TFM background material. Contract changes to include SubTerra are not completed at this time.

Meeting Notes
Wed, Dec 2, 1992
Technical Database Working Group Meeting

Attendees:
Jim Beckett EGG 4 7448
Dave Brickey EGG 4 7581
Debbie Edwards USGS
Jim Hall LANL/CAG 4 7270 & 503/852-7214
Bob Lewis T&MSS 4 7993
Ron Oliver LANL 4 7095
Ardyth Simmons YMP 4 7998

This was a very preliminary meeting just to discuss the understanding of the attending participants concepts of data submitted to GENISES, participant and, project record centers. R Oliver described using TDEVs to transmit records reference information for data stored in participant record centers to the ATDT and TDB. B Lewis pointed out that TDEVs are only currently accepted by ATDT with referenced data attached. This would result in a certain amount of duplicate archived data in the participant record centers and ATDT. D Edwards did not know the status of USGS data submittal strategy for fracture data from early construction activities.

EGG is now accepting acquired data (raw data) from participants on a case by case basis. EGG does not want to accept massive quantities of raw data from all participants and they will attempt to filter requests for acquired data entry into GENISES to “appropriate data”. No criteria have been
implemented to identify generalized requirements for identifying appropriate data.

R Oliver indicated that LANL will be interacting with underground test PIs to develop their data package contents and turn-over schedules as part of general test package development activities. This LANL data turn-over liason has not been accomplished for the Fran Ridge task at this time.

A Simmons stated that for GENISES complete data sets intended to be used in analysis would be entered into the SEPDB and higher level models or constructs based on these data sets would be entered into the RIB.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
Summary

Next scheduled trip:
Las Vegas, NV   LANL/TCO   Mon, Nov 30 - Wed, Dec 2, 1992
Irvine, CA     Fluor, Irvine   Thu, Dec 3, 1992

Sun, Nov 22, 1992
• Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Mon, Nov 23, 1992
• Met with H Kalia to discuss strategies and equipment requirements for MK construction
  monitoring of the N Portal and pad.
• Received an uncontrolled copy of M&O QA Procedures.
• Attended a meeting called by Ardyth Simmons (YMP) to discuss incorporation of USGS
  fracture data into the GENISES database.
• Met with Jim Beckett (EGG) to check that he was aware of the restart of the LANL TFM
  database project and was staffed to support the activity. He knew about the TFM restart
  and EGG has increased staff by about 6 FTEs for FY93 and will be able to handle the TFM
  work as it develops. He called my attention to the upcoming “TDB Working Group Meeting”
  scheduled for Wed, Dec 2, 1992, room 755. I will plan to attend this meeting (notice attached).
• Met with Kumar Gidwani for a tour and discussion of the YMP VAX facility. He will be
  getting some assistance from the VAX center staff for IDS issues.
• Met with Kumar Gidwani for a preliminary discussion of issues to be raised in the IDS meeting
  scheduled for Tue, Nov 24.

Tue, Nov 24, 1992
• Attended an IDS planning meeting with the M&O to discuss IDS for N Pad & Portal
construction monitoring.

- Met with K Gudwani to interview an IDS software manager candidate from the Fluor Greenville, SC office. He becomes non-chargeable in Dec and Fluor is anxious to find him chargeable work.
- Returned to CAG offices in Carlton, OR

IDS
Continued discussion with H Kalia on IDS support for construction monitoring. Since the work has been characterized by MK as not quality effecting, design oriented QA controls for developing the DAS are probably not necessary. M&O IDS involvement could help establish the credibility of the team and promote the idea of a proactive IDS group. This approach seems likely to succeed since Fluor Daniel has a pool of working DAS engineers to draw one person from to carry through this task.

H Kalia provided a copy of the RSN response to MK’s request for a preliminary overview of construction monitoring.

TFM
Meeting Notes
Mon, Nov 23, 1992
Incorporation Of USGS Fracture Data Into The GENISES Database Participants

Attendees:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jim Beckett</td>
<td>EGG</td>
<td>4 7448</td>
</tr>
<tr>
<td>Dave Brickey</td>
<td>EGG</td>
<td>4 7581</td>
</tr>
<tr>
<td>Debbie Edwards</td>
<td>USGS</td>
<td></td>
</tr>
<tr>
<td>Jim Hall</td>
<td>LANL/CAG</td>
<td>4 7270 &amp; 503/852-7214</td>
</tr>
<tr>
<td>Bob Lewis</td>
<td>T&amp;MSS</td>
<td>4 7993</td>
</tr>
<tr>
<td>Ron Oliver</td>
<td>LANL</td>
<td>4 7095</td>
</tr>
<tr>
<td>Ardyth Simmons</td>
<td>YMP</td>
<td>4 7998</td>
</tr>
</tbody>
</table>

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A Simmons stated that for GENISES complete data sets intended to be used in analysis would be entered into the SEPDB and higher level models or constructs based on these data sets would be entered into the RIB.

Tue, Nov 24, 1992
IDS Planning for the N Pad and Portal Construction Monitoring

Attendees:
Hemi Kalia  LANL  47094
Jim Hall  LANL/CAG  47270 503/852-7214
Kumar Gidwani  M&O  45371
Larry Engwall  M&O  41826

The discussion focused on helping the M&O understand the monitoring task. The followings issues were discussed:

- The task is in 2 parts;
  construction, mine safety, and life support using conventional equipment such as MSA and blast monitoring for determining overbreak,
  liner engineering monitoring using conventional geotechnical instrumentation and dataloggers.
- This is an opportunity for IDS to become identified as a professional, responsive group taking care of the business of project wide data acquisition.
- SNL is putting together the specs for liner engineering monitoring.
- J Hall will put together the functional requirements by mid-Dec.
- The M&O has equipment funds that should cover procurement of the needed DAS and cable. There may not be funds for M&O procurement of instruments also. If the N-Tunnel MSA surplus equipment can be used current funding may cover the rest.
- A trailer will be required at the pad with mains power and a UPS for the DAS equipment.
- This gear should be procured by the M&O as sole source primarily from time constraints.
- A draft report package should be prepared that will allow a presentation of the preliminary IDS design concept to the Project Office before Christmas.

Cyg: N Elkins, LANL, EES-13/LV, MS 527
     EES-13/LV, LANL, MS 527
     CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Las Vegas Trip Report FY9303, Wed, Nov 11 - Fri, Nov 13, 1992

Summary

Next scheduled trips:  
Las Vegas, NV       LANL/TCO      Sun, Nov 22 - Tue, Nov 24, 1992

Wed, Nov 11, 1992
• Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Thu, Nov 12, 1992
• Met with Hemi Kalia for a discussion of pad-portal IDS requirements.
• Met with N Elkins and C Breeds (CAG) to discuss TCO requirements for CAG geotechnical engineering staff support for FY93.
• Continued to rewrite the “IDS Management Issues” memo for the M&O.
• Drafted “Early Test IDS Strategy Request” memo for M&O, not published at this time

Fri, Nov 13, 1992
• Finished the rewrite of “IDS Management Issues” memo for the M&O.
• Finished “Early Test IDS Strategy Request” memo for M&O
• Met with K Gidwani to discuss IDS software management candidate.
• Participated in the TFM meeting discussing preparation for pad work
• Met with H Kalia and N Elkins to clarify J Hall’s role in FY93 TFM activities
• Met with K Gidwani to discuss IDS background issues
IDS
LANL
In preliminary discussions, H Kalia described the possible MK requirements for construction monitoring at the N Pad and Portal. There is a possibility that IDS could supply data acquisition equipment and specify the instruments used. An important part of this strategy is M&O IDS providing the DAS equipment (and possibly instruments) from their current FY93 capital equipment allocation. Further discussing identified our lack of specific requirements for an M&O procurement and led to the decision to study the requirements further before recommending that the M&O get involved. This will allow the M&O to focus on preparing their engineering plan and straightening out their IDS QA while we develop firm requirements.

M&O
K Gidwani has asked the M&O QA group to review their program to identify specific IDS issues that may require addition procedures or modifications of existing procedures based on LANL comments. The M&O has identified the need for an IDS management plan and to this end K Gidwani has started to write an IDS Engineering Plan.

The first candidate for the IDS software manager position has been found unsuitable and new candidates are being sought. In the interim period until permanent staff is added to the IDS design task K Gidwani will be using local M&O and T&MSS staff to support certain computer related tasks and Fluor, Irvine staff for general IDS system planning. I have scheduled a visit to the Fluor, Irvine office to meet with K Gidwani and his support person on Thu, Dec 3, 1992.

TFM
H Kalia, N Elkins, J Hall, and R Oliver (briefly) met with Chris Breeds of SubTerra, Inc. to discuss CAG/SubTerra support for the TFM task. Under the present contract CAG can bring in new personnel to work on tasks identified in the current CAG subcontract SOW with minimum effort if there is no change in scope and cost. C Breeds indicated that he could be available about 1/2 time for LANL YMP work including TFM. He proposed that he be involved in the initial TFM activity with the possibility of other SubTerra personnel (Jerry Conway and others) participating later as needed. C Breeds will start reviewing TFM information to get familiar with the task in preparation to starting work in late Nov or Dec when contract coverage for SubTerra as a CAG subcontractor is completed. CAG will provide the database engineer for development of the local TCO TFM database, the interface with GENISES including any SQL links required, and design and user documentation. TFM database development is tentatively scheduled to start in Jan 1992.

Several tasks need to be accomplished to start the TFM work:

- CAG must submit the SubTerra subcontract and employment details to MAT to include new billable personnel in the present contract.
- CAG must revise the existing proposal to indicate that no cost or scope has changed by
including these additional personnel
- CAG must prepare a revised cost impact summary for FY93 for TCO planning since continued use of additional personnel will require a higher FY93 CAG subcontract ceiling.
- CAG must submit a revised cost summary in late Dec 1992 or Jan 1993 to MAT to start the process of revising the FY93 CAG subcontract ceiling to include additional effort.

**CAG Subcontract Task 3**
Due to a clerical error not detected until this week, CAG proposal Task 3 was included in the fin negotiated subcontract. Due to the fact that Task 3 was included in the CAG proposal and negotiated with the TCO as apart of the required FY93 CAG effort, it is possible to include Task 3 in the subcontract as a simple modification if there are no cost or scope changes (beyond adding Task 3). To initiate this modification the TCO needs to send MAT a memo requesting the change. I will draft a sample memo ASAP.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Las Vegas Trip Report FY9302, Mon Nov 2 - Thu, Nov 5, 1992

Summary

Sun, Nov 1, 1992  
- Trip from CAG offices in Carlton, OR to Las Vegas, NV.

Mon, Nov 2, 1992  
- Met with Hemi Kalia for a discussion of FY93 IDS task.  
- Met briefly with Kumar Gidwani to discuss work schedules for this week.  
- Continued to rewrite the “IDS Management Issues” memo for the M&O.  
- Drafted “Early Test IDS Strategy Request” memo for M&O, not to be published at this time

Tue, Nov 3, 1992  
- Finished the rewrite of “IDS Management Issues” memo for the M&O.  
- Finished “Early Test IDS Strategy Request” memo for M&O  
- Met with K Gidwani to discuss IDS software management candidate.  
- Participated in the TFM meeting discussing preparation for pad work  
- Met with H Kalia and N Elkins to clarify J Hall’s role in FY93 TFM activities  
- Met with K Gidwani to discuss IDS background issues

Wed, Nov 4, 1992  
- Met with R Morely to discuss the status of standardized data file formats developed by G Cort  
- Met with K Gidwani to review his progress and identify important documents he will need to review for IDS background information  
- Met with R Oliver to discuss TFM issues  
- Continued to identify background documents for CAG review to support IDS design oversite task
Thu, Nov 5, 1992,

- Arranged with M&O to get a controlled copy of their QAP in our library
- Talked to R Oliver about IDS issues. J Hall needs to be in contact with USGS soon for IDS planning of early test monitoring needs and to get up-to-date on USGS plans for their PC based data collection stations to used for RBTs.
- Returned to CAG offices in Carlton, OR

IDS

Information requests to the M&O should be delayed until it is clear that they can respond. They need time to get oriented on the IDS task and probably need more TCO input to define the early tests. The following activities will transmit essential information to the M&O for preparation of a preliminary definition of their design requirements for early tests.

- IDS Requirements for Pad/Portal Tests (Milestone 560 11/16/92)
- meeting with the USGS for an IDS update
- definition of test locations in the ESF

Discussions with R Oliver led to his including an IDS item in his perched water meeting agenda with the USGS. This is a remote possibility for IDS, however it is a good opportunity for an initial IDS contact with the USGS and perhaps some discussion of general IDS issues. R Oliver suggested that I draft a memo requesting that IDS be included in up-coming talks with the USGS (and other participants) with identified or potential IDS requirements.

TFM Comments

TFM discussions with H Kalia and N Elkins included the following items:

1. LANL will be managing TFM for FY93.
2. N Elkins and H Kalia identified a Los Alamos candidate to transfer to LV and manage the TFM work.
3. The TCO will receive additional funding ($150K) from WBS 1.2.9
4. H Kalia will continue as the transitional TCO TFM coordinator until the new TFM manager is up to speed
5. J Hall may need to work on TFM as the year progresses to support the new TFM manager
6. K Quintana is still identified as the TFM database person.

I had a separate discussion with R Oliver to describe my ideas about the FY93 TFM task. The issues discussed included the following items:

- Since the Project Office has refused to transfer the work to the M&O, the TCO has to stop trying to weasel out of TFM work. Continuing this stance will be harmful to LANL, lowering morale of TCO personnel, creating confusion about TCO capabilities, and lowering DOE confidence in the TCO.
- The TCO TFM manager should be a capable technical person with a data entry/database maintenance person working for them. The chemistry background of the identified candidate
should be very helpful. The TFM manager’s primary duties would be organizing and bird-dogging information through the TFM process.

- The TFM manager should have capabilities (maybe partly gained through TFM experiences) for identifying issues that needed expert consideration. He would first turn to LANL staff specialists who could give him guidance and help him form a strategy for this particular TFM occurrence, then to other participant specialists, and finally the formal analysis process for disposition.

- The commitment, morale, and capabilities of the TFM manager are very important and need to be fully supported by the TCO without an undercurrent of rumors that the TFM task is bad, the TCO wants out, and that this is just a tread-water task.

- TFM’s are very important to the Project Office, the TFM task should be very important to the TCO.

- It will be important that the TCO maintain a well thought out TFM database supporting electronic transfers of TFM data to the TDB or other EG&G supported GENYSIS databases. This task will require some new hardware and software to support the TFM database activity that will also provide the TCO with important report generating facilities.

- TFM database personnel will have to work with EG&G GENYSIS personnel to develop TFM database requirements for TFM data stored on GENYSIS, data transfer protocols, and Ingres database training for the TCO database maintenance person. EG&G would maintain the TFM data on GENYSIS in the TCO’s participant work area separate from DOE controlled databases prior to transfer of TFM data into a controlled database.

Cy: N Elkins, LANL, EES-13/LV, MS 527
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
Summary

Mon, Oct 19, 1992
- Trip from CAG offices in Carlton, OR to the TCO in Las Vegas, NV.
- Met with Hemi Kalia and Ned Elkins for a preliminary discussion of FY93 IDS task.
- Started a review of IDS file documents.

Tue, Oct 20, 1992
- Preliminary contact with Bob Craig (USGS) to determine the status of the first RBT.
- Met with Kumar Gidwani (M&O) for a preliminary IDS task background discussion and planning for FY92 TFM activities.

Wed, Oct 21, 1992
- Worked with Kelly Quintana to develop a document format for the transfer of CAG documents to the TCO word processing program (WordPerfect v5.1).
- Reviewed proposed FY93 IDS milestones.
- Met briefly with K Gidwani regarding IDS schedules and general scope.
- Attended the American Mining Congress MINExpo equipment show in the afternoon with H Kalia to investigate possible mine safety and construction monitoring sensors, data acquisition systems, and control equipment.

Thu, Oct 22, 1992
- Met with K Gidwani and adopted the following IDS strategies:
  1. USGS is tentatively expected to supply their own Organizational Computer (OC) for initial RBT data collection.
  2. The USGS Operational Computer for the initial RBT test will stand alone (no IDS connection). USGS data will be transferred to IDS on disk (or other media) and entered in
the IDS database at a later date.

- Briefly interviewed John Ricker, the M&O candidate for the IDS lead software position. He seems to be competent and suitable for the job.

**Fri, Oct 23, 1992**

- Met with K Gidwani for final discussion of his new IDS development schedule. Added initial IDS ready in Sep 94 for early data collection.
- Met with H Kalia for wrap-up discussion.
- Trip from the TCO in Las Vegas, NV to CAG offices in Carlton, OR.

**Comments**

During preliminary discussions H Kalia and N Elkins the following items were discussed:

1. IDS was identified as the primary CAG activity for FY93.
2. The fate of TFM has not been resolved. N Elkins plans a meeting w/DOE soon to resolve the identification of LANL in the TFM Plan as managing TFM information. Possible CAG involvement in FY93 TFM activities has not been considered.
3. H Kalia was identified as the CAG technical manager in the TCO.
4. N Elkins will act as contract administrator.
5. Funding is available to support J Hall full time for FY93. Additional personnel or consultants hired to assist the TCO through the CAG contract will be funded from other resources than those currently identified for the CAG contract.
6. CAG documents submitted to the TCO should contain WBS and QA notations consistent with current TCO practice.

**USGS Contact Summary**

USGS was not been funded for ESF work for FY92. Their planning and development work for the Launch Chamber RBT is just starting. IDS requirements are probably the same as in FY91. H Kalia mentioned that a USGS person (Debora ?) is slowly assuming some of R Craig’s POC duties for testing. She may be involved in future technical meetings between the TCO and USGS. The following issue were discussed with R Craig (USGS, 794-7142) Tue, Oct 20.

**USGS Contact Details**

- The first test just under the collar is the Launch Chamber RBT.
- There are no new layout drawings at this time.
- USGS schedule for this test is unknown. R Craig believes that the Launch Chamber will be constructed by Sep 93. Launch Chamber construction and test preparation will begin after Sep with preliminary USGS testing starting as early as Jan-Feb 94. IDS should be tied into the test early to allow the USGS to upload data as they deem appropriate. Preliminary test activities will be involved with stabilizing the thermocouple psychrometers (TCs) and equipment shake-down in preparation for routine data monitoring. After this initial phase (4-12 weeks) each TC will be read 2-4 times/day until the end of the test.
The RBT PI is still Gary LeCain
- Michael Brody is on an extended leave of absence and will not be back for several months.
- R Craig checked with Mike Charnack (USGS) and found that Larry Anna (303/236-5185) will be appointed to M Brody’s task until he returns. L Anna is not an electronics engineer or computer specialist. He is a PI for other USGS tests.
- N Elkins requested that I hold-off any further contacts with USGS until the planned technical meetings on test planning packages get underway in Nov. The first meeting on mapping is scheduled for Mon, Nov 2. I won’t attend. Further meetings that I will attend are yet to be scheduled for soon after.

IDS Milestones
During the discussion on IDS milestones the following issues were discussed:
- High level IDS requirements must be completed before finalizing the related TPP.
- The titles of the IDS milestones are generalized and the TCO expectation is that only available information will be included in the milestone document on the scheduled date. Additions and/or changes will be incorporated as revisions to the milestone at some later date.
- “No IDS requirements” is a suitable response where it is factual.
- Milestone titles should accurately reflect their scope
- Item 590 should be titled “IDS Requirements for Starter Tunnel Construction monitoring”
- Item 700 should have the title changed to something like “IDS MTL Preliminary Requirements” followed by item 701 “IDS MTL Intermediate Requirements”, etc)
- Item 720 will be a preliminary data management plan dealing with current data acquisition activities and will be replaced at some later date with a more comprehensive plan.

K Gidwani Report
K Gidwani shared what he considers “key” names of other participants on the program:
- DOE	Tom Fortner (4-7576 DOE->Petrie) is responsible for IDS
- Kieth Lobo (4-7518 SAIC->Cottle) T Fortner’s IDS leg-man
- TRW	Art Hahn (4-1860 M&O->Schutt) is the ESF manager
- Raytheon	Terry Nelsen (4-7063 RSN->Stanley) is the IDS contact
- Fluor Daniel	Paul Pimentel (4-1848 M&O->Sandifer)

Cy: N Elkins, LANL, EES-13/LV, MS 527
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
FY93 Memos & Other Products
MEMORANDUM

To: Fred Homuth  
From: Jim Hall  
Subject: FY94 IDS Draft Specifications

LLNL Large Block Test (LBT)
Operational Requirements

1. Data acquisition will be a joint effort between LLNL and IDS. LLNL will provide data acquisition for specialized tasks designated by LLNL.
2. Connection from the LBT to the IDS archiving computer is required. This connection is not task failure critical during FY94 and can be delayed based on the availability of the IDS archiving computer at the N Pad. IDS will be critical at the start of FY95.
3. Telephone line modem data transfer off-site is required.
4. IDS local DAS database access will be compatible with National Instruments LabView data acquisition and control software planned for the LLNL portion of the installation.

LLNL will provide the following portion of the test measurement equipment and support:

- all measurement instruments (transducers, sensors, and arrays) and instrument installation
- data acquisition measurement equipment for all LBT long term measurements
- installation of LLNL supplied equipment, cabling, and equipment connections
- calibration and maintenance of LLNL supplied equipment for FY94-95
- software running on the LLNL data acquisition equipment
- LLNL native data file format information to allow the IDS to read LLNL data files

IDS will provide the following portion of the test measurement equipment and support:

- IDS DAS equipment for identified LBT long term measurements
- IDS DAS equipment will be mounted in LLNL supplied standard 19 inch racks
- complete installation and maintenance of IDS installed equipment
- an IDS network connection from the LBT IDS to the IDS archiving computer at the N Pad (IDS funding dependent)
- Local IDS DAS data transfer specifications to enable LLNL to access the DAS database

Functional Requirements

1. All test measurement instruments, cabling, cable connections, checkout, calibration, and maintenance is the responsibility of LLNL.
2. Designated LLNL data acquisition equipment, equipment cabling, equipment cable connections, checkout, calibration, and maintenance is the responsibility of LLNL.
3. IDS will supply standard IDS DAS equipment and software to collect data from ≈300 LBT instruments.

4. IDS will supply a network link suitable for periodic uploads of data from the LBT databases to the IDS archive computer located at the N Pad. At least in FY94-95, these uploads will be dependent on the availability of the IDS network and archiving computer and under the control of IDS software.

5. IDS will supply RBT data archiving consistent with IDS Phase 1 and 2 equipment availability.

6. The LBT measurement list is as follows:

<table>
<thead>
<tr>
<th>Instrument Type</th>
<th>Number of Instruments</th>
<th>Measurement</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. RTD (3 or 4-wire)</td>
<td>220</td>
<td>10°C-100°C</td>
<td>±0.05°C</td>
</tr>
<tr>
<td>b. Vibrating wire instruments</td>
<td>20</td>
<td>0-5VDC</td>
<td>±0.05% FS</td>
</tr>
<tr>
<td>c. DC</td>
<td>20</td>
<td>4-20mA</td>
<td>±0.01mA</td>
</tr>
<tr>
<td>d. Strain gage (300Ω)</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Current loop transmitter</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SNL Construction Monitoring Test (CM)
Starter Tunnel
Operational Requirements

SNL will provide the following portion of the test measurement equipment and support:

- all measurement instruments (transducers, sensors, and arrays) and instrument installation
- data acquisition equipment (datalogger) for all long term measurements
- installation of SNL supplied equipment, cabling, and equipment connections
- calibration and maintenance of SNL supplied equipment for FY94
- software running on the datalogger to control the CM data acquisition activity
- CM native data file format information to allow the IDS to read CM data files

IDS will provide the following portion of the test measurement equipment and support:

- a starter tunnel IDS network interface computer (NIC) to connect the CM datalogger to the
  IDS Ethernet network and the IDS archive computer located at the N Pad
- all software controlling the NIC and interaction with the datalogger
- an environmentally controlled cabinet for IDS NIC equipment
- an uninterruptible power supply (UPS) powering the NIC if a UPS is required to allow a
  controlled shut down and subsequent restart of the NIC without interfering with continuous
  and uninterrupted data collection by the SNL datalogger during the power outage and
  power restoration
- complete installation and maintenance of IDS installed equipment
- an IDS network connection with a data storage server to accommodate periodic CM data
  transfers from the CM datalogger to the NIC and finally to the server
- IDS data transfer specifications to enable USGS to reformat native CM datalogger data into
  a standard IDS data format

Functional Requirements

1. All test measurement instruments, test instrument cabling, test instrument cable
   connections, checkout, calibration, and maintenance is the responsibility of SNL.
2. Starter Tunnel CM data acquisition equipment, equipment cabling, equipment cable
   connections, checkout, calibration, and maintenance is the responsibility of SNL.
3. SNL supplied data acquisition equipment will consist of:
   a. Geokon Micro-10 Model 8020-2 Datalogger with a 32-channel multiplexer and data
      storage module. This unit is supplied to Geokon by Campbell Scientific as their Model
      CR-10 Datalogger with accessories listed below
   b. Campbell Scientific AM-32, 32-channel vibrating wire multiplexer
   c. Campbell Scientific SM-716 data storage module
   d. datalogger software to control CM data acquisition
   e. an IBM PC with keyboard and monitor or equal to interface with the datalogger for data
      retrieval and inspection
   f. IBM PC software to interface with the datalogger
   g. IBM PC Ethernet interface card
4. IDS will supply an Ethernet connection to a data server located on the same physical
   network segment and in the same zone suitable for periodic uploads of data from the CM
   PC computer. At least in FY94-95, these uploads will be asynchronous and under the
   control of SNL software commands and operational requirements.
5. IDS will supply RBT data archiving consistent with IDS Phase 1 and 2 equipment
   availability.
6. CM measurement list is as follows:

<table>
<thead>
<tr>
<th>Instrument Type</th>
<th>Number of Instruments</th>
<th>Measurement Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geokon vibrating wire instruments</td>
<td>57</td>
<td>-</td>
<td>±0.05% FS</td>
</tr>
<tr>
<td>RTD (3 or 4-wire)</td>
<td>10</td>
<td>10°C-30°C</td>
<td>±0.05°C</td>
</tr>
<tr>
<td>DC-DC LVDT</td>
<td>10</td>
<td>0-5VDC</td>
<td>±0.05% FS</td>
</tr>
<tr>
<td>Strain gage (300Ω)</td>
<td>6</td>
<td>4-20Ma</td>
<td>±0.01mA</td>
</tr>
<tr>
<td>Current loop transmitter</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SNL Construction Monitoring Test (CM)

ESF Drifts following the TBM

Operational Requirements

SNL will provide the following portion of the test measurement equipment and support:

- all measurement instruments (transducers, sensors, and arrays) and instrument installation
- installation of SNL supplied equipment, cabling, and equipment connections
- calibration and maintenance of SNL supplied equipment
- descriptions, layout drawings, and electrical schematics of all SNL equipment

IDS will provide the following portion of the test measurement equipment and support:

- data acquisition station (DAS) equipment for CM long term measurements
- an environmentally controlled cabinet for the electronic equipment
- an uninterruptible power supply (UPS) powering all measurement equipment and instruments as needed for:
  - protection against equipment shut down during brief (<5 min) power interruptions
  - protection against power lines surges, transients, and low voltage (brown out)
  - as needed for orderly shut-down and power-up of the equipment
- complete installation and maintenance of IDS installed equipment
- IDS network connecting the CM DAS to the IDS archiving computer located on the N Pad
- availability of a user workstation computer at the IDS archiving computer
- availability of user workstations for use at DAS units located at CM instrument stations
- provisions for retrieving current and historic CM data at the local DAS
- provision for remote test monitoring and CM data retrieval via telephone data modem

Functional Requirements

In addition to requirements and revisions in the current edition of the IDS FRD

1. All test measurement instruments, test instrument cabling, test instrument cable connections, checkout, calibration, and maintenance is the responsibility of SNL.
2. IDS will supply a complete IDS data acquisition station (DAS) outfitted and located to provide complete and cost effective data acquisition for CM instrument stations located 150 meters apart.
3. Each CM DAS unit will have provisions for ≥30% additional channel capacity when planned CM measurement station instrumentation is fully implemented
4. The CM DAS and associated equipment will be housed in an environmentally controlled enclosure. The enclosure will provide a shelf or support to hold the IDS workstation accessible from a normal seated working position and have provisions for an accessible storage drawer for manuals and related supplies.
5. IDS will supply an uninterruptible power supply (UPS) to provide continuous operation of all CM equipment and instrumentation for ≥5 minutes after loss of power. The UPS will supply a loss of power signal to the CM DAS control computer to allow an orderly shut down of the DAS. The UPS will include standard commercial line conditioning and filtering to provide a degree of isolation from noise and surges generated by mining equipment and generator based power. The UPS will also supply normal voltage and acceptable VA output during rated over and under-voltage conditions. The UPS will be rated for continuous rated duty to loads containing switched reactance power supplies that generate substantial 3rd and higher harmonic load currents.
6. IDS will supply a network connection from each CM DAS to the IDS archiving computer and data archiving consistent with IDS Phase 1 and 2 equipment availability.
7. CM instrument list is identical to CM Starter Tunnel Requirement 6 above.
USGS Alcove#1 Tests
Radial Borehole Test (RBT1)
Thermocouple Psychrometer Measurements
Operational Requirements

USGS will provide the following portion of the test measurement equipment and support:

- all measurement instruments (transducers, sensors, and arrays) and instrument installation
- data acquisition measurement equipment for all RBT1 long term measurements
- installation of USGS supplied equipment, cabling, and equipment connections
- calibration and maintenance of USGS supplied equipment for FY94-95
- software running on the local RBT control computer to control the RBT data acquisition activity
- RBT native data file format information to allow the IDS to read RBT data files
- descriptions, layout drawings, and electrical schematics of all USGS equipment

IDS will provide the following portion of the test measurement equipment and support:

- the RBT control computer for the data acquisition measurement equipment for RBT1 long term measurements
- an environmentally controlled cabinet for the electronic equipment
- an uninterruptible power supply (UPS) powering all measurement and the control computer
- complete installation and maintenance of IDS installed equipment
- an IDS network connection for the RBT measurement station equipped with a data storage server to accommodate periodic RBT data transfers from the RBT control computer
- IDS data transfer specifications to enable USGS to reformat native RBT data into a standard IDS data transfer format
- recommendations for instrument cables and instrument wiring methods to minimize electrical noise on measured signals

Functional Requirements

1. All test measurement instruments, test instrument cabling, test instrument cable connections, checkout, calibration, and maintenance is the responsibility of USGS.
2. RBT1 data acquisition equipment (not including the RBT control computer), equipment cabling, equipment cable connections, checkout, calibration, and maintenance is the responsibility of USGS.
3. IDS will supply the IBM 386 PC or equal as the RBT control computer with the following specifications:
   a. 80386 or 80486, 50Mhz processor
   b. 8Mb RAM (640Mb main memory, 7340Kb extended memory)
   c. 3-1/2 (720Kb/1.44Mb) and 5-1/4 (360Kb/1.2Mb) floppy disk drives
   d. 320Mb hard disk drive
   e. Backup tape drive
   f. SuperVGA color display with option for a touch panel
   g. Ethernet interface card
4. IDS will supply an environmentally controlled enclosure for the USGS equipment and the RBT control computer. The enclosure will provide RBT control computer keyboard and display access from a normal seated working position and have provisions for accessible storage drawer for manuals and related supplies.
5. The enclosure will provide mounting space for the USGS RBT1 data acquisition equipment. Mounting methods must provide front and rear access to the equipment during
installation and routine servicing activities without requiring dismounting the equipment, the RBT control computer, installed cabling, or the enclosure or enclosure components.

6. IDS will supply an uninterruptible power supply (UPS) to provide continuous operation of all RBT equipment for 5 minutes after loss of power. The UPS will supply a loss of power signal to the RBT control computer to allow an orderly shut down of the RBT data acquisition programs. The UPS will include standard commercial line conditioning and filtering to provide a degree of isolation from noise and surges generated by mining equipment and generator based power.

7. IDS will supply an Ethernet connection to a data server located on the same physical segment and in the same zone suitable for periodic uploads of data from the RBT control computer. At least in FY94-95, these uploads will be asynchronous and under the control of USGS software commands.

8. IDS will supply RBT data archiving consistent with IDS Phase 1 and 2 equipment availability consistent with the FRD and current revisions.
USGS Alcove#1 Tests
Radial Borehole Test (RBT1)
Gas Permeability Test (GPT)
Operational Requirements

USGS will provide the following portion of the test measurement equipment and support:

- all measurement instruments (transducers, sensors, and arrays) and instrument installation
- data acquisition measurement equipment (Campbell Scientific Datalogger) for all GPT measurements
- installation of USGS supplied equipment, cabling, and equipment connections
- calibration and maintenance of USGS supplied equipment for FY94-95
- software running on the GPT datalogger to control data acquisition activity
- software for uploading GPT data from the datalogger to the RBT1 control computer and transferring the resulting file to the IDS data server
- RBT native data file format information to allow the IDS to read GPT data files

IDS will provide the following portion of the test measurement equipment and support:

- the RBT control computer configured for supporting RBT1 tests and uploads of GPT datalogger data and transfer of this GPT data to the IDS data server on this network segment.
- complete installation and maintenance of IDS installed equipment
- an IDS network connection for the GPT measurement station equipped with a data storage server to accommodate periodic GPT data transfers from the RBT control computer
- IDS data transfer specifications to enable USGS to reformat native GPT data into a standard IDS data transfer format

Cy: N Elkins, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
MEMORANDUM

To: Hemi Kalia
From: Jim Hall
Subject: Comments on the M&O Integrated Data System (IDS) Implementation Plan (IP), dated August 15, 1993

General Comments:
1. Ref: Section 4.0, "Technical Specifications" and elsewhere; It is unclear how the DOE can conduct a meaningful review of the IP, even as a preliminary draft, if the technical specifications (supposed to be included in Appendix A) haven't even been developed. The DRD isn't finalized, the Design Specifications for FY94 have yet to be prepared, the Design Studies required to finalized the FY94 Design Specifications haven't been identified. The IP is supposed to describe the methodology for controlling the IDS procurement, but the scope of the procurement depends on the design process. The design process should be defined in the DRD, and should drive the preparation of the IP and, once the IP is approved, subsequent procurement processes. See the flow chart provided as Figure 1 in comments provided on the DRD.

2. Ref: Section 5.0, "Standards and Guidelines"; Again, the IP should describe, or at least reference, the design process through which the requirements of the FRD are addressed by the DRD, which is translated into Design Specifications that will form the technical basis for procurement. Neither the FRD or the DRD is cited as a governing document. If they were, then it should be clear that individual Design Specifications will cite the standards and guidelines applicable to the system components addressed by each specification.

3. Ref: Section 7.0, "Procurement Strategy"; It is highly unlikely that a simple reference to the REECo procurement procurement adequately describes the procurement and procurement-related interfaces that will be required for the IDS procurement. The general statement regarding shared responsibilities in 7.1.2 should be expanded to convincingly and specifically describe organizational responsibilities for:
   1. supplier evaluation and selection;
   2. procurement document preparation, review, approval, distribution, and change control;
   3. source inspection/FAT witnessing;
   4. receiving inspection/acceptance testing;
5. negotiation with the supplier regarding rejected items; payment (i.e., who decides what specifically constitutes item acceptance); and

6. warehousing and material control.

4. Ref: Section 7.5.1, "FY 94 Acquisitions"; See general comment 1; it is unclear how specific equipment items can be recommended to the DOE when the design process has yet to be finalized. References to installation of SNL- and USGS supplied equipment are unclear; are the equipment items part of the IDS design or not? if they are, then the IP ought to clearly identify which parts of the system are excluded from the IDS procurement activity, and the DRD should be revised to clarify the responsibilities of USGS and SNL.

5. Ref: Section 7.6, "Funding"; See general comments 1 and 4; how can the basis for FY 94 funding be represented in a credible manner if the design process has yet to be completed, equipment requirements aren't finalized, and competitive ranges have yet to be established? If the funding request is based on assumptions of what the FY94 design will require and estimates of probable cost, then so state and make provisions for updating the funding request when the design specifications are complete and the competitive range for FY 94 components have been determined through the procurement process.

6. Ref: Section 8.0, "Major Milestones"; See general comments 1 and 4; finalization of the DRD and FY94 Design Specifications must be considered major milestones. Given the effort that will be required to finalize even the FY94 portion of the design, a 9/20/93 submittal date for an updated IP seems unrealistic. In any case, the IP must be approved by DOE before REECO can be given the Procurement Request (i.e., Design Specification) package.

7. Ref: Section 10.0, "Quality and Safety"; The current versions of the EP, this IP, the DRD, and the M&O's QAPP all inadequately address the management of the IDS configuration as an integration of its hardware and software components. YMP/88-4 describes how engineered items and components will be accepted into the overall ESF configuration baseline by the DOE through a Configuration Audit process, but does not address how the M&O/Fluor Daniel plan to handle IDS configuration management during the design and development process. Configuration management throughout the entire multi-year process of IDS design and development is absolutely critical to the success of the system, and it should be clear to DOE as they review the IP that the M&O/Fluor Daniel have recognized the need and have the planning in place to address it. The configuration management process must be integrated with the design processes that should be defined by the DRD.

8. Ref: overall document; The purpose of the IP is to justify IDS procurements. The mass of material presented in this document obscures the intended FY94 procurement and its relationship to following procurements in out years. There is no clear statement of near term and long term
procurement strategies. It is our opinion that the best interests of IDS would be served with a simpler document specifically focused on procurement issues with details for the plans for FY94 and to a less extent for FY95. Only the highest level technical details should remain in the IP with reference to the FRD, DRD, and Design Studies for lower level technical details. The extensive use of low level figures duplicated in other documents will contribute to document revision problems and confusion when separate documents are individually revised on different schedules. Such an approach would help maintain a consistent level of detail and information throughout the IP.

**Specific Comments:**

1. Ref: Executive Summary, Description of Equipment, page 1, sentence 1; The purpose of the two CPUs operating in parallel is to provide an on site replacement CPU to control the data acquisition and archiving activities. Although parallel redundancy would be satisfactory (at no cost premium) an electronic switch-over from a failed CPU to a good one is also acceptable as is a manual swap. Change “redundancy” to “automatic or semi-automatic fail-over to the operating unit”.

2. Ref: Executive Summary, Integration Plan, page II, sentence 2; Change this sentence to read “Additional testing requirements may be identified during FY93-94 that will require new or additional IDS resources, and revisions to this IP will be made to accommodate these revisions as needed.”

3. Ref: Section 1.3, page 2, 2nd paragraph, sentence 3; Delete sentence starting “Other early tests...”.

4. Ref: Section 1.3, page 2, 3rd paragraph, sentence 3; Change “As tunneling progresses, it will become economical to begin stringing...” with “As tunneling progresses, it will become necessary, for technical reasons, to begin installing...”.

5. Ref: Section 1.3, page 3, 1st paragraph, sentence 1; Tests will continue to be installed in the ESF after excavation is completed. Change “…until the ESF excavation is nearly complete.” to “…until after the ESF excavation has been completed.”

6. Ref: Section 2.1.1, page 4, 1st paragraph, sentence 1; The ESF does not get licensed. Change “licensing” to “site characterization”.

7. Ref: Section 2.1.1, page 4, 1st paragraph, sentence 2; Not all the data archived by the IDS will be site characterization data. Change “…distribute site characterization test data” to “distribute test data”.
8. Ref: Section 2.1.1, page 4, 1st bullet; Please clarify the term secured.

9. Ref: Section 2.1.1, page 4, 4th bullet; LANL will perform data management for IDS. There are no current plans for routine transfers of data to Project Record Centers. Please delete this reference.

10. Ref: Section 2.1.2.4, page 6, last sentence; Delete reference to Project Record Centers.

11. Ref: Section 2.1.2.4, page 7, first sentence; Change “accepted” to “identified”.

12. Ref: Section 2.1.2.4, page 7, 2nd paragraph, item 1; Delete reference to Project Record Centers. Data distribution.

13. Ref: Section 2.1.2.4, page 7, last sentence; LANL is the IDS data manager. Requests for IDS information distribution will be directed to LANL. LANL will provide direction for all IDS data distribution. Suggest rewriting items 1, 2, and 3 as follows: LANL will provide data management and controlled data distribution for IDS. Under these controls, data will be routinely distributed to Participants and others at the request of the Project Office. Data distribution schedules will be determined by the Data Manager.

14. Ref: Section 2.1.2.5, page 7, 1st paragraph, item 1; Delete reference to Project Record Centers.

15. Ref: Section 2.2.2.3, page 8 and 9, items 1 and 2; It is our position that the RSN analysis of the data rates is inaccurate and inflates system storage and peak data rate analysis. Data rates of 1/sec will only be needed for about 1-2% of the sensors and not all of those will be online at once. Data rates of 1/hour will probably be in the 40-50% range. Until an M&O design study is performed to confirm these data rates they should not be quoted in high level documents. Accumulated data will be minimal for FY94 and these issues can be revisited to produce better estimates during that time. In addition this level of detail is inconsistent with the rest of the document, not relevant for the document purpose, and can be acknowledged by reference only. The point of this document is simply to state what will be done. Justification and backup details are provided in other documents. Suggest deleting the detail from item 1 and 2 and substituting summary paragraphs that these issue have been studied and worst case considerations are practical with proposed networking and data storage strategies.

16. Ref: Section 2.2.2.3, page 8 and 9, items 1 and 2; From the way the document is written it is not clear whether these data rates and the resulting storage requirements apply to FY94 activities.
17. Ref: Section 2.4, page 11, sentence 2; Change “…from the lowest qualified bidder…” to “…from the lowest cost qualified bidder…”.

18. Ref: Section 3.2, page 13, paragraph 2, sentence 1; The description of the host hardware system is significantly more in-depth than other comparable descriptions. We suggest the description be simplified to be consistent with other descriptions.

19. Ref: Section 3.2, page 13, paragraph 2, sentence 1; Please change the first sentence from “The host system…” to “A representative host computer system…”.

20. Ref: Section 3.5.1, page 15, paragraph 1, sentence 1; Change this sentence to “Ideally, the operating system software…”.

21. Ref: Section 7.5.1, page 23, paragraph 1, sentence 1; Add “…and LLNL Large Block Test.”

22. Ref: Section 7.5.1, page 23; This section should be revised to identify the Campbell scientific Datalogger with SNL data acquisition equipment installations that IDS supports with an IDS network interface. IDS supplied data acquisition equipment should be referenced as general purpose DASs equipped to service the Construction Monitoring Instrument Stations.

23. Ref: Section 7.5.1, page 26-28, Figures 7.5.1-1, 2, 3; Revise to include Large Block Test.

24. Ref: Section 9.0, page 31, paragraph 31, paragraph 1, last sentence; Replace parentheses with “to supply verifiable controlled data to participants supporting their site characterization activities.”

25. Ref: Section 10.2, page 32; This paragraph implies that CM for the IDS will be accomplished at the Project level. This is unacceptable for a working CM program covering the IDS design. Only final products should go into the Project CM system.

26. Ref: Section 10.2.1, page 32; There is no indication of how the identified baseline will be established and maintained. Please clarify or delete.

27. Ref: Section 10.2.3, page 32; As built documentation will be part of the M&O IDS baseline and reflected in documentation updates.

28. Ref: Section 10.2.4, page 33; It is confusing that software baselines are specifically identified and no corresponding items for hardware are mentioned. Please develop the same level of baseline control for hardware or delete the software baseline discussion.
29. Ref: Section 11.0, page 35, paragraph 2, sentence 2; Delete discussion of tests unrelated to IDS.

30. Ref: Section 11.0, page 35, paragraph 2, sentence 1; Add a reference to the LLNL Large Block Test.

31. Ref: Section 11.0, page 35, paragraph 4, sentence 1; Change "...network can be installed..." to "...network will be installed...".

32. Ref: Section 11.0, page 35, last paragraph, sentence 1; Change "...until ESF excavation is nearly complete" to "...until after ESF excavation is complete".

33. Ref: Appendix B, Item 3, IDS Integrated data System; The term "Secure Data" is inappropriate here. Within the context of the National Labs and DOE a secure data refers to some level of secrecy reflected in security clearances for access and defined processes for controlling the physical network and access to the facility and data. The data on this network will just be ordinary data on a network. Change "SECURE DATA" to "TEST DATA".

34. Ref: Appendix B, Item 4, IDS Communications Overview; This figure has been simplified to the point that it conveys very little information. A more physically realistic figure would be useful.

35. Ref: Appendix B, Item 12, DAS Equipment Deployment; This figure is unreadable in our copy of the IP. Please review the quality of this and other figures to be sure they are publication quality in the final document.

36. Ref: Appendix C, DEC quotes and ESF maps; Although necessary backup material, these items should not be included in the IP except as summaries or by reference. As a precedent, the amount of quote type material will be enormous as the IDS progresses and will be impractical as an attachment in out years. The maps are unreadable and contribute little or nothing to understanding the IP.

Cy:  
N Elkins,  
LANL, EES-13/LV, MS 527  
F Homuth,  
LANL, EES-13/LV, MS 527  
J Canepa,  
LANL, EES-13, MS 521  
EES-13/LV,  
LANL, MS 527  
CAG Files,  
Carlton, OR
First a couple diagraming conventions:

If these are intended to be Yourdon DFDs, they have violated the Yourdon model in a couple ways. First, Yourdon uses a “data store” symbol that looks like this. Other symbols used in the Yourdon model are squares or rectangles for “external entities”, bubbles for “processes”, and curved arcs for “data flows”.

External entities in DFDs are generally people, departments, companies, offices, etc. which receive or provide data to the system. Their role of provider or recipient makes them external to the system e.g. external entities.

Processes are generally action items representing transformation, manipulation, transmittal, calculation, etc. activities performed on data. High level physical DFDs sometimes use processes to describe the activities of the entire system or of some large component of the system. Low level logical DFDs usually use processes to describe software activities, sometimes expressing so much detail that the process itself can be fully described to a programmer in a few lines of pseudocode.

Data stores are used to describe data repositories. Depending on the level and nature of the diagram, data stores may describe physical things like filing cabinets, log books, or file rooms, or they may describe electronic data storage devices like file servers, large databases, distributed database nodes, disk drives, etc. Data stores are internal to the system (i.e. external data stores are represented by “external entities”) and are “things where data is stored”.

Some problems with the diagrams as presented:

Square symbol items:
The diagrams shown in this document represent things called “files”, “databases”, “histories”, “software”, “equipment”, “logs”, and “terminals” using the square symbol indicating these things are external entities. There are several problems with these “square symbol items” (I will refrain from calling them external entities because they clearly are not):

- While databases, files, and logs may provide data inputs to the system or receive data outputs, the way in which they are represented implies they are not external to the system and are therefore not external entities.
- The names of these things make them a very mixed bunch. That a “history” and “equipment” are somehow the same enough to be represented by the same symbol makes no sense. A history implies formatted data (something logical) and equipment implies physical stuff of metal and wires — two things which do not belong on the same diagram much less represented by the same symbol.
Some of the "square symbol items" should be represented as data flows. For example, on Figure 4.5-1, the Audit File, Sensor Instrument History, Event Log, Download Audit File, and User Activity Files may all be labels on data flows. These are data which result from system processes and which are transmitted from one process to another, from a process to an external entity, or from a process to a data store.

Other "square symbol items" should be represented as data stores. For example, on Figure 4.5-1, the Active Test Database, On-Line Test Database, On-Line Test Support Database, System Configuration Database, and Test Configuration Database should all be represented as data stores. In making this change, the diagrammer must bear in mind that a data store does not transmit data to or receive data from anything but a process. The Active Test Database and On-Line Test Database are represented communicating without an interfacing process. This is not allowed in formal DFD models.

**Bubble symbol items:**

Things called "terminals", "servers", "processes", and "managers" are represented using the bubble symbol indicating they are processes. There are several problems with these "bubble items" (I will refrain from calling them all processes because some are not):

- User Terminals are generally represented as external entities because they represent users who provide and receive data from the system. They use provide the bridge between the system and the outside environment. They are definitely not processes.
- Virtual Terminal Server and Network Server should probably be represented as data stores with process interfaces to other system components.
- The Managers are appropriately represented as they describe large components of the system which can be modelled at a lower level through process explosion.

**Data flows:**

Every data flow represented on a DFD must be labeled. Regardless of the level of abstraction represented, appropriate labels must be present to describe what data are going where. The whole point of a DFD is to provide an easily understood model of the flow of data through a system. A DFD without data flow labels effectively defeats the purpose.

Dotted lines for data flows are not formally described in the Yourdon model, although they are often used in practice to describe control flows. I'm not sure what is intended here.

Yourdon data flows are represented by curved arcs. While it may seem tidier in such complex diagrams to draw angular data flows, doing so violates the Yourdon model.

It is extremely bad form to present a DFD in which the data flows cross. Generally, if the DFD has become so complex that crossing data flows cannot be gracefully avoided, this is a good clue that the DFD is too complex. The solution is to model a higher level of abstraction to simplify the diagram, then show desired detail in similarly abstracted explosion diagrams. It may take a good DFD modeler many explosions to achieve the final level of detail desired, but no single diagram will be difficult to understand.

Part of the problem leading to the overly complex diagram shown in Figure 4.5-2 is the apparent attempt of the author to express both a very high and very low level of abstraction in the same diagram.
User Terminals

Test data

Severe alarms

Test calibration configuration data

IDS Host System

Test data

Download data

Events

Audit

Active Test Database

Test data

Events

New test setup

Network Services

IDS DAS System

Malfunctions

Test data

Measurement Acquisition Equipment
To: Ardyth Simmons
From: Jim Hall
Subject: Flow of Information from IDS Meeting Notes excerpt from J Hall’s Trip Report FY9329

Meeting Notes
Tue, Aug 17, 1993
Flow of Information from IDS
1:30pm - 3:30pm in the DOE Large Conference Room

Attendees
Larry Engwall M&O/FD 4-1826
Jim Hall LANL/CAG 4-7270 or 503/852-7214
Jim Leak M&O/FD 4-7204
Kumar Gidwani M&O/FD 4-5371
Ron Oliver LANL 4-7095
Bob Rosche M&O/FD 4-1970
Ardyth Simmons YMP 4-7998
Jan Statler SAIC 4-7771
Bob Waters YMP 4-7935

Two presentations, one by J Hall and the other by A Simmons, were planned to outline IDS information flow from test data acquisition to participants, and finally to DOE. The discussion was meant to be high level, suitable for a management or overview of the full range of activities involved without excessive detail in how the processes were accomplished. A secondary issue was resolution of an M&O suggestion that IDS design be modified to include specific capabilities to accommodate direct NRC requests for transfer of IDS data to the NRC Licensing Support System (LSS) database. A NRC spokesman arrived for the meeting, invited by the M&O, and left after A Simmons informed him that this meeting was a DOE information gathering activity. He will be informed by DOE when information had been identified for inclusion in the LSS, however, since the LSS doesn’t even exist at this time it is premature to identify inclusion of IDS data.

J Hall described the basic data flow from IDS input from ESF activities (IDS monitored tests, participant data acquisition, manual data entry, IDS and instrument calibration and configuration files, IDS self monitored data, and IDS event logs) into the IDS database, data distribution from this database to PI test databases, and from the PI test database to DOE. The main elements of the current
IDS design and management impacting data flow from tests to DOE are summarized as follows:

1. Responsibility for data processed by the IDS remains with the participant that generated the data. IDS is analogous to a contract data acquisition service for each participant. They give IDS the responsibility to collect their data and IDS in return guarantees to do this job using responsible, controlled processes, to keep each participants data secure and separate from other participants, maintain a secure backup record, and finally, to deliver the data to the participant that is a verifiable copy of data processed and stored by IDS.

2. Participant responsibility for their data is an important attribute of the functional description of IDS data processing and data management. The IDS is not a data policeman looking for bad test data, locking PIs out of IDS operation, or representing PI interests in any way except to collect and store data.

3. Normal ADP security and access measures will be used to verify controlled access to the IDS including participant test personnel, IDS Operations and Maintenance (IDS O&M) personnel, and others. Access to on-line test data stored on IDS will be read only. Participants will not be able to access other participant organization data on the IDS. All data entered into the IDS will be saved. No data will be overwritten. All data files created on IDS will be part of a backup data set and the IDS archive. A certain subset of current IDS data (this subset may include all data) will be available on-line.

4. IDS data management is structured to regularly submit each participants data to that participants record center designated for receiving test data. The IDS Data Manager will submit data to others at the direction of DOE. Options to meet specific data transfer requirements are available for the physical media and data formats. Replacement or duplicate distribution data sets are available on request. All archived data is available for use in creating special data sets as needed and requested by participants (data available to participants is identified by access privileges for that time period) and/or DOE (access to data from all participants for all time periods).

5. Participants wishing to share data could send the shared data directly from their record center to the requester. In addition, since participants define their access privileges, any participant can designate subsets of their data to be shared with others by granting other participants defined access privileges. This shared data would be distributed according to participant organization access as part of the regular IDS data distribution activity. Data from the Subsurface Safety and Alarm System (SSAS) and common data will be available for distribution to all participants on request.

6. Each participants data is accessible on demand, as determined by access controls, in the ESF, at the surface on site, and remotely via modem and/or direct telecom links. IDS Data Management regards these transfers as uncontrolled (no QA verification of the process) and should not be relied on for site characterization unless the data sets are verified against controlled data transferred from IDS to the participant record center.

7. IDS input to a participant test records center will be one of several several data sources feeding this records center. Surface test data and laboratory data will also be included. All of these data sources, including IDS data, will be reported to the DOE by participants in similar ways defined by current project data management procedures. The LANL IDS data management plans do not include periodic transfers of participant data to DOE record centers. DOE requests for special data transfers would need to include specific data required and instructions on the mode of transfer and tracking procedures to be followed by the IDS Data Manager.

8. LANL IDS Data Management will be part of TCO test planning and field support activities.
Summaries of IDS data monitoring (not the actual data) are planned to be included in the TCO Test Coordination periodic reporting to DOE and participants. These reports will include notes on IDS activities and events (i.e., test data acquisition started or stopped, kinds of data being monitored, and other related information) for the reporting period. This will allow DOE and participants to regularly review overall ESF data acquisition activities and identify possible data of interest to them. The IDS will also include catalogs and database search capabilities that will support identifying data (source only—not the actual data), equipment configurations, and specific operational details from all IDS monitored tests. This will provide another method of identifying data of interest.

9. Evaluation of preliminary data and development of reported data sets will be accomplished by participant PIs.

10. Although participant data flow is represented on the slide, this diagram is only meant to be a conceptual description of technical data flow in participant organizations. The main issue for IDS data management is that the participant distributes technical data to DOE record centers, databases, and others as directed by DOE under controls implemented by the participants QA program in conformance with DOE data management procedures. IDS plays no functional role in this process.

Ardyth Simmons presented three slides demonstrating current DOE technical data flow and management strategies. The first slide demonstrated that technical data is initiated from study plans or job packages using methods identified for action and funding by PACS. This leads to participant field and/or laboratory data acquisition activities that flow into the participant data archive and then YMPO data tracking, databases, and the CRF under management controls satisfying participant and YMPO procedures. The second slide detailed participant data submittals to YMPO databases and CRF and the third slide detailed the CRF activities involved in managing incoming technical data records packages. It is important to note that none of the YMPO processes differentiates the IDS from participant activities. The method of participant data acquisition is transparent to YMPO.

Cy: J Canepa, LANL, EES-13, MS J521
    N Elkins, LANL, EES-13/LV, MS 527
    F Homuth, LANL, EES-13/LV, MS 527
    R Oliver, LANL, EES-13/LV, MS 527
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
INFORMAL MEMORANDUM

Date: August 12, 1993
From: Ardyth M. Simmons
To: Bob Waters, YMP, NV
     Jim Hall, LANL, Las Vegas, NV
     Fred Homuth, LANL, Las Vegas, NV
     Larry Engwall, M&O/FD, Las Vegas, NV
     Kumar Gidwani, M&O/FD, Las Vegas, NV
     Jim Leake, M&O/FD, Las Vegas, NV
     Steve Bodnar, M&O/TRW, Las Vegas, NV
     Keith Lobo, SAIC, Las Vegas, NV

Subject: FLOW OF INFORMATION FROM INTEGRATED DATA SYSTEM (IDS)

Recently, questions have been raised about the flow of information from the IDS to participants, to the Project Technical Database, Central Records Facility, and eventually to the Licensing Support System. I have therefore scheduled a meeting to discuss these issues and reach a common understanding for the project. The meeting will take place from 1:30-3:00 on Tuesday, August 17, 1993, in the Large Conference Room here at the project office. Please call me at x4-7998 if you are unable to attend.
J Hall's overhead slide (1)

A Simmon's 3 slides
TECHNICAL DATA MANAGEMENT

PARTICIPANT ACTIVITIES

PI

DATA INPUT
PDA

COMPLETE
TDIF &
ASSIGN
DTN

COMPLETE
DATA
TRANSMITTAL
PACKAGE

TECH. DATA
TDIF

TDB

CRF

META-DATA INTO
ATDT SYSTEM

* Completes Segment of Technical Research
General Comments:
1. General Comment: As currently written, the Integrated Data System (IDS) Design Requirements Document (DRD) is not clearly focused on describing how the requirements of LANL’s Functional Requirements Document (FRD) are going to be met through the phased delivery of specific portions of the system, at times that coincide with the testing and construction data acquisition needs of the project. Construction or testing delays attributable to delays in the installation of the IDS or the inability of the IDS to service the project’s data acquisition needs could be enormously expensive, and could seriously jeopardize the success of the project. For this reason, the DRD must define a design effort that is carefully organized and prioritized in order to ensure that the IDS is developed, tested, and installed in time to meet the data acquisition needs of the project, at the required schedule milestones. At a minimum, the DRD must establish a conceptual model for the system that recognizes milestone-phased operational requirements; it must identify and prioritize Design Specification requirements based on the phased conceptual model; and, it must identify the specific Design Studies necessary to develop the Design Specifications, prioritized to address the phased conceptual model. Section 1.7 contains a much improved discussion of the phased approach, but the document still does not adequately define the role of Design Specifications and Design Studies in the implementation of the FRD.

The processes discussed in this comment are presented graphically in Figure 1, 2, and 3.
Figure 2

Identify Specific Design Tasks for the Target FY
Current FRD & Testing Requirements → Evaluate Impacts of Overall IDS Design

New/Revised Design Requirements

Yes → Plan Detailed Design Requirements for Identified Tasks

No → Plan High-Level Design Requirements for Deferred Tasks

Submit Draft DRD for LANL Review

Submit Draft DRD for Internal M&O Review

Changes?

Yes → Prepare/Update DRD

No → Figure 3: Detailed DRD & Design Specification Development Process for Specific Tasks
2. General Comments: Configuration Management (CM) concerns are addressed in several locations throughout the document, but it is unclear exactly what the IDS configuration baseline consists of and exactly which control mechanisms will be applied. Procedural controls are hinted at, but unless specific cross-references to controlled plans or procedures are provided that actually service the needs of IDS development, then it is difficult to conclude that a functional system is in place. Neither the EP or the current version of the M&O's QAPP provide the necessary level of detail. See Specific Comment 58 and 60.

3. Generals Comment: The content and emphasis of the document are uneven. Although great technical detail is provided to describe the exact sort of IDS that will evolve there is no similar level of detail presented to describe the design process, procurements, and verification of the design. The current level of technical hardware/software description are too detailed for this level of document (design studies would seem more appropriate) and the other issues are not detailed enough. The amount of technical detail and lack of supporting information make the document hard to understand, weakly characterize IDS, and provide only a hazy understanding of what IDS plans for the next two years. Time constraints based on IDS schedules may prevent the extensive rewrite that would make this a useful working document in this revision, however, any future revision must address these issues.

Specific Comments

1. Ref: Entire document and Glossary, Sect 12.0, page 85; References to "TCO" should be changed to "LANL TCO"

2. Ref: Section 1.2, page 2, last 2 sentences; The functional requirement for IDS data distribution is a LANL responsibility as the IDS Data Manager. Although it is appropriate to mention this activity as part of the description of what becomes of data collected by IDS it should be noted that these functions will be performed by LANL as Data Manager. The exact content and destination of data distribution packages will be determined by LANL in cooperation with DOE, participant organizations, and the PIs. For clarity remove the reference to the "Local Records Center."
3. Ref: Section 1.2, page 2, last sentence; Use of the term "certified path" is inappropriate. Data acquired through the IDS do not automatically become "certified"; rather, the IDS provides the means of obtaining reliable, high-quality (i.e., well documented, traceable, and otherwise defensible) data suitable for use by the PIs for developing models and codes that will be used by DOE in licensing activities.

4. Ref: Section 1.2, page 3, 2nd bullet; See comment 1 above. Change the sentence to read "Transfer of the stored data from the IDS to the PIs and other recipients at the direction of the IDS Data Manager (LANL)."

5. Ref: Section 1.2, page 3, last bullet; It is important to convey the fact that this is uncontrolled data. Delete the reference to analysis; IDS does not anticipate PI use of data. Change the sentence to read "Provide uncontrolled test data to the PI as needed for their use."

6. Ref: Section 1.2, page 3; Add a new bullet between the existing first and second bullet. "Store electronic data including calibration, location, eventlogs, and other related information for IDS equipment, test instruments and equipment, and related IDS/test items."

7. Ref: Section 1.3; The presentation of the purpose and scope of the DRD is weak; the DRD must be more than "consistent" with the requirements of the FRD, it must translate FRD requirements into the Design Specifications and drawings that actually define the system design in terms specific enough to be purchased, assembled, and successfully tested and installed. Moreover, the DRD must remain responsive to changes in the FRD throughout the construction and testing of the ESF. To meet these goals, the DRD must define the specific Design Specifications necessary to meet the FRD requirements and the requirements for development and delivery of the IDS in discrete phases. Wherever Design Studies are required to properly address unknowns in the development of specific Design Specifications, they should be identified and scheduled as necessary to support system deliverable dates.

8. Section 1.3, page 3, paragraph 2, bullet 1: The IDS supports the participant Principal Investigators. The reference to the EIS and LA should be deleted. Change statement to read: Provide reliable, high confidence data for site characterization studies.
9. Ref: Section 1.4; The roles of participant organizations relative to the design process are not adequately defined, especially as presented in the Responsibility Matrix. LANL is responsible for the FRD, for review and approval of the DRD and its implementing Design Specifications, for review and approval of all Design Studies related to Design Specification development, for coordinating all external review and change control processes, for witnessing operational acceptance testing prior to the performance of configuration audits by DOE, and other critical roles. Other comments on the Responsibility Matrix are as follows:

- the role of the M&O is still unclear; do they assume review responsibility for the design documents prepared by Fluor Daniel prior to LANL/DOE review, do they defer such responsibilities to LANL, do they participate as an active member of the design team, do they monitor Fluor Daniel activity through quality verification processes, or do they perform some combination of these roles?

- it is suggested that the roles of the M&O contractor and Fluor Daniel (or IDS Designers) should be addressed separately and the DOE should be added as a separate column;

- under item 1.2, DOE approval authority over the FRD should be defined;

- since the FRD will be developed/updated in response to the testing needs documented by the PIs, it is suggested that the order of items 1.2 and 1.3 be reversed;

- under 2.1, LANL is responsible for review and approval of the DRD and its subsequent updates;

- ref: item 2.2; procurement specifications should be verbatim transcriptions of applicable portions of the latest approved Design Specifications. Design Specifications should be distributed for external review at LANL's discretion, but there should be no reason for broad distribution of individual procurement specifications. If the M&O's QA program, as implemented by the IDS contractor, is working properly, the system will ensure that procurement documents contain the necessary technical information;
• ref: "phase" 4.0; receiving inspection/material control responsibilities for procured items and equipment pending assembly, final testing, delivery, and installation in the ESF are not addressed;

• ref: "phase" 5.0 is unclear; the IDS is not a facility; it is installed in the ESF facility after completion of pre-installation assembly, operational acceptance testing, and DOE configuration audit;

• ref: the installation "phase" is mis-numbered; system configuration audits should be conducted prior to delivery and installation in the ESF.

10. Ref: Section 1.5; It is unclear why the identification of applicable technical specifications and standards is deferred to a future Design Study, rather than being performed as part of the preparation of this document. The specifications cited in this Section, are, in combination with the FRD, fundamental to the design effort and hence to the stated purposes of the DRD. With regard to the performance of Design Studies, the DRD should identify all Design Studies that will be required in order to finalize or verify the adequacy of individual Design Specifications; Design Studies should be prioritized based on the delivery and installation schedules for each deliverable portion or "phase" of the system. Design Studies that affect Design Specifications applicable to all deliverable portion of the system should be given the highest priority, then those that affect those portions of the system provided at the first delivery milestone, then the second, and so forth.

Also, the FRD should be cited as a primary governing technical specification.

11. Ref: Section 1.6; Specific document citations should be provided for the M&O and REECO QA plans. However, the M&O QAPP does not address the system configuration management controls that should be required; see comments 9 and 10.

Unless such concerns are adequately addressed in an update to the M&O's QAPP, the DRD should also emphasize and clarify those features of the QA program that are a significant concern in the development of the IDS. In addition to the CM concerns discussed in Specific Comment 8 and 9, the DRD should require that individual Design Specifications define the any specific component- or subsystem-level acceptance testing requirements that must be invoked as conditions in procurement documents. The DRD
should also require the definition of minimum requirements that must be addressed in the acceptance testing plans prepared for all deliverable system modules (prior to DOE configuration audits and delivery to the ESF) and post-installation operational acceptance tests. The DRD should specifically cite the minimum handling, storage, and transportation requirements required to maintain the design integrity (e.g., special handling and storage requirements for electronic components, bar code identification requirements, security/material control procedures) of components from receipt through assembly, testing, and installation in the ESF, or provide appropriate cross-references if they are adequately addressed in other documents. The interface between individual document control organizations and the CM system should be explicitly defined, or noted by cross-reference to the CM specifications/procedures prepared for this project. The DRD should specifically note the responsible organizations and procedures governing receiving inspection; receiving inspection interfaces with the design engineers (Fluor Daniel) and the procurement manager (REECO) must be particularly well defined, since acceptance testing at the suppliers facilities or upon receipt may be required for many components. Auditing and surveillance functions should be defined; it is assumed that the M&O will provide all such functions and will manage all nonconformance reporting and corrective action processes. Records responsibilities are rather more complex because of the multiple-organization distribution of responsibilities in areas that will produce records, and should be defined in detail; if the M&O is going to maintain the IDS project records on behalf of Fluor Daniel, REECO, and other entities performing work on the M&O's behalf, then so state.

12. Ref: Section 1.7; the DRD does not necessarily encompass the design configuration baseline, which must contain all documents, specifications, and/or drawings that collectively define the current design of the IDS. The baseline must encompass both the hardware and software elements of the design and must be kept accurate and current. See Specific Comments 8 and 9.

Section 1.7 does contain a much improved discussion of the phased approach, but the document still does not adequately define the role of Design Specifications and Design Studies in the implementation of the FRD. See General Comment 1

13. Ref: Section 2 and Appendix B; implementing the requirements of the FRD should be the primary focus of the DRD, and therefore it is suggested
that this section would be an appropriate place to describe the Design Specification development process, as discussed in General Comment 1. A list of planned Design Specifications and all associated Design Studies (that may be required in order to finalize any Design Specifications). An FRD to DRD requirements matrix is an excellent idea, and will facilitate maintaining continuity between the FRD and DRD throughout all subsequent updates, but specific section/paragraph numbers should be provided for the FRD reference sections.

14. Section 3.1 and 3.2: The detailed discussion of Measurement Range and Accuracy (Section 3.1) and IDS Data Error (Section 3.2) would be more appropriately treated in a Design Study Document rather than the DRD.

15. Ref: Section 3.1, page 13, paragraph 1; It is not clear from the text what the relationship is between items 1, 2, and 3 and the performance specifications. Clarify or eliminate the reference.

16. Ref: Section 3.1, page 14, paragraph 2; IDS data is produced to support participant Principal Investigators. Delete reference to “ESF design and license application requirements” and substitute “participant testing programs”.

17. Ref: Section 3.1, page 14, bullet 1; I do not understand the reference to “anticipated data use”. PIs use the data, IDS does not use data (except for internal monitoring functions). Trying to make estimates of required data accuracy based on anticipated PI data use is not appropriate. Please clarify.

18. Ref: Section 3.1, page 14, bullet 2; It is inappropriate for IDS to anticipate PI data usage. IDS has no way to anticipate “site characterization modeling and design verification data requirements.” These responsibilities belong to DOE and testing organizations. Delete this reference.

19. Ref: Section 3.2, page 15, paragraph 1; Change the first sentence to eliminate “absolute”. This term overstates the case made for understanding items tending to decrease the accuracy of IDS measurements.
20. Ref: Section 3.2, page 17, last; Since this the responsibility of the PIs extensive comment in this document is inappropriate. Change the last sentence to read "These theoretical relationships are sometimes difficult to verify for the required accuracy of measurement and may contribute to uncharacterizable errors in engineering unit values and subsequently calculated parametric values."

21. Ref: Section 4.0, page 18, paragraph 1, last sentence; This sentence implies that IDS progress is related in some way to the preparation of final requirements. Due to time constraints, testing schedules, and other management issues, a fairly complete IDS FRD and related specifications may not be prepared for several years. The concept of supporting the testing program is not to define a final solution; it is to continue to work with the PIs to develop IDS to meet their current requirements. These requirements may change (and certainly will develop to replace current testing requirement TBDS) with time. This sentence should be revised to accurately reflect our intention to define specifications for FY94 procurements followed by broader specifications describing the next phases of IDS. Since these specifications become part of the procurement documents they must be phased in a similar manner to the planned procurements. The final documents will be the last step in the process.

22. Ref: Section 4.0, page 18, paragraph 2, bullet 3; More modern technologies than those reflected in the FRD currently provide excellent on-line data protection (WORM optical disks) without redundant storage. However backup copies stored in a secure facility will certainly be required. This sentence should be modified to reflect the availability of this newer technology.

23. Ref: Section 4.0, page 18, paragraph 2, bullet 4; On-line access must include supporting information (calibration, configuration, etc) as well as test data. Please change this sentence to clarify this issue and include these items in on-line data.

24. Ref: Section 4.1, page 20, last paragraph; This paragraph is not a clear statement of the anticipated DAS installations in the ESF. Change this paragraph to include "DAS installations underground will be in dedicated equipment enclosures for small tests, portable vehicle mounted enclosures and work area for short term, isolated tests, and in environmentally controlled portable buildings erected near the test for
larger and long term test." The way the paragraph is currently written, there is the implication that some DAS units will be located at the surface and that their enclosures will be different than the standard ESF unit. No DAS units are currently planned for the surface (Large Block Test may be an exception) and ESF enclosures are expected to be standardized.

25. Ref: Section 4.1, Fig 4.1-1; Although this figure is technically correct it contributes very little to understanding the high level concept of the IDS as a networked system with network cables extending into the N Portal, looping through the upper level, exiting the S Portal, and returning to the surface computer center. This diagram should be redrawn in a more representative manner while presenting the information shown.

26. Ref: Section 4.1, Fig 4.1-?; Another simple diagram must be included to demonstrate the target configuration defining the planned FY94 procurements.

27. Section 4.1, page 22, paragraph 5, bullet 1: It needs to be stated that the IDS will ramp up to some large number (i.e. 15,000) channels with the capability for even further expansion if necessary.

28. Ref: Section 4.2, page 24, 2nd paragraph; "...a high availability multi-processor system with shared access to all mass-storage devices." is not the critical issue for IDS. The surface computer does not need high availability. The multiple processors or CPUs are simply to provide a convenient option for switching out a failing unit and selecting a functioning unit to minimize repair downtime. There is no test driven reason for the configuration described. IDS failures that result in surface computer downtime and lost data are expected and acceptable. There will need to be an IDS study plan and an Operations and Maintenance (ESF O&M) plan describing how failures are repaired and expected downtimes. The referenced "shared access" seems to imply some high-tech number cruncher type configuration. For IDS multiple access simply means that each processor is attached or can be manually attached to the mass storage devices as needed. High tech is only valuable for this function if it is free or an intrinsic part of the system without incurring substantial extra cost.

29. Ref: Section 4.2, page 24, last paragraph; See comment 28 above.
30. Ref: Section 4.2, page 26, 3rd paragraph; The sentence “For high availability requirements...” should be deleted.

31. Ref: Section 4.3, page 28, header; The title of this section is not specific enough to differentiate it from other communications activities (i.e., telephones). Change the title to something like “Data Communication Networks”.

32. Ref: Section 4.3, page 28, last paragraph; The use of FDDI for IDS is not justified by the high data rate capability. The overwhelming reason for selecting FDDI is that it is a fiber optic network characterized for extended lengths important for the ESF. This last sentence should be re-written to reflect this emphasis as follows; “The FDDI network has been chosen primarily for its ability to support the extended distances required to support ESF tests and the noise immunity of the fiber optic cable. IDS data rates will be far below FDDI limits.”

33. Section 4.3, page 30, paragraph 3: The LAN can be fiber optic or copper cable in the early phase of the IDS.

34. Ref: Section 4.3, page 30, first paragraph; The redundant FDDI network connecting equipment throughout the ESF and surface computer center relies on this redundancy to deliver communication for the entire system. Redundant Ethernet local area networks (LANs) may or may not be critical for test support. The second sentence should be changed to “LAN functionality will be evaluated and redundant networks will be utilized where needed to support extensive test configurations. Normal LAN failure/repair processes will be acceptable for most configurations.” The last sentence should be modified to change “LAN” to “redundant LAN”.

35. Ref: Section 4.3, page 30, 2nd paragraph; Remove reference to ANSI network management standards. Initial equipment installations in FY94 may not be able to meet this requirement. Invocation of this standard seems gratuitous and may actually interfere with vendor proposals. Referencing an IEEE 802.3/Ethernet LAN should be enough to completely characterize the network.

36. Ref: Section 4.3, page 30, 5th bullet; Change “health” to “operational condition”.

37. Ref: Section 4.3, Fig 4.4.1-1; This is a complex diagram and certain words are abbreviated unnecessarily or the abbreviations are undefined. Where there is space do not abbreviate (i.e., "CH" should be "CHANNELS", "TYP" should be "TYPICAL FOR", "ENV" should be "ENVIRONMENTAL"). Certain terms are undefined and/or are inconsistently annotated with periods (i.e., "P/O", "CP", "E.U.", "MUX", "A/D").

38. Ref: Section 4.3, Fig 4.4.1-1; In general, participant testing activities in the ESF are referred to as tests not experiments. Change "EXPERIMENT" to "TEST".

39. Ref: Section 4.4.3, page 34, 3rd paragraph; Change "will conform to a number of acceptable standards" to "will conform to existing commercial standards".

40. Ref: Section 4.4.3, page 34, 3rd paragraph; Reference to card edge test points seems to be excessive detail for the intended procurement methods. Would the absence of card edge test points actually disqualify a desirable vendor? Please delete the reference to "card edge" test points.

41. Ref: Section 4.4.3.1, page 37; Indicate which figure demonstrates the "Instrument Termination Panel" as part of the test configuration.

42. Ref: Section 4.4.3.1, Fig 4.4.3.1-1; In the LEGEND list change EXIT to EXCIT.

43. Ref: Section 4.4.3.1, Fig 4.4.3.1-1; See comment 37 and 38 above.

44. Ref: Section 4.4.3.1, Fig 4.4.3.1-2; This figure is confusing. The simplest planned DAS (FY94 procurement) is not specifically illustrated. Diagram links that have optional configurations are not noted (i.e., it appears that a Local Operator Test Station must be connected to the Main DAS Processor and the LAN TR). The use of all capital letters in the figure causes confusion with all capital letter acronyms. The DAS acronym has been used consistently, prior to this diagram, to refer to an individual unit containing all the elements to perform as a free standing unit or connected to a LAN. If the DAS includes the main processor shown in the diagram, the units labeled DAS-1, DAS-2, etc should be renamed. If this main processor is not part of the DAS this should be made clearer in prior descriptions and diagrams. The concept of a Main DAS Processor seems to detailed for the DRD as a precursor for procurement functional
specifications. Please revise this figure to include each specific DAS configuration currently planned and address the issues raised above in this comment.

45. Section 4.4.3.1, page 39, Figure 4.4.3.1-2: This figure does not show any local storage capability for the various DAS configuration types. Won't this feature be needed?

46. Ref: Section 4.4.3.1, Fig 4.4.3.1-3; The implication of this figure is that a DAS Room may be an actual drift in the rock. This is not indicated in the FRD and is unacceptable. DAS Rooms in the ESF will be conventional trailers or portable buildings erected underground. These DAS houses may be located in a drift.

47. Ref: Section 4.4.3.1, Fig 4.4.3.1-3; The diagram implies some functional linkage between test drifts and the local DAS and workstation room. This should be removed from the diagram as it is misleading. DAS rooms will be located near large tests, general test instrument concentrations, and as needed in the ESF. It is highly unlikely that the configuration demonstrated will ever exist. DAS rooms (trailers) will probably be located in shallow alcoves off main drifts or test drifts that just get them out of the way. Although this diagram contains correct "conceptual" information, the presentation conveys the wrong layout. Please add an artistic perspective style drawing to represent the actual concept as a supplement or replacement for this figure. Revise this figure to delete the concept of a specialized DAS Room excavation.

48. Ref: Section 4.4.3.1, Fig 4.4.3.1-3; See comment 37 and 38 above.

49. Ref: Section 4.4.3.1, page 42, bullets; These bullet symbols are not consistent with the bolder symbols used in other parts of the document. Please change the bullet symbols, at this level, here and elsewhere in the document for consistency throughout.

50. Ref: Section 4.5.1, page 52, 2nd paragraph; Please include a minimum set of functional capabilities for the proposed FY94 & 95 PC-based host computer software.

51. Ref: Section 4.5.2, page 55, 1st bullet; Change "health" to "condition".
52. Ref: Section 4.5.2, page 56, last paragraph, 1st bullet; Change “The software must be designed to include...” to “The DAS software must be designed to include...”.

53. Ref: Section 4.9, page 64, 1st sentence; Change “under the control of the TCO...” to “under the control of LANL TCO Data Management Plan. Physical transfer may be accomplished...”

54. Ref: Section 4.9, page 64, last sentence; Change the sentence to read “The format, frequency, destination, and processes supporting the data transfer will be established by the LANL IDS Data Manager.”

55. Ref: Section 4.10, page 64, 1st sentence; Add “with good engineering practices and test requirements.”

56. Ref: Section 4.10, page 65, 4th & 5th paragraph; See comment 28 above. The need for IDS fault tolerance will be limited to critical testing activities that have yet to be identified. This is not a critical system issue. For the most part envisioned passive redundancy will be adequate with operators making change overs or some slow (in advanced CPU management terms) automatic CPU swaps to perserve overall system integrity. The very important design feature of the DAS units that allow them to operate autonomously without network connections to the surface for extended periods make the FDDI network and surface CPU redundancy and high availability a desirable operational feature, not a critical requirement. For DAS installations not using a sub-network to functionally link DAS components, sub-network redundancy and availability is not critical. For large, clustered DAS installations using a sub-network to link DAS components and supporting single or multiple tests, this sub-network will critical and sub-network availability and redundancy will be very important. Please revise or delete these paragraphs to reflect these issues.

57. Ref: Section 4.10, page 65, last paragraph, last sentence; Change “provided where redundancy is too costly;” to “provided where redundancy is too costly or not required;”

58. Ref: Section 5.0; based on the observations made in this Section, which appear to based on an evaluation of the current conceptual design for the ESF and current construction/testing schedules it ought to be
possible to define the major elements of all deliverable system modules, and to develop Design Specifications and conduct Design Studies in a prioritized fashion, as discussed in general Comment 1.

With regard to the sequence of the Implementation Plan in the Acquisition Schedule shown on page 69, it is suggested that the IP cannot be properly developed and submitted for DOE approval until the Design Specifications common to the entire system and the first phase are approved, and all Design Studies that would have a significant effect on the overall design and the first phase deliverable system components should be completed. Once the IP is approved, then procurement activities should be initiated for the components of the first system module.

59. Section 5.0, page 70, paragraph 5, bullet 8: Milestones 9 and 10 in column "FY 94 IDS" of Acquisition Schedule should read "12/20/93" and "12/20/93" respectively.

60. Ref: Section 6.0; although this section considers the configuration management needs of the IDS in greater detail than any previous version of the DRD, the procedural controls that must be applied still are not defined in adequate detail, either by reference to other documents or by inclusion in the text or appendices of the DRD itself. It is absolutely critical that the system for establishing the IDS configuration baseline and managing all subsequent changes be planned and procedurally defined as soon as possible.

Configuration management (CM), as it relates to the IDS should be considered part of the process of design control, and hence should be considered as part of the QA program requirements applicable to the activity. The M&O's QAPP has been cited as the governing QA program document for Fluor Daniel, but in its current form does not address configuration management at the level necessary to effectively control the IDS design. It is suggested that the QAPP be revised to cite or incorporate an IDS project-specific CM Plan and supporting procedures developed under the design interface management criteria established by the M&O's QA Program Plan. If existing M&O procedures can be used to fulfill any CM functions, they should be incorporated into the CM plan by reference. Other CM procedures could either be written directly into the text of the CM plan, or prepared as discrete procedures in compliance with M&O procedure QAP-5-1, "Preparation of M&O Quality Administrative and Implementing Line Procedures." It is assumed that the M&O would assume
responsibility for verifying the adequacy of CM system implementation through the auditing and surveillance functions defined by their QA program.

At a minimum, the CM Plan should define the procedural controls that specifically address the following considerations:

- Phased Delivery and Installation Requirements; Since the IDS will be designed, procured, tested, and installed in phases that support specific construction and testing milestones, not all system elements will be designed and tested when the first portions of the system become operational. The overall design effort (and hence the procurement, assembly, and testing effort) must be responsive to system change requirements originating from operational experience and/or changing user needs. Moreover, the design of the operational portion of the system may also require revision in response to evolutionary changes brought on by incorporation of more recent versions of the software/hardware components of the system.

- Requirements for Ensuring the Quality of Acquired Data; even though the design effort will be evolutionary, the precise configuration of the IDS at the time that specific ESF data are acquired must be known and documented (along with the system's subsequent design change history) if the data are to remain defensible for potential licensing purposes. System change requests must be evaluated for their potential effect on previously acquired data, as well as data yet to be acquired.

- Organizational Interface Requirements; even though DOE may accept deliverable portions of the IDS into the YMP ESF configuration to support particular phases of construction and testing through configuration audits, M&O/Fluor Daniel responsibilities for the overall design will require that they systematically maintain cognizance over the overall configuration for the duration of their design responsibilities for the ESF project. Although the M&O/Fluor Daniel may not physically control the delivered portions of the system, they must be able to systematically assess the effects of design changes, system additions, and modifications on the previously delivered portions of the system. Where those effects are determined to have an impact on the delivered system, its data acquisition functions, or previously acquired...
data, they must be systematically transmitted to LANL, DOE, and system users for their appropriate action.

It is suggested that in response to these concerns, CM procedures be developed that:

• describe verification processes that will ensure that all configuration items have completed all of the various review and approval processes required by applicable Quality Assurance (QA) program requirements. Configuration items must include the Functional Requirements Document (FRD), the DRD, all Design Specifications, and the Implementation Plan (IP), each of which should be subject to specific QA program controls that govern its preparation, review, approval, and update; completion of all required review processes should be a precondition for incorporation into the baseline.

• describe entry of each verified configuration item into an actively updated CM data base or configuration item baseline record that defines all configuration items currently accepted into the baseline; the database should also be capable of flagging the following:
  1. the systems-effect evaluation status of all configuration items (see the following bullet);
  2. items with open nonconformance resolution or corrective action requirements; and
  3. items that define system components that have also been accepted into the YMP configuration (i.e., delivered/installed);

• describe Configuration Change Board (CCB) evaluation of the overall effect of new or modified configuration items, system nonconformance resolution/corrective action proposals, and change requests (from users, PIs, or system designers) on the design of the overall system. Each addition, modification, or deletion of configuration items must be considered in relation to all other configuration items that have been previously accepted into the system, and change requests/authorizations initiated across proper organizational interfaces. Such evaluations should result in the following:
  1. unconditional acceptance, if no system changes actions are required;
  2. conditional acceptance, if system changes or modifications are
required or can be accommodated without unacceptably compromising schedule, budget, and/or data quality; or

3. rejection., if the effects on the existing design are such that they cannot be accommodated within the constraints of schedule, budget, and/or the maintenance of data quality.

If changes are authorized, the CCB should define the parameters that must be met for the revised configuration item in order to receive CCB approval. In addition, the system must be especially capable of identifying all affected portions of the IDS that may already have been installed in the ESF, and must be able to flag specific data acquisition operations performed using installed equipment that may be affected by system additions or changes.

The CM system discussed in this comment is described graphically in Figure 2; the system should be established by the M&O; DOE and Fluor Daniel should participate in the CCB, but it should be chaired by LANL.

61. Ref: Section 6.1; See comment 60. The IDS configuration baseline must contain all documents, specifications, and/or drawings that collectively define the current design of the IDS. The baseline must encompass both the hardware and software elements of the design and be kept accurate and current through the systematic application of procedural controls. Figure 4 describes a model of the overall process of configuration item entry, as well as the change control processes that will be required to track completion of DOE configuration audits, delivery/installation of system components, user/PI-initiated change requests, and the resolution of system nonconformances and all recommended corrective actions.

62. Ref: Section 6.2; as noted in comment 58, it is unclear how the IP can be meaningfully prepared until the Design Specifications (which would include the equipment descriptions, technical specifications and other information required for inclusion in the IP) have been prepared and accepted. Organizational responsibilities for the preparation of the IP must be defined; since it involves a combination of Design Specification details, procurement control information, QA program considerations, and overall management considerations, it seems that IP production should be coordinated by the M&O with input from Fluor Daniel and REECO. Still, the Design Specifications should be approved at least by LANL prior to incorporation into the IP.
63. Ref: Section 6.4; the discussion of as-built documentation in this section implies the acceptability of changes to IDS design documents without addressing the impact to the total configuration; because of the potential impact on the quality of acquired data, such an assessment must be made, either proactively for all planned changes, or as part of corrective investigations related to system discrepancies or unplanned (and hence nonconforming) system changes. The text should be clarified accordingly.

64. Ref: Section 6.5; system software must be controlled as part of the overall system configuration; see Specific Comments 60 and 61.
65. Ref: Section 7.0, page 77, 1st sentence; Change to “All data recorded by the IDS will be subject to the control of the LANL TCO IDS Data Management Plan and procedures.

66. Ref: Section 8.0; no schedule was provided for review, however, such a schedule should identify all testing milestones, which should include component or subsystem-level Factory Acceptance Tests (FATs) or other tests performed as a condition of item acceptance; LANL-witnessed post assembly acceptance tests, prior to presenting individual phase deliverables for DOE configuration audits; DOE configuration audits designed to accept individual phase deliverables into the overall ESF configuration; and Operational Acceptance Tests (OATs) after the installation of each group of phased deliverables in the ESF.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    F Homuth, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
MEMORANDUM

To: Ron Oliver
From: Jim Hall
Subject: Requirements for Telephone Lines to Support Off-Site Voice and Data Communication for the SNL Construction Monitoring Test and LLNL Large Block Test at Fran Ridge

Recent IDS planning/interface meetings with SNL and LLNL have identified the need for voice and data communications from the SNL Construction Monitoring Test principally fielded in the North Portal Starter Tunnel during FY93 and FY94 and the LLNL Large Block Test at Fran Ridge. The planned data communication will be supported by a single telephone line dial-up modem located at a central IDS facility controlling the Construction Monitoring Test and another identical modem located in a similar facility at Fran Ridge for the Large Block Test.

Data rates will be low (although not completely defined at this time). The data channel will not be used for controlled data distribution. For this reason, precise definitions of data quality over the channel are not critical and commercial telephone line standards are adequate if they support the required data rates reliably.

It is expected that a commercial 14,400bps modem incorporating v.42bis data compression will be satisfactory for the duration of testing during FY94 and early FY95. Because of the elementary nature of this data communication scheme, a separate voice channel would be helpful for setup and troubleshooting, however, a single channel would be the minimum requirement for supporting each test. It would be desirable that each data channel be devoted to the assigned test, however, shared access may be tolerable if other users do not dominate the channel or engage in extended communications locking out PI access to their tests. The voice channel quality is not critical and must have a non-critical but good availability.

Distribution:

R Craig, USGS
F Thamir, USGS
L Costen, SNL
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W Lin, LLNL
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N Elkins, LANL, EES-13/LV, MS 527
F Homuth, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, J 527
J Hall, CAG, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Comments on the M&O Draft IDS DRD, Rev 0, Dated May 1993  

General Comments:  
Please incorporate comments on an earlier DRD draft contained in the above referenced memorandum from Hall to Kalia, dated Fri, May 21, 1993.

1. As currently written, the Integrated Data System (IDS) Design Requirements Document (DRD) does not clearly describe how the requirements of LANL's Functional Requirements Document (FRD) will be met through the delivery of discrete system modules in a timely manner that coincide with the testing and construction data acquisition needs of the project.

2. The design effort defined by the DRD does not provide a structure that would ensure that the system would in fact become operational in increments that correspond to the construction and testing needs of the Yucca Mountain Project (YMP) Exploratory Studies Facility (ESF). Construction or testing delays attributable to delays in the installation of the IDS or the inability of the IDS to service the project's data acquisition needs could be enormously expensive, and could seriously jeopardize the success of the project and the viability of IDS. Because the current version of the M&O's IDS Engineering Plan (EP) is not structured to provide such details, the DRD must define the required design effort, which must be carefully organized and prioritized in order to ensure that the IDS is developed, tested, and installed in time to meet the data acquisition needs of the project at the required schedule milestones. At a minimum, the DRD must:

   a. Establish A Conceptual Model Based On Operational Requirements

      The DRD must establish a conceptual model for the IDS that defines the general parameters or design boundaries of each major deliverable system module, based on the general requirements of the FRD, the M&O's current understanding of the integrated ESF test and construction schedule, and the corresponding operational requirements for each deliverable system module. Even though the integrated construction/testing schedule may not be final, now is the time to establish the model, which should be entered into the IDS configuration baseline as part of the
DRD, and would thereby serve as an organizational standard or paradigm throughout the design effort. The conceptual model should require that IDS Module A be designed to service the data acquisition needs of the ESF at milestone A; Module B should be designed to be integrated with Module A to service the data acquisition needs of the ESF up to milestone B; Module C should be designed to be integrated with Module A and B to service the data acquisition needs of the ESF through milestone C; and so forth.

b. Identify And Prioritize Design Specification Requirements

To the extent possible, the DRD should identify the individual Design Specifications that will be required to physically define the software and hardware components of each deliverable system module (as defined by the conceptual model discussed in 1.a above). The Design Specifications should be prepared with detailed component and spare parts listings and all applicable component acceptance inspection/testing requirements, which can subsequently be directly referenced in procurement documents. Preparation of these Design Specifications should be prioritized based on the delivery/installation schedule needs for the associated system module or modules. The highest priority should be given to those Design Specifications that must be incorporated into all deliverable system modules, then those additional Design Specifications that will be required for the first module, then those required for the second deliverable module, and so forth.

Schedules for Design Specification preparation must be defined in the DRD, since they are not currently provided in the Engineering Plan (EP). Some details will not be able to be specified or developed to the required level of completeness at this time in the current version of the DRD. These items should be noted and identified as part of a later design requirements development effort and will be incorporated in later revisions of the DRD.

c. Identify And Prioritize Requirements For Design Studies

The DRD must define (deliverable system module by deliverable system module) all Design Studies required to finalize or verify the adequacy of individual Design Specifications, and establish priorities and schedules for conducting such studies that are based on the delivery/installation schedule needs for the associated system module. Design studies that affect Design Specifications applicable to all deliverable system modules should be given the highest priority, then those that affect the first module, then those that affect the second, and so forth.

Once the Design Specifications common to the entire system and the first module are approved, and all design studies that would have a significant effect on the overall design and the first module are concluded, then the first version of the Implementation Plan (IP) should be submitted for DOE approval. Once the IP is approved, procurement activities should be initiated for the components of the first system module. The processes described in this comment are presented graphically in
Figure 1.

**DRD & Design Specifics Development Process**
3. It must be noted that completing the IDS design and implementation will take place over several years. The configuration of the final system cannot be predicted even with the most careful attention to design details at this time. This is the result of a testing requirement driven design and DOE management of annual budget cycles. Two separate data acquisition components have been identified in FY93 for procurement and installation in FY94 that were not anticipated last year. These sorts of changes will continue as testing program plans are translated into DOE approved activities at the ESF.

Based on experience at YMP and with other DOE sponsored data acquisition programs, as the facility is excavated certain tests (perhaps not planned for or dramatically changed) will be approved by DOE for installation on a relatively fast track schedule, and other tests that are expected to proceed and have been planned for may be held back. IDS planning as reflected in the DRD must accommodate this uncertainty and abrupt changes in scope by concentrating on products to be provided in FY94 as the primary, highly detailed, issue. The DRD should

- **The DRD should be identified as a working document revised at least once per year** to reflect the design tasks in progress to support currently funded or near term test planning.
- **Identify specific tasks to be worked on in the target FY.**
- **Deferral longer range design issues** (FY95 and beyond) whenever possible to conserve IDS resources.
- **Identify specific long term design goals** (i.e., computer center, fiber optic cable and network) related to the integrated testing schedule and make these items part of the FY95 budget request.

The DRD is a working level document whose purpose is to accurately describe what is going on at the design (and by implication the implementation level). Next year will be dominated by procurement of the Subsurface Safety and Alarm System (SSAS) and the small data acquisition stations (DASs) to support SNL’s Construction Monitoring Test (and maybe other surprises). The DRD should have this emphasis while indicating that continued design work will progress on the overall IDS. The processes for identifying detailed DRD topics are shown in Figures 2 and 3.
Identify Specific Tests Planned & Funded for the Target FY

Determine IDS Sched. from Integrated Construction/Test/IL Schedule

Design or Procurement Changes in Target FY?

Yes

Included in Current FY Detailed Design?

Yes

Procurement Schedule OK?

Yes

Identify Specific Design Tasks to the Target FY

Funded Test FRD & Testing Requirements

Estimate Level of IDS Required for Planning

Identify IDS Module Needed to Support Testing

Identify Deferred Modules & Design Tasks

Develop Preliminary Module Design Criteria 

Planning

No

No

Yes

Develop Module Procurement Strategies

Figure 2
Identify Specific Design Tasks for the Target FY
Figure 3
Detailed DRD & Design Specification Development Process for Specific Task
4. Configuration Management (CM) concerns are addressed in several locations throughout the document, however, it is still unclear exactly what the IDS configuration baseline consists of and exactly which control mechanisms will be applied. Procedural controls are hinted at, but unless specific cross-references to controlled plans or procedures are provided that actually service the needs of IDS development, then it is difficult to conclude that a functional system is in place. Neither the EP or the M&O's QAPP provide the necessary level of detail, although preparation of a configuration baseline specification that is both "a controlled document and the means of control" is discussed conceptually in Section 1.6.3. It is absolutely critical that the system for establishing the IDS configuration baseline and managing all subsequent changes be planned and procedurally defined at the earliest possible opportunity. The DRD must be updated to explicitly define all required design interfaces with the CM system. The IDS configuration baseline must include the FRD and, after completion of their initial approval cycles as shown in Figure 1, the DRD and all Design Specifications produced or updated thereunder.

5. The inclusion of descriptive material in the DRD is excessive and confuses the purpose of the document.

- The introduction in Section 1 contains background YMP information suited to a Title 1 IDS Design Document but inappropriate to the DRD. Better descriptions of project background are available elsewhere. The introduction should be limited to stating the goals of the IDS and the DRD in a simple and straightforward manner.

- Repetition of FRD contents in Section 2 does not contribute to describing the planned design criteria, studies, or specifications to be outlined in the DRD.

- Plans for correlating FRD requirements with DRD design elements are not made clear.
Specific Comments

1. Ref: Preface, pg 2, para 2, line 9; the sentence containing “will need a computer system for…” should be changed to “will need a computer based system for…”

2. Ref: Preface, pg 2, para 2, line 10: the sentence starting with “The ESF Project Integrated Data System…” should be changed to “The Integrated Data System…”

3. Ref: Preface, pg 3, para 1, line 3; the description of the physical networks is confusing. Change “instrumentation; local and fiber-optic networks for distributing the data to the central computer…” to “instrumentation; local copper-wire and fiber-optic networks and an ESF general purpose fiber-optic network that supports distributing data to the central computer…”

4. Ref: Preface, pg 4, para 1, last sentence; references to the NRC are not appropriate in this document and should be deleted here and in any other occurrences. All NRC interactions are the responsibility of the Project Office. We can speculate on the content or supporting information that the Project Office will use, however, we don’t know or control the YMPO interactions with the NRC.

5. Ref: Preface, pg 4, para 2, last sentence; the referenced “databus” is jargon. Replace with an accurate syntactic description such as “By providing integrated acquisition, transfer, storage, and distribution for all ESF test data, the IDS will:”

6. Ref: Preface, pg 4, para 2, 5th bullet; there is an intimation that data analysis will be performed by or with IDS. IDS does not do analysis; what the PIs choose to do with their IDS data is their business. Change the sense of the sentence as follows; “Provide data recall for use by PIs to monitor test progress.”

7. Ref: Preface, pg 4, para 3, last sentence; not all general DOE requirements apply to IDS. Add “as appropriate” to the end of the sentence.

8. Ref: Section 1.2; the design processes defined by the DRD must also be structured to ensure that individual deliverable/installable system modules are designed (and hence procured, assembled, tested, and installed) in a sequence that corresponds with the integrated ESF construction and testing schedule. The DRD should identify all Design Specification requirements and provide a schedule for their development and any Design Studies required to verify the adequacy of one or more Design Specifications must be identified and scheduled. See General Comment 1.

9. Ref: Section 1.2, page 3, last paragraph; the specific "state-of-the-art systems engineering techniques" that will be used are not adequately defined elsewhere in the document; if they remain undefined, the statement becomes gratuitous. The DRD will become a critical part of the configuration baseline, and must be supported by specific plan, method, or procedure references.
10. Ref: Section 1.3; suggest reversing order with paragraph 1.2.

11. Ref: Section 1.4 The role of the participant organizations is inadequately defined in terms of the design interface requirements that affect or are affected by the DRD. For example, the DRD should specifically note the following:

a. DOE has direct review and approval authority over the DRD and its associated Implementation Plan, and will conduct final YMP Configuration Audits on each deliverables system module as a condition of acceptance;

b. LANL is responsible for review and approval of the DRD, all Design Specifications, and all subsequent revisions, and will review the recommendations of all Design Studies as they support Design Specification changes.

It is important to note that LANL will chair the configuration change control board or other administrative mechanism established by the M&O to manage the IDS configuration baseline. YMPO will have their own internal configuration change control board dealing with IDS and other ESF issues. The DRD defined role for the M&O participants, outside of the IDS design team, is unclear. Does the M&O assume review responsibility for the design documents prepared by Fluor Daniel prior to LANL/DOE review, do they defer such responsibilities to LANL, do they participate as an active member of the design team, do they monitor Fluor Daniel activity through quality verification processes, or do they perform some combination of these roles? These are Engineering Plan (EP) level issues but are not treated in the current version of the EP.

12. Ref: Section 1.5; the standards listed in this section should be limited to those that directly affect the DRD. DOE Order 4700.1A is a higher level standard that probably doesn't need to be reflected at a level below the EP. The DRD should provide the guidance necessary to prepare all required Design Specifications, conduct all required Design Studies, and complete the Implementation Plan. Discussions should be provided for each standard describing its applicability to these specific tasks. The level of detail routinely provided in the introductory sections of DOE orders is suggested as a minimum. It is Fluor Daniel's responsibility to interpret the applicable portions of the appropriate standards into specification detail (without reference to vague DOE order references) for vendors or in-house development that will allow incoming inspections, test plans, and verification activities to be evaluated without interpretation during IDS design, review, and implementation.

13. Ref: Section 1.6, introductory paragraph; The M&O QAPP reference should be a complete citation. Since the DRD becomes part of the IDS configuration baseline, all references must be specific. The reference to DOE Order 5700.6A should be 5700.6B. The last sentence should
clearly state that the portions of the M&O QAPP that specifically apply to the activities addressed by the DRD are addressed in the following paragraphs.

14. Ref: Section 1.6.1; responsibility for M&O QA program implementation relative to the DRD resides with Flour Daniel’s Project Manager and IDS engineering staff, not the M&O QA Manager. The M&O QA Manager, through delegation to a Field QA Coordinator, is responsible for verification of compliance through surveillance and/or auditing processes. This important distinction of responsibilities is crucial to understanding and supporting the QA process and appropriate control and responsibility hierarchies.

15. Ref: Section 1.6.2; specific procedural references should be cited; if specific training responsibilities have been assigned to the Flour Daniel IDS Task Leader, then so state.

16. Ref: Section 1.6.3; responsibilities for preparation of the configuration baseline specification and its implementing configuration management procedures must be explicitly defined. The interface between the design documents produced pursuant to the DRD and the configuration management system must be defined. See Figure 1 and general Comment 2.

17. Ref: Section 1.6.4; the DRD should require that individual Design Specifications define the any specific component or subsystem-level acceptance testing requirements that should be invoked as conditions in procurement documents. The DRD should also require the definition of minimum requirements that must be addressed in the acceptance testing plans prepared for all deliverable system modules (prior to DOE configuration audits and delivery to the ESF) and post-installation operational acceptance tests.

18. Ref: Section 1.6.5; the DRD should specifically cite the required procedures, or at least cite the governing plan under whose auspices they will be developed. Minimum handling, storage, and transportation requirements required to maintain the design integrity (e.g., special handling and storage requirements for electronic components, bar code identification requirements, security/material control procedures) of components from receipt through assembly, testing, and installation in the ESF should be addressed in the DRD if they are not adequately addressed elsewhere. If these issues are addressed elsewhere, a reference citation should be included in the DRD.

19. Ref: Section 1.6.6; the DRD should specifically cite the required procedures, as well as the responsible organizations. The interface between individual document control organizations and the CM system should be explicitly defined, or noted by cross-reference to the CM specifications/procedures prepared for this project.
20. Ref: Section 1.6.7; the DRD should specifically cite the required procedures, as well as the responsible organizations. Responsibilities for receiving inspection (REECO? M&O?) and interfaces with the design engineers (Fluor Daniel) and the procurement manager (REECO) must be particularly well defined, since acceptance testing at the supplier's facilities or upon receipt may be required for many components.

21. Ref: Section 1.6.8; the DRD should specifically cite the required procedures, as well as the responsible organizations. It is assumed that the M&O will provide all required auditing and surveillance functions and will manage all nonconformance reporting and corrective action processes. Records responsibilities are rather more complex because of the distribution of responsibilities in areas that will produce records, and should be defined in detail. If the M&O is going to maintain the IDS project records on behalf of Fluor Daniel, REECO, and other entities performing work on the M&O's behalf, then so state.

22. Ref: Section 2.0, introductory paragraph; with regard to the reference to the FRD, it is suggested that in order to reduce the updating requirements of the DRD, that revision levels for controlled documents not be specified. Instead inclusion of a general statement that latest approved versions of all documents shall be assumed to apply should be adequate. CM controls should only require that the DRD be updated whenever technical changes are required in order to accommodate new configuration items or changes in previously accepted items.

23. Ref: Section 2.0, introductory para, line 4; replace “This document defines the IDS as a Data Management Function providing…” to “This document characterizes IDS as providing…”

24. Ref: Section 2.0, introductory paragraph, third sentence; the IDS Mission Statement should be expanded to require the performance of system functions in phases that correspond to the evolving construction and testing needs of the ESF. See General Comment 1.

25. Ref: Section 2.0, pg 12, line 10; replace “High system reliability is essential…” to “High system reliability and a very high level of data quality is essential…”

26. Ref: Section 2.0, general comment; given the detailed presentation of functional requirements in the FRD, it is unclear why this section is included in this document when the FRD could simply be incorporated by reference. The purpose of the DRD is to respond to the FRD, i.e., to translate FRD requirements into actual system Design Specifications. Design Specification preparation should be driven by the FRD directly, not through a truncated restatement in the text of the DRD. Inclusion of Section 2 only increases the possibility of misinterpretations based on inconsistencies between the documents; these possibilities will tend to increase over time as the FRD is updated to accommodate revised ESF and/or IDS user requirements and thus loses textual correspondence to the DRD.
27. Ref: Section 2.1, part 2.b, pg 13; add "unique identification of each instrument" into the paragraph.

28. Ref: Section 2.1, part 4.a, line 5, page 14; delete "producing a scaled engineering unit often unrelated to the parameter of interest"

29. Ref: Section 2.2, part 1.a, page 16, line 5; Delete the last part of this section starting with "Note that each data values does not..."

30. Ref: Section 2.2, part 2, page 17, 1st para; change the sentence "Archival to be accomplished within two hours of acquisition during normal operation." to "Archival to be accomplished once per day during normal operation." The two hour requirement is no longer appropriate. Time to archive data should be related to overall system performance and risk of losing data as a result of central computer and/or subsystem failure. Archiving must be a priority activity for IDS. When IDS is restarted after a failure or scheduled down time, archiving may not be the most important priority item to accomplish at any arbitrary time during the restart sequence. If low risk data storage is utilized, archiving may take place once a shift or once a day as appropriate. The archive is meant to be an off-line backup that will preserve data through system failures that corrupt on-line data storage. To be effective, any proposed archiving strategy will have to account for the system configuration, risk of data loss, data accumulation rates, and other operational factors.

31. Ref: Section 2.3, page 19, item 3; a parenthetic note is included in the text that should be resolved and/or removed.

32. Ref: Section 2.4, page 21, item 3; LANL, with the TCO acting as the IDS Data Manager, will be responsible for distributing archived test data. This should be indicated here and in other references to IDS data distribution in this document.

33. Ref: Section 2.4, page 21, item 4; Please update the specific equipment requirements as stated in the parenthetical note. Add a tabloid size (11X17 inches) color printer to the equipment list.

34. Ref: Section 2.4, page 22, item 7; including the 10 year lifetime is OK. There must be a follow-up change in FRD requirements, however.

34. Ref: Section 2.5, page 23, top bullet; add "In the case of an archive computer system failure, a preplanned procedure will be followed to make backup copies of data residing in subsystem storage to minimize data loss in case certain subsystems failed also."

35. Ref: Section 2.6, page 25, last sentence; change "A detailed study shall..." to "As appropriate, detailed studies shall..."
36. Ref: Section 3.0, page 28, first paragraph, last sentence; the DRD is not a tutorial. Delete the third sentence and change the last sentence to read “Factors effecting accuracy requirements are as follows:”.

37. Ref: Section 3.1, page 29, item 3; off-site may refer to participant labs or off-site testing facilities at NTS or elsewhere. In the first sentence change “off-site laboratories” to “off-site facilities”

38. Ref: Section 4.0, page 33, first sentence; add to the end “with later amendments by memorandum”

39. Ref: Section 4.0, introductory paragraph; our view is that the DRD should be focused on developing the Design Specifications necessary to translate FRD requirements into a definitive design, i.e., with all components identified at a level of detail that permits their purchase and receiving inspection/supplier acceptance testing. As such, it is unclear what purpose conceptual discussions will serve. If the FRD does not contain the level of detail necessary to prepare the DRD, then the M&O and Fluor Daniel should address the issue directly with LANL so that the FRD may be properly updated. If Design Studies are required prior to Design Specification development, then so state and establish appropriately prioritized schedules. Even if the final post assembly acceptance testing or post-installation operational acceptance testing schedules are not finalized, it is unclear why Design Specifications cannot be prepared based on what is now defined in the FRD and knowledge of FY94 testing requirements. See also General Comment 1.

40. Ref: Section 4.0, general; without some discussion of the modular nature of the IDS design and planned gradual implementation based on testing requirements, this discussion of IDS has little value in determining the scope of the task or work planning for FY94. We suggest adding this discussion.

41. Ref: Section 4.0, general; we suggest adding a discussion characterizing the Dual FDDI Ring as a general purpose ESF communications network supporting IDS, voice communication, TV signals, etc. This will identify the FDDI Ring as a more general purpose item than specifically linked to IDS and allow more freedom in funding, design, and implementation. This would also provide the basis for project wide use of the network for their own designated tasks.

42. Ref: Section 4.3, general; the purpose of the DRD is to detail the design task not to sell, demonstrate, or lobby for a particular idea. Simply state that fiber optic cable will be used. If references to different types of fibers are included, describe when each is used. Much of the fiber network detail (and all of the questions posed) belong in a design study.

43. Ref: Section 4.3.1.1, general; too much design study level discussion. See above.
44. Ref: Section 4.3.1.1, first sentence; LANL has not reviewed this study. Please supply a copy to the TCO for review. We do not agree with certain of your assumptions.

45. Ref: Section 4.4.2, general; include a reference to the availability of isolated signal conditioners providing instrument and DAS ground isolation.

46. Ref: Section 4.4.3, page 55, first paragraph; change the sentence “Isolated signal conditioning circuits may also be required.” to “Isolated signal conditioning circuits will be provided as required.”

47. Ref: Figure 4.4.3.1-2; The DAS units may be located at some distance from the Main DAS Processor. Show a local test operator terminal capability at each DAS-n either through the LAN or by direct connection to the DAS.

48. Ref: Figure 4.4.3.1-3; this drawing does not clearly depict the various elements. We cannot understand the drift outline and overlapping elements should be minimized.

49. Ref: Section 4.5, general; the software described seems to apply only to the surface IDS computer center. If so, please state.

50. Ref: Section 4.5, general; there is no indication of plans to implement this software in modules or stages consistent with testing requirements. If there is a staged implementation, say so. If the entire software system is installed in one unit, please state.

51. Ref: Section 4.5, general; there is no mention of DAS software. DAS software should be described including the following considerations:

- software designed to include operation independent of the host computer
- the host computer can be the IDS surface archiving computer or another correctly configured computer on the network
- DAS operation defining files can be downloaded from a host computer or entered through a local terminal
- DAS operation defining files and current parameters will be stored in non-volatile memory and will be unchanged as a result of a power interruption, restart, or a DAS operational failure.
- a “cold boot” restart from power on will result in the DAS resuming normal operation based on stored operation defining files without operator intervention
- the real time clock time will be continuously update to non-volatile memory, allowing the time of shut-down and restart to be entered into an event log at restart.
52. Ref: Section 4.5, general; the software description should include necessary software to support a DAS implementation that includes a simple desktop PC alternative to the complex archiving computer described and the transition envisioned to the full system. The PC alternate will probably be used for tests supported in FY94-95.

53. Ref: Section 5.0; based on the observations made in this Section, which appear to based on an evaluation of the current conceptual design for the ESF and current construction/testing schedules it ought to be possible to define the major elements of all deliverable system modules, and to develop Design Specifications and conduct Design Studies in a prioritized fashion, as discussed in general Comment 1.

54. Ref: Section 5.0, 2nd to last paragraph; the paragraph beginning “It is anticipated…” is irrelevant, out of the DRD scope, and should be deleted.

55. Ref: Section 5.0, last paragraph; the paragraph beginning “In situ test…” should be deleted. Tests requiring IDS support will come on-line through processes beyond the scope of the DRD. The timing of these tests will be determined by others and not when construction “is well underway” (whatever that means). IDS will be provided to support testing whenever needed. Grand plans will be modified or abandoned to accommodate test requirements whenever required.

56. Ref: Section 6.0, “Certifiable Data” paragraph; IDS does not certify data. Change “Certified” to “Controlled”.

57. Ref: Section 6.0, general; the term baseline should not be used indiscriminantly. The M&O IDS baseline is not part of on-line IDS data or vice versa. The IDS design baseline is a controlled record of the design process. An operation IDS baseline would contain analogous information pertaining to operations. The source of information supplied to participants will be IDS files not design and operational baselines. IDS data supplied to participants will include test data, calibration data, event logs, system configurations, test configurations, etc.

58. Ref: Section 6.1; responsibilities for preparation of the configuration baseline specification and its implementing configuration management procedure or procedures must be explicitly defined. The interface between the design documents produced pursuant to the DRD and the configuration management system must be defined. See Figure 1 and general Comment 2. Membership and chairmanship of the CCB must be defined.

59. Ref: Section 6.2; the IP cannot be meaningfully prepared until the Design Specifications (which would include the equipment descriptions, technical specifications and other information required for inclusion in the IP) for equipment covered by the IP have been prepared and accepted. Since it is necessary to prepare and maintain an IP to cover ADP equipment projected for future
procurement, best engineering estimates must be used and referenced as the basis of IP estimates. Organizational responsibilities for the preparation of the IP must be defined. Since preparation of the IP involves a combination of Design Specification details, procurement control information, QA program considerations, and overall management considerations, it seems that IP production should be coordinated by the M&O with input from Fluor Daniel and REECO. Certainly, the Design Specifications should be approved, at least by LANL, prior to incorporation into the IP.

60. Ref: Section 8.0; See General Comment 1 and Specific Comment 20.

61. Ref: Section 8.2; see General Comment 1; testing milestones will include the following:

a. component or subsystem Factory Acceptance Tests (FATs) or other tests performed as a condition of item acceptance;

b. LANL-witnessed post assembly acceptance tests, prior to presenting individual deliverable system modules for DOE configuration audits;

c. post-installation Operational Acceptance Tests (OATs) for each deliverable system module.

It is noted that DOE configuration audits designed to accept IDS modules into the overall ESF configuration are not identified as specific milestones. Unless DOE has revised their CM procedures, this is a major milestone that must be considered in IDS development schedules.

62. Ref: Section 9.0; all key positions and organizational responsibility requirements affecting the DRD should be defined in the EP. If these details are repeated here, they should include (in addition to the design team personnel listed here) key individuals responsible for configuration management, procurement, receiving inspection/FAT witnessing, QA surveillance or auditing functions, and material control.

63. Ref: Section 10.1.2; it should be noted that construction acceptance test (i.e., post-assembly tests of individual modules prior to DOE configuration audits) is a LANL, not M&O, responsibility. If the M&O performs FATs, appropriate Fluor Daniel design engineering personnel must be included in the inspection team.

64. Ref: Section 10.2; see General Comment 1.

65. Ref: 11.2; it is suggested that human factors engineering requirements be examined in detail. All NRC requirements that the reviewer is aware of were developed for nuclear power plant operating rooms, and involve requirements that are in all probability well beyond that required for safe and effective operation of the IDS.
66. Ref: 11.3; no standards are listed; see Specific Comment 65 above.

67 Ref: 12.0; references should be confined to those specifically cited in the text of the document.

Cy:  N Elkins, LANL, EES-13/LV, MS 527
     F Homuth, LANL, EES-13/LV, MS 527
     J Canepa, LANL, EES-13, MS J521
     EES-13/LV, LANL, MS 527
     CAG Files, Carlton, OR
Here are the report designs which I promised you. There are six in all.

I had a discussion with Jim Hall this morning regarding a number of issues with which I am currently concerned involving the scheduled database delivery date of July 7. I am recommending postponing delivery of the TFMDB application until the week of July 19. There are several reasons for this recommendation, the first of which is that I have not been able to devote the amount of time I had envisioned during the past few days and see the delivery date putting me into rush mode. Never a productive mode in software design.

Additional concerns are as follows:
First is the issue of delivering the database application to LANL complete with the large amount of information which must be present before the database will be particularly useful. Examples of such information are data on Boreholes, Locations, common TFMS, TFM Aliases, TFM Categories, Persons involved in the TFM process, Organizations, JPs, and TPPs. While some of this information has been captured by LANL personnel via the flat file I set up for that purpose, much of this “foundation” information has not yet been captured, and, as we have discussed on numerous occasions, the data which has been captured must be thoroughly examined before admittance to the TFM database. This process promises to be a time consuming one for me and is one which I have not yet begun.

Second, the issue of getting the data currently residing in the flat file designed for preliminary data capture into the “real” database is not a trivial one. While I will not have re-key all of the data, there promises to be a substantial amount of data entry which I will have to undertake in order to integrate the data properly into my rigorously integrity constrained database design.
Third, I am concerned that the database be delivered as free as possible of bugs and glitches which often become apparent only during rigorous use of the system. The data entry tasks I have described above provide a perfect, albeit time consuming, opportunity to perform just such debugging activities.

Finally, while the application is designed to be as user friendly as possible, it is not entirely intuitive and I feel it is critical that Jessie have access to some sort of tutorial or user’s manual upon initial installation and training. This is something which I will not have ready by next week.

While I am planning to have coding completed by the middle of next week, delivery on the 7th will preclude the delivery of any user-oriented documentation and the majority of the data entry and debugging activities I have described above. To ensure that what I install is in “plug and play” condition, up to date with what Jessie has been doing, and complete with a basic operation tutorial, again I recommend postponing delivery of the TFMDB Application until the week of July 19.

Let me know what your thoughts are both on this rethinking of delivery dates and on the reports I have mocked up for your inspection. If I do not hear from you regarding changes to the report designs by Friday, I’ll go ahead with integrating them into the system.
TFM Database Preliminary Data Capture Screen

Data entry procedure for GLOBAL form:

Page 1

JPP #                   Number (e.g. 92-3) of Job Package for which this TFM is being requested
TPP #                   Number (e.g. 92-3) of Test Planning Package for which this TFM is being requested
Submittal #            Submittal number on TFM Request Form submitted by requestor
Request Date           Date on TFM Request Form submitted by requestor
Request Rcvd           Date TFM Request Form is entered in computer or date it is marked received by LANL (whichever comes first)
Requestor              Last name and first name of TFM requestor (on TFM Request Form)
Organization           Company with which TFM requestor is affiliated
TFM Name                Name of TFM being requested
Composition             Composition of TFM if given or See MSDS if available
Purpose                 Description of the reason TFM is needed or use to which it will be put (if given)
Quantity req            Quantity requested by user (minimum to maximum range). If no range given, enter same values in minimum and maximum fields.
Concentration           Concentration of TFM if given
Date applied            Date TFM is actually used. Leave blank until requestor reports actual usage info.
Duration                Expected time TFM will stay in place (in days) if temporary or enter “Permanent”

Page 2

Position                north coordinate — format N999999 (no decimals)
east coordinate — format E999999 (no decimals)
Surface elev           Leave blank unless it is provided to you.
Location name           Common name for location like “North Pad and Portal”
Location type           Use only these values: Surface (if being applied to the surface) or Subterra (if being applied underground)
Disposition            Use only the values shown. All TFM applications will be “pending” when they are first requested. They become “applied” only after the requestor has reported actual usage information.
Borchole ID #          number of borehole into which TFM is being applied (only applied when borehole is involved)
Dist frm surf          Enter the depth reported by requestor (if in a borehole) or the underground elevation (if in another underground installation e.g. a tunnel)
App length             Enter the length of the application if in a borehole, i.e. how much of the borehole will be filled (in feet)?
<table>
<thead>
<tr>
<th><strong>Page 3</strong></th>
<th><strong>Analyst</strong></th>
<th>Last name and first name of analyst to whom the TFM Request Form will be sent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analyst org</strong></td>
<td>Organization with which the analyst is affiliated</td>
<td></td>
</tr>
<tr>
<td><strong>Waste Isolation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sent</strong></td>
<td>Date (MM/DD/YY) TFM Request is sent out for Waste Isolation analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Back</strong></td>
<td>Date (MM/DD/YY) TFM Request is received back from Waste Isolation analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Compl</strong></td>
<td>Leave blank</td>
<td></td>
</tr>
<tr>
<td><strong>Test Interference</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sent</strong></td>
<td>Date (MM/DD/YY) TFM Request is received back from Test Interference analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Back</strong></td>
<td>Date (MM/DD/YY) TFM Request is received back from Test Interference analysis</td>
<td></td>
</tr>
<tr>
<td><strong>Compl</strong></td>
<td>Leave blank</td>
<td></td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>After the TFM Request is received back from analysis, what is the status of this specified TFM (i.e. approved, denied, restricted)</td>
<td></td>
</tr>
<tr>
<td><strong>Remarks</strong></td>
<td>Any remarks made by the analyst regarding the status of this TFM application request</td>
<td></td>
</tr>
</tbody>
</table>
Person/Organization Form:

Person ID: ____________________________
Last name: ____________________________
First name: ____________________________
   Phone: ____________________________
   FAX: ____________________________

Organization: ____________________________
   Address: ____________________________
       City: ____________________________
   State: ____________________________
   Zip: ____________________________
   Phone: ____________________________

Person ID assigned by system (next highest available number in Persons table)
Last name entered by user
First name entered by user
Phone entered by user (includes area code; format mask: (999) 999-9999)
FAX same as above
Organization value chosen from lookup menu; if desired value found in
   Organizations table, balance of fields are auto-filled from that record; if desired
   value not found, user enters name and balance of fields and Organizations table
   is updated. Saiful: will this work? If not, how else can this be achieved?

Produce error message if first and last name entered already exist in Persons table
   (e.g. The name --------- -----_---- is already taken. Please choose another.).

Produce error message if organization name entered already exists in Organizations
   table (e.g. The name --------- is already taken. Please choose another.).
Organization form:

User enters data in all fields.
Edit mask for phone (999) 999-9999

Produce error message if organization name entered already exists in Organizations table (e.g. The name ------- is already taken. Please choose another.).
TFM/MSDS/REL_ALS Form:

New TFM only

TFM ID:  
Name:  
Category:  
Control status:  

Characteristics:  

MSDS ID:  
MSDS Info:  

Aliases:  

TFM ID assigned by system (next highest available number in TFM table)
Name entered by user
Category select from a Categories table lookup form (or may be left blank)
Control status (this is the Control field) valid values are Controlled and Uncontrolled. User should be able to select one of those two values from a selection menu, dialogue box, or form.
Characteristics (this is the TFM_Notes memo field) info is entered by user. In illustration, the Characteristics memo (blob) field (window) is showing. This window should appear automatically when the user enters the Characteristics field (i.e. the user should not have to press control-F or alt-F? to get the blob window to appear)
MSDS ID select from a MSDS table lookup form (or may be left blank)
MSDS Info (this is the Composition field) this field is hidden by the Characteristics memo field in the illustration - if a valid MSDS ID is entered, MSDS Info is entered by the system (from the MSDS table). See Characteristics field description above. This is the only field on this form which belongs to the MSDS table.
TFM/MSDS/REL_ALS Form:

New TFM

TFM ID:
Name: ________________
Category: ________________
Control status: ________________

Characteristics: _

MSDS ID: ________________
MSDS Info: ________________

Aliases: ________________

Select an alias...

Add  Done

Aliases  this is a multirecord form (Alias field only from REL_ALS table) which will show all records in the REL_ALS table which have the TFM_ID shown on this New TFM form. For a New TFM, of course, this multirecord form should be empty. When the user enters the field and double clicks or presses a designated key, the Select an alias dialogue box should appear.

Select an alias...  this dialogue is a lookup form for the Aliases table. When the user selects an Alias in this dialogue and selects the Add button, the selected Alias should appear in the Aliases multi-record field on the New TFM form above. The user should be able to repeat this process as many times as there are Aliases for the specified TFM, thereby populating the REL_ALS table thru the Aliases multi-record form on the New TFM form above. See idea dialogue code enclosed...
TFM/MSDS Form:

New TFM Error Handling

Name when the user enters a new TFM name, the system should check the TFM table for any identical names. If a match is found, show a dialogue stating the name is already taken and to choose another.

In addition, the system should check the REL-ALS table for matching names in the Aliases field. If matching names are found, the system should show a dialogue like the one opposite displaying the TFM names corresponding to the TFM IDs shown in the REL-ALS table where matches occurred.

The name...

is an alias for the following TFM:

Add anyway?

[Add] [Cancel]
TPP Forms:

As with all of the other forms you’ve done so far, there should be a lookup form for TPPs from which the user selects a TPP_ID. The lookup form does not have to be exactly like the one shown below. Just do the same sort of lookup form you’ve been doing for the other forms...

**Select TPP**

**TPP Detail**

TPP: ____________________________
DRC File #: ____________________
Related JPP: ____________________
Description: ____________________

Person in Chg: __________________
Organization: __________________
As-Built Archives: _______________
Start Date: _____________________
Date Closed: ___________________
Comments: _____________________

TFM A/URs Requested: __________
Related TFM A/URs:

<p>| | |</p>
<table>
<thead>
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</table>
TPP Forms (cont.):

Here is a description of the fields shown on the TPP Detail form on the previous page —

TPP: This is the TPP_ID field and is entered by the user. In both ADD and EDIT modes, the number should be checked against all already in the TPP table (primary key) and an error message generated if the number already exists. This is a required field.

DRC File #: This is a user entered number (but NOT a required field).

Related JPP: This is a JPP_ID related to the TPP (TPPs will usually have a “parent” JPP) and should be selected from a lookup form or entered by the user (only JPP_IDS already in the JPP table will be accepted). This is NOT a required field.

Description: This is shown as a memo field in the Data Dictionary, but I think maybe we should implement a long alpha field instead (with two lines of text displayed). This is NOT a required field.

Person in Chg: This is NOT a required field. The user should be able select a name from a Persons lookup form.

Organization: This field should be automatically filled if a valid name appears in Person in Charge (the organization name should be the one associated with the person name in the Person in Charge field. If there is no name in the Person in Charge field, this field should default to blank and is NOT a required field.

As-built Archives: The user selects an organization name from a lookup form or enters a valid organization name. This is not a required field.

Start Date: This is not a required field. It is a date and should use a date MM/DD/YY picture.

Date Closed: This is not a required field. It is a date and should use a date picture as above.

Comments: Memo field which is not required. Handle this one with a check box as you have previously.

TFM A/URs Requested: This is a date. It is not a required field. It should be handled with a date picture as above.

Related TFM A/URs: These are the TFM A/UR ID numbers of all TFM A/URs related to this TPP. This association between TPPs and TFM A/URs is established via the TFM A/UR form only. This is a multi-record form appearing on the TPP Detail form. When the user double clicks on one of the TFM A/URs on this multi-record form, the selected TFM A/UR form should be displayed.

JPP Forms:

The JPP forms should be the same as the TPP forms except the JPP form should also have a Related TPP multi-record form (just like the Related TFM A/UR multi-record form on the TPP Detail form). See your original interface stuff for an illustration, but use the new TPP form enclosed as the model for the JPP form.
To: Distribution
From: Jim Hall
Subject: IDS Information Exchange Meeting Notes

Meeting Notes
Thu, Jun 3, 1993, 1:00pm
IDS Information Exchange
Location: Bank of America Center, Suite P125, Room 10
Scheduled duration: 1:00pm - 4:30pm

Attendees
Larry Engwall M&O/FD 4-1826
Tom Fortner DOE 4-7576
Kumar Gidwani M&O/FD 4-5371
Jaime Gonzales DOE 4-7337
Jim Hall LANL/CAG 4 7270 or 503/852-7214 MS 527
Fred Homuth LANL 4 7097 EES-13LV, MS 527
Hemi Kalia LANL 4 7094 EES-13LV, MS 527
Frank Lane M&O/FD 4-1968
Pat McKinley USGS 303 236-5781
Allan Mitchell LANL 505 665-6335 EES-13, MS J514
John Peters M&O/MK 4-1862
John Pott SNL 505 844-1580
Norm Rector LLNL 510 422-3994 L-154
Bob Rosche M&O/FD 4-1970
Falah Thamir USGS 303 236-5189
Ted Valk LLNL 510 422-8903 L-154

Distribution
Attendees
W Simeca DOE

Attachments
Presentor overhead slides (not included in this version)
Meeting Notes
The meeting followed the distributed agenda. A summary of specific discussion issues follow:

H Kalia presented opening remarks, reiterated the meeting goal of a free exchange of ideas supporting ESF data acquisition activities and introduced the first participant presenter.

Larry Engwall, YMP M&O/FD provided a recap of M&O YMP responsibilities and confirmed M&O support for their IDS design team to meet test PI and Project Office goals.

John Pott, SNL described SNL data acquisition general requirements for Construction Monitoring and other planned ESF tests. Each test has an individual installation and duration schedule and are expected to continue from time of installation for a few days, weeks, or years. Specific issues were as follows:
- Anticipated maximum accuracy for any measurement will not exceed ±0.2%
- There are no detailed test descriptions available for most planned tests. Only general planning documents are available at this time.
- No new estimates for IDS test measurement requirements are available at this time.
- As part of the test and IDS configuration inventory, instrument type, name, serial number, and model number must be included.
- Each instrument will be calibrated through the complete IDS using a field calibration fixture underground to load the instrument and a local IDS terminal to monitor the process. The resulting calibration results would be stored in a calibration file.
- Certain tests will involve heated drifts creating a hostile environment (≈200°F).
- A preliminary identification of some sensors expected to be used has been done, however, the selected units may change before the test is implemented.
- In the past SNL PIs have proposed to do concurrent monitoring of instruments connected to IDS. This is still being considered.
- The fastest measurement rates vary for each test and will probably slow down with time for certain tests. Fastest rates are expected to be 1-reading/sec to 1-reading/minute.
- Slowest data reading rates are expected to be 1-reading/day to 1-reading/week.
- The number of channels/test will vary widely with expected numbers from 1 - 1000 channels/test.
- The Construction Monitoring Test is currently being supported by clipboard. Anticipated scan rates are ≈1-reading/10sec.
- Written responses to the M&O IDS questions will be prepared and are expected to be delivered in late July or early August, 1993.

Norm Rector, LLNL (filling in for Wunan Lin) described his involvement in providing instrumentation and data acquisition for the upcoming Large Block Test planned for the surface in 1994. Due to the short preparation time this data acquisition system (DAS) will be based on an NTS system specified by LLNL and designed and installed by EG&G EM based on CAMAC modular equipment. N Rector showed slides describing the NTS installation. He stated that the planning for the large block test has not progressed to DAS and instrument specifications and the ESF tests are very much further behind. Firm specifications for the ESF tests may be years away. He agreed that some technical interchange meetings between LLNL and IDS would be helpful for IDS to better understand
the Large Block Test and start basic planning for IDS support for ESF tests. No written response to the M&O IDS questions are planned.

_Falah Thamir and Pat McKinley, USGS_ Perched Water Tests will not need IDS support primarily because the test location can’t be predicted. Extending the ESF drifts to the Calico Hills sequence will result in repeating all tests except the Excavation Effects Test. Radial Borehole Tests (RBTs) involving thermocouple psychrometers for rock water content measurements will be active for from days to months. Permeability Tests will acquire data at ≈1-reading/sec. Percolation, Excavation Effects, and Bulk Permeability Tests will all have long term data rates of ≈2 to 4-readings/day. Controls will be required to regulate gas flow rates and turn solenoid valves on and off. USGS will provide a written response to the IDS questions.

Later discussion identified that instrumentation and data acquisition activities similar to that planned for the RBTs is set up and running in USGS facilities located in NTS Area 25. To arrange a visit we should contact the principal USGS PI for this test, Joe Rousseau, in Denver. The test PI is Gary LeCain and the thermocouple psychrometer DAS programmer is Mark Kurzmack.

_John Peters, YMP M&O/MK_ The Subsurface Safety and Alarm System (SSAS) will be used for tunnel safety monitoring and related controls and mining performance data acquisition and will be developed under the IDS umbrella by the M&O IDS designers. Recent discussion at YMP have identified additional construction related data acquisition and control functions and integrating these items into the SSAS is in process. In addition to measurements concerned directly safety (i.e., gas concentration, smoke, fire, ventilation on/off, equipment shut-down) measurements of humidity, ventilation system performance and status, tunnel boring machine (TBM) performance, conveyer performance, electrical distribution performance and status, and other related items will be incorporated into the SSAS. Since the primary function of the SSAS is to verify the safety of the excavation, measurement accuracy meeting conventional mining standards is satisfactory as contrasted to the sometimes higher accuracy scientific test measurements made through the IDS.

There was an active discussion concerning SSAS data by participants interested in accessing the data as verification of their own measurements or as primary data as an adjunct to their test data. It was noted that there is a need for further coordination of SSAS measurements and data availability.

After lunch the meeting resumed.

_Kumar Gidwani, YMP M&O/FD_ Provided an overview of the IDS design concept, scope, and tentative schedule based on the current construction schedule. The IDS design is based on individual self contained data acquisition stations (DASs) of different sizes as needed located near the tests, and interconnected by a general purpose fiber optic cable high-speed data network to the IDS surface computer. The surface computer will archive the test data and provide computer terminals and support for users. The general purpose fiber optic network will support IDS, voice communications, video, and have space for other needs defined later in the program. IDS procurement plans for next year include five small DAS units to be supplied to SNL to support Construction Monitoring Tests. Although the full IDS will not be fully implemented for several years, these DAS units will be able to be used as stand alone data acquisition systems or linked with a local area network (LAN) to a desktop...
computer located at the surface for setup and data archiving.

*Frank Lane, YMP M&O/FD* Described the proposed IDS Data Acquisition Station (DAS) concept, instrument interface designs, and the fiber optic network. The DAS design includes the capability for stand alone data acquisition system with a local terminal interface and adequate hard drive space for long term data storage. Standard instrument interfaces include volts, amps, ohms, counts, and period, with specialized front ends for industry standard thermocouples, RTDs, strain gages, and others. Analog to digital converters will have a resolution up to 16-bits with higher resolution available as needed. ESF equipment will be housed in environmentally controlled cabinets or portable buildings. Each DAS will be connected to an uninterruptible power source (UPS) for continuous monitoring during power disruptions.

*Bob Rosche, YMP M&O/FD* Described the conceptual software design for the IDS archiving computer to be located in the surface IDS computer center. The configuration includes files and logic to create and control DAS configuration, instrument inventory, calibration, disposition, tracking, DAS inventory, component calibration, disposition, and tracking, exception logs, performance logs, raw data archives, raw data on-line, and engineering-unit data on-line. In addition the system will support operation and maintenance consoles, user work stations in the computer center, user work stations in the ESF on the network, printing and plotting facilities, and a dedicated computer power conditioner and UPS. Standard IDS formats will be used for uploading DAS test data, instrument calibration data, and other DAS files into the archiving computer. Additional work needs to be done to establish these standard format for user data upload formats or add additional user formats to the IDS library.

The following action items were identified:

1. LANL will develop planning networks that specifically support the IDS schedule in terms of test and construction schedules.
2. PIs must include IDS support for tests in test plans as they are developed.
3. The M&O and LANL will jointly develop a description of the fiber optic network to help participants understand its purpose and capabilities.
4. The M&O will schedule an initial meeting with LLNL to discuss the Large Block Test and planned IDS support for LLNL underground tests.
5. LANL will schedule an initial meeting with SNL to discuss IDS support for Construction Monitoring Test.
Meeting Notes
Thu, Jun 16, 1993, 10:00am
IDS/LLNL Information Exchange
Scheduled duration 10:00am - Noon, 1:00pm - 2:00pm
Room P114

Attendees:
- Kumar Gidwani (M&O/FD) 4-5371
- Jim Hall (LANL/CAG) 47270 or 503/852-7214 MS 527
- Frank Lane (M&O/FD) 4-1968
- Norm Rector (LLNL) 510 422-3994/L-154
- Bob Rosche (M&O/FD) 4-1970

Distribution:
Attendees
- J Blink, LLNL, MS 527
- J Canepa, LANL, EES-13, MS J521
- N Elkins, LANL, EES-13/LV, MS 527
- F Homuth, LANL, EES-13/LV, MS 527
- EES-13/LV, LANL, MS 527
- CAG Files, Carlton, OR

There was no formal agenda since the meeting was planned around a free discussion. The goal of the meeting was to provide a forum for better understanding of LLNL YMP testing data acquisition activities and demonstrate current IDS design concepts supporting ESF testing. A summary of specific discussion data acquisition system (DAS) issues follow:

Meeting participant’s initials are used to identify the initiator of identified discussion threads.

NR sharing some general observations on LLNL data acquisition experience;
- The user interface will always be somewhat vague. Recommends that IDS require users to specify and supply their own special purpose interfaces such as vibrating wire multiplexers.
Most measurements in the Climax Spent Fuel Test (Climax) were high temperature thermocouples.
- 90% of these measurements were made with a simple reed relay multiplexer (MUX) and a digital voltmeter (DVM).
- No amplifiers or filters were included in the measurement system outside of those built into the DVM. These items add complications in calibration, maintenance, and reliability.
- Climax data acquisition equipment was located in a controlled environment alcove maintained at 72°F ±2°F and 50% RH.

ALL There was general agreement that it will be necessary to environmentally control the ESF data acquisition equipment located underground in small buildings or special cabinets.

JH The ESF IDS is a substantially larger system than the Climax DAS. These differences in scale and complexity will lead to alternative YMP approaches to solving certain specific details of implementation.

KG Are there components we could use in IDS from the EGG EM design supporting nuclear testing now being completed at NTS?

NR There are significant differences in the approach for the NTS system making it unsuitable for the ESF IDS;
- The user interface is not suitable for the YMP task
- It is a different kind of system designed for a dissimilar task
- If NR was designing an IDS it would look pretty much like the M&O design

FL The high quality front end data converters (and supporting input amplifiers, filters, and scaling, good common mode rejection (CMR)) planned for the IDS is critical to system performance and is essentially a DVM or DMM in a different form as described by N Rector. Using amps preceding the DVM is bad because there must be 1 amp per channel increasing complexity, calibration, etc.

NR Does not use or specify thermistors and strongly encourages PIs to avoid using them due to his experience of poor long term stability. Recommends 4-wire RTDs best, 3-wire RTDs as good, thermocouples only OK due to the need for individual calibration and long term stability, and thermistors are NG.

KG Is front end design useful activity for IDS or should PIs provide their own front end equipment?

NR Recommends that several different types of underground DAS be implemented by IDS and the appropriate type used for simple and more complex measurements.

JH IDS is a user utility in the ESF and IDS maintenance may include providing a variety of services for different PIs. Some may want to be in control of their instrument interfaces directly (LLNL) and others may want IDS to provide all equipment up to the sensor (SNL). At a later time certain instrument maintenance work may also be assumed by IDS (at PIs request). The basic design of IDS and the planned capabilities must include provision for all of these eventualities.

KG We should have a meeting at LLNL to discuss the specific LLNL ESF test requirements including YMP IDS and LLNL engineers and PIs.

NR Good idea, however, coordinating all of the LLNL participants will take some planning.

FL we need to establish known system interfaces including hardware and software to participant boxes so that when the IDS is delivered it will recognize these interfaces and perform as
expected. IDS will store raw data (when available) as well as converted engineering unit data for the convenience of users. We expect each participant to supply their own conversion algorithms or approve IDS supplied conversion algorithms.

FL  IDS may need detailed interface documents to define user requirements.

NR  Detailed info may not be available for some time (years). It would be helpful if there was a way for IDS to utilize the interface specifications developed as tests are better defined to generate new or modified IDS user interfaces.

FL  How about just saying that IDS will provide fixed (16-bit) accuracy measurements? Would that eliminate the need to discuss the accuracy needed for each individual measurement?

NR  If you press us we will specify very high accuracy requirements for measurements we have not yet fully defined. Since we don’t have specifications yet, we will over specify accuracy requirements for all measurements to be sure that those measurements (if any) that will finally require high accuracy are available.

NR  Here is a brief description of how LLNL did data acquisition at the spent fuel test (Climax).

DAS measurement references included 1mV, 1V, 100Ω, 0°C standards wired into operating channels. The alarm limits were set very close to the expected value to be sure to flag even small deviations in standard channel performance. This turned out to be a very good idea since there was only one DVM making all measurements for this test.

Functional responsibilities and responsibilities for Climax test data acquisition were as follows:

<table>
<thead>
<tr>
<th>LLNL</th>
<th>NTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>Build up functions</td>
</tr>
<tr>
<td>QA</td>
<td>check user</td>
</tr>
<tr>
<td>incoming inspection</td>
<td>installation</td>
</tr>
<tr>
<td>calibration</td>
<td>calibration</td>
</tr>
<tr>
<td>database</td>
<td>calibration files database</td>
</tr>
<tr>
<td></td>
<td>item name tag mnemonics (i.e., SAT131)</td>
</tr>
<tr>
<td></td>
<td>alarm log</td>
</tr>
</tbody>
</table>

Data was stored on magnetic tape at the site. The tapes were then sent to LLNL for analysis. The remote operating site at LLNL enabling PIs to monitor and control the test from LLNL was very useful. Communications for a number of NTS test sites are provided by microwave link. This can (and will if there is no alternative) be used for the large block test.

JH  Asked NR to request a dedicated phone line at YM to support remote test monitoring for the Large Block Test. This will be very useful for other planned IDS supported tests.

NR  YMP should consider a satellite communications link. Agreed!

KG  what are the characteristics of the large block test DAS currently being planned by LLNL?

NR  The large block test is intended to support LLNL characterization of “hot repository” modeling work with a field study program. Only the most general details of the actual test are known at this time. The modelers are actively attempting to evaluate the test to the extent necessary to have confidence in selecting block test procedures and instrumentation strategies.
**FL** what are the characteristics of the heater controllers used at Climax that N Rector would find useful today for the same task in the ESF?

**NR** The principal features of the heater controllers used at Climax are as follows:
- there were 77 separate heaters drawing a total of 500KW of power
- each individual heater had a separate, stand alone, set point controller
- each set-point controller’s set point could be changed from a remote computer terminal
- the remote computer could ramp each controller between set points
- once at the set point, the controller’s function was to regulate constant watts to the heater. Regulation of heater wattage did not involve controlling the set point.
- A watt transducer was used on the output of each controller to supply set point feedback. The controllers used zero-crossing control and the wattmeters were not rated for this duty. Each watt meter had to be individually calibrated to provide the correct feedback over the rage of expected control.

**Close out**
The meeting was very successful in accomplishing the goal of technical interchange of information relating to IDS, the LLNL Climax Spent Fuel Test, and a preliminary introduction to the upcoming YMP LLNL Large Block Test. Continued meetings were identified as a priority for maintaining this interface to discuss additional details of the Large Block Test and planned LLNL ESF tests. Although the Large Block Test instrumentation and data acquisition is being handled by LLNL (Norm Rector), it was clear from this meeting that there will be a significant IDS role in LLNL ESF testing.

**Action Items**
1. Frank Lane will look into Internet connections for the M&O IDS design team at the Bank of America Center. Norm Rector suggested that it would be useful for the IDS team and LLNL to have Internet access as one mode of communication. Norm Rectors Internet address is rector2@llnl.gov.
2. Frank Lane and Norm Rector will work out the preliminary technical details for our next interface meeting planned to be within the next month at LLNL.
3. Norm Rector will coordinate with LLNL, identify potential meeting dates, and discuss the details with Kumar Gidwani.
4. Kumar Gidwani will coordinate the meeting with YMP participants and set the final meeting date with N Rector.
5. Kumar Gidwani will prepare the meeting notice and agenda and distribute them.
6. Jim Hall and Norm Rector will work on drafting a letter from LLNL to YMP requesting a telephone line for site data communications to support the Large Block Test. A request for this phone line will also originate from IDS.
The information below contains a comprehensive responses to the referenced memo. Responses are provided in the format of the requesting memo to enhance the clarity of the original FRD issue, the designer’s request for clarification, and the response. These preliminary comments will be included in the FRD revision planned for later this year. Some responses include additional discussion to provide more background for clarification as follows:

1.1 Acquire

The actual number of data, excitation, digital input/output, and communications channels implemented shall be determined from testing requirements and increased by a fixed percentage, determined from cost/benefit studies, to account for needed spare and contingent on-line excess capacity.

[Need to verify the number of channels and spare/contingent fixed percentage]

LANL: The exact number of channels for each test has not been determined at this time. Participants are in the process of reviewing their testing programs to accommodate the ramp configuration and the newest construction monitoring requirements. The exact number of channels should not effect the DRD which treats the IDS as a highly modular assembly able to accommodate our best engineering estimate of needed capacity plus a reasonable expansion. It is expected that if the envisioned system itself approached a limiting capacity of data channels or data traffic then a second parallel system, identical to the first, could be installed to continue the expansion. To accommodate major expansion of capacity to support requirements identified in the future, the design should include a planned strategy for adding duplicate systems including the physical network, central computer, and local data acquisition stations. Additional IDS data acquisition capacity would not be expected to impact the planned user support facilities (i.e., workstations, printers, plotters) in the central computer facility. Options for IDS users outside the central computer facility must be included in plans for the initial IDS. Such users would be linked to IDS by dial-up modem, on-site LAN, and dedicated T1 type telephone service to Las Vegas and participant sites. These
remote users will vary in required utility from DOE observers to test PIs interacting with tests in progress.

It is not expected that IDS will be installed as one homogeneous system. IDS will be installed in stages in the surface facility and in the ESF as needed to support installed tests. Prior to installation at the site, small (32-64 channel) IDS data acquisition stations and control computers with IDS software will be made available to participants for use at their facilities for instrument evaluation and test procedure checks. Early construction monitoring requirements by SNL require IDS support now and may require an interim solution prior to the full IDS implementation. The unavailability of IDS will complicate Construction Monitoring data acquisition until IDS is available for this task. Early test support may utilize equipment that may or may not be integrated into the final IDS. This early test support must be part of IDS design and FY94 and out year budget estimates.

It will be important to size the IDS design to accurately reflect anticipated requirements (i.e., number of channels and data rates) including provision for a reasonable expansion (15-20%) to accommodate newly identified tests or an expanded testing program. Cost effective additions to the proposed IDS that would support later expansion (i.e., redundant LAN fiber optic cable) should be included in budget estimates as appropriate. Engineering estimates should be included that characterize the maximum practical expansion (at additional cost) of the proposed initial single IDS prior to implementing additional parallel systems. This will support staged (by FY), realistic high level scope and budget estimates for IDS and testing program contingency planning. Limiting the proposed IDS procurements to currently identified near term test activities will allow realistic budget estimates and identify cost related changes that may be required in the future. In sizing the complete IDS, it will be very important to identify the peak number of active data channels as differentiated from the accumulated total connected channels over the life of the system. Widely varying estimates of the accumulated total channels have been made and have little impact on IDS design. Peak active channels will probably be less than 10K for the present testing program. Estimates of channels per test should be prepared by the IDS designers and the number of active channels over time must be verified with LANL based on projected testing schedules.

shall maintain participant requirements for accuracy and resolution.

[Need to determine requirements for accuracy and resolution]

LANL: Requirements for accuracy and resolution should include standard provisions for:
- 12-bit resolution (11-bit data plus sign and 10-bit accuracy)
- 14-bit resolution (13-bit data plus sign and 12-bit accuracy)
- 16-bit resolution (15-bit data plus sign and 14-bit accuracy)

Accuracy referenced to the converter input terminals will depend on converter gain and internal noise referred to the input. Where there are suspected conflicts with the resolution and accuracy stated above and identified test measurement accuracy and/or resolution requirements from other sources, specific participant verification will be required as part of a written request to LANL for review of the identified requirements.
All digital data interfaces and transmission protocols shall be specified by the IDS contractor unless they are an integral part of participant equipment hardware and/or software.

[Need definition of any protocols/interfaces that are an integral part of participant hardware/software]

LANL: Participants are in the process of reviewing their testing programs to accommodate the ramp configuration and the newest construction monitoring requirements. Required participant interface protocols will have to be determined as testing programs are defined in sufficient detail and to define any new interfaces. An aggressive IDS strategy is needed to make IDS available to participants in the their labs significantly ahead of test installation in the ESF. This will acquaint PIs with IDS equipment and operation, allow PIs evaluation and feedback for IDS revisions needed for their testing program, and minimize the need for participant designed or specified equipment and related interfaces to IDS. Provision must be made in the design for custom interface protocols utilizing standard interface hardware and custom hardware/software interfaces of a "reasonable sort" for the IDS design envisioned. The designer should list and set anticipated limits on the the conventional interfaces (i.e., data rates, cable lengths, number of drops) and the unknown interfaces (i.e., protocol, serial, parallel, number of bits, data rates, cable lengths, number of drops) as a basis for PI discussion. An important concept in working with the PIs will be to include the flexibility to include PI favorite peripheral equipment (i.e., vibrating wire multiplexers) into the standard IDS data acquisition station.

1.1.2 Collect Supporting Data

Includes IDS and test configurations; instruments; and configurations for participant computers, controllers, and auxiliary equipment located in the ESF and other testing areas.

[Need to clarify that this requirement pertains to instruments, etc., directly connected to the IDS. Data supplied by manual data entry, portable data loggers, etc. will include supporting data only to the extent that it is supplied by participant]

LANL: This requirement pertains to equipment directly connected to the IDS. Data entered into IDS from portable data loggers that are not part of IDS will contain the referenced data as part of the data file transferred, or it will be part of manual data entry supporting the data logger data transfer, or it will not be part of the data contained in the IDS. Manually entered data will be at the discretion of the responsible PI and conform to the PI and participant organization test plans and QA program requirements. IDS must develop some minimum data identification requirements, consistent with IDS internal data management, for manually entered data that will allow the data to be cataloged and retrieved for distribution to the designated PI and testing organization. It is not the task of IDS to police PI data entry. It would be contrary to IDS purposes if entered data contained insufficient information to be identified later. An example of a passive strategy for preventing lost data sets could be implemented by having the minimum required data set identification information part of a PI data entry screen used to upload data logger data and/or sign on for manual
data entry. Minimum data set ID information needs to be developed by the IDS designers in cooperation with LANL as a separate design study supporting internal IDS data management.

1.1.2.4 IDS Common Data

Includes AC main power supply, standby power supply, processor power supplies, processing equipment status, equipment housing temperature and humidity, thermocouple references, and standard IDS I/O reference signals.

[Need to clarify again that this pertains to such items directly connected to the IDS. Data supplied by manual data entry, portable data loggers, etc. will include common data only to the extent it is supplied by participant. Also need to clarify that temperature and humidity data is needed only for equipment housings?]

LANL: IDS Common Data is being redefined at this time into two separate categories:

1. IDS Equipment Status and Performance Data
   IDS equipment performance data directly related to IDS performance (i.e., IDS equipment cabinet mains, IDS power supplies, and IDS reference voltages)

2. Common Data
   ESF data (i.e., drift humidity and temperature)

IDS will be responsible for category 1 data. There will be a Common Data PI responsible for category 2 data. Construction management measurements (i.e., mains power center voltage, current, KVA, surges) will part of the Subsurface Safety and Alarm System and will be the responsibility of an M&O appointed PI.

1.1.2.5 Performance Event Logs

Includes malfunction occurrences and all system diagnostic analysis results identified by time, date, system interface, or component identifier and shall contain sufficient descriptive information to identify a specific event from other similar occurrences. The system interface or component identifier shall be sufficient to identify the failed device (unit numbers and interface numbers may be arbitrary).

[Need to clarify again that this pertains to such items directly connected to the IDS. Data supplied by manual data entry, portable data loggers, etc., will include performance event log entries only to the extent supplied by the participant.]

LANL: This requirement pertains to equipment directly connected to the IDS. It is correct that data supplied by manual data entry, portable data loggers, etc., will include performance event log entries only to the extent supplied by the participant.
1.1.4 Transfer

Connection requirements for data logger and portable data acquisition equipment to IDS I/O interfaces shall be specified after the participant equipment and software have been identified. 

[Need to determine all connection requirements prior to completion of DRD specifications.]

LANL: Due to the long lead time in defining tests scheduled for 2-3 years from now, not all interfaces can be defined as requested. The designers should assume that these interfaces will be standard hardware/software definition protocols (i.e., RS232C, RS422, RS485, IEEE488, IEEE802.3, SCSI, and others that the designer may identify). The list of supported interfaces may be more specifically defined and/or other useful interfaces may be identified by PIs during planned participant interface meetings. Preliminary identification of appropriate IDS standard interfaces should be part of an IDS interface design study. IDS strategy should emphasize with participants that interfaces identified and accepted as part of interface meetings and design reviews will be IDS standard interfaces. These standards should be used where ever possible. Alternate interfaces can be provided on an as needed basis if the need is justified. For instance a datalogger may have a non-standard physical interface and/or protocol. The participant or IDS could support this by contracting with the datalogger vendor (or a 3rd party vendor) to supply an external adaptor converting the non-standard datalogger interface to a standard IDS physical interface and basic signaling protocol. Non-standard or special software protocols will need to be accommodated by specific IDS peripheral driver software as needed and provisions for adding these drivers must be part of the software operating system design. Arbitrary variations or deviations from published standards, encrypted, or proprietary interface hardware, software, and protocols will not be supported. If the final details of this information is critical to completion of the DRD it will have to be TBD in the current version and included as part of DRD revisions at a later date when additional information becomes available. Procurement specifications must include some form of the details included in this discussion.

All digital data transmission protocols shall be specified by the IDS contractor unless they are an integral part of participant hardware and/or software. 

[Need definition of any protocols/interfaces that are an integral part of participant hardware/software]

LANL: Participant hardware and software interfaces and interface protocols will be identified and evaluated by the IDS designers as part of participant interface activities with LANL and the testing PIs. See broader discussion in section 1.1.4 above.

1.1.4.1 Raw Data

Provide for the transfer of raw data from participant equipment interfaces to IDS I/O interfaces, to IDS processing equipment, and finally to storage.
Processing generates raw digital data from participant analog input signals, producing a scaled engineering unit often unrelated to the parameter of interest. Raw data from user instruments may also be in the form of digital data where the conversion from analog to digital data occurred outside of the IDS.

[Need to clarify that raw data is the binary representation of analog data after A/D conversion or prior to D/A conversion before any conversion to scaled engineering units. Also need to clarify that raw data associated with manual test data entry, portable data loggers, etc., will be stored only to the extent supplied by the participant.]

LANL: “Raw data” from the user’s perspective is the output of the IDS front end interface/adaptor/converter scaled to produce data in units of the connected instrument output (i.e., if the instrument outputs volts then the “raw data” of interest is volts). The actual output of the IDS front end is an unscaled, signed or unsigned binary number with no associated units. This binary number is certainly more fundamentally “raw data” than the binary value converted to instrument output units (engineering units). This binary number has no significance without the internal IDS calibration that allows the binary number to be converted into an engineering value representing the converter input (instrument output) signal. Engineering unit data calculated in this way will utilize calibration information intrinsic to the IDS and known to the designers (i.e., scaling and temperature compensation). The required conversion is internal to the IDS making the binary number (with its associated conversion process) and engineering unit input related data equivalent to the external user. Binary data, however, will be of little or no interest to the user since instrument calibrations and observations of instrument behavior will be related to instrument output expressed in some engineering unit (i.e., volts, amps, etc). In one sense the IDS input converter and conversion process described above acts as a digital multimeter (DMM) reading out measured values of input signals in units of volts, ohms, amps, counts, time, frequency, even temperature for certain front end components. Saving the binary number may be useful to IDS maintenance or for other internal IDS reasons. Engineering unit data must also be saved for the convenience of users. Processing raw data items (binary numbers or engineering unit data) through specific PI supplied or approved algorithm could be used to produce parametric data. Parametric data would only be created on demand for users for their use and would belong to the user. Parametric data is not part of the principal data sets identified for backup and archiving by IDS, or distributed as part of IDS data management. The raw data characterization and processing described above for binary number data and engineering unit data will apply to all IDS stored data whether it is collected through the IDS front ends, uploaded to the IDS as an electronic transfer, or manually entered.
1.1.4.2 Protocol Control

The IDS shall provide data transfer protocols or methods that ensure successful data transfers between IDS modules, subsystems, and data communication networks. Transmitted data shall be retained in the transmitting module or subsystem until an acceptable data transfer has been confirmed.

[Need to determine if a checksum or CRC check with attendant ACK/NAK is sufficient to satisfy this requirement.]

LANL: The required error detection and correction protocols for the complete IDS system will not be covered by one method. Intrinsic IDS connectivity interfaces such as FDDI, ethernet, RS232, proprietary hard drive interfaces, etc. will all have error detection and correction protocols. Strategies used will vary depending upon the impact of data errors. The LAN should have very good error detection and correction, whereas a datalogger upload interface might use a significantly less stringent standard since the datalogger data would be retained until the upload was verified. Checksum and CRC checks are at the low end of the error detection and correction spectrum and may be perfectly adequate for certain uses. Determining the acceptable levels of predicted statistical error and suitable error detection and correction strategies must be evaluated for the IDS system as a whole and is most appropriate for a design study.

GENERAL ACQUIRE REQUIREMENTS:

Continuous 24-hours-per-day operation shall be provided with automatic data collection from all designated sensors without operator intervention during normal operation.

[Need to determine if this applies to the central computer facility or only to the DAS. This will impact central computer backup alternatives.]

As long as data is collected and saved during shifts that leave the central computer facility unmanned there should be no problem. This means that if the central computer goes down remote data acquisition stations should not be impacted except for their inability to upload data to the central computer. The network should continue to work after central computer failure either as an intrinsic part of the design or via a bypass actuated by a central computer watchdog type timeout.

1.2 Process

1.2.1 Control

1.2.1.1 Identify

Provide automatic source identification of test-related data prior to storage; reference related configuration information.

[Need to clarify again that this pertains to such items directly connected to the IDS. Data supplied by manual data entry, portable data loggers, etc., will include source information required for traceability and accountability.]
identification and reference related configuration information only to the extent supplied by the participant.]

LANL: This requirement pertains to equipment directly connected to the IDS. Data entered into IDS from portable data loggers that are not part of IDS will contain the referenced data as part of the data file transferred, or it will be part of manual data entry supporting the data logger data transfer, or it will not be part of the data transferred to and stored in the IDS. The content of manually entered data will be at the discretion of the responsible PI and conform to the PI and participant organization test plans and QA program requirements. IDS must develop some minimum data identification requirements, consistent with IDS internal data management, for manually entered data that will allow the data to be cataloged and retrieved for distribution to the designated PI and testing organization. IDS does not have responsibilities for participant manually entered data beyond noting when it was entered, who is the owner, and how is the data addressed to when distributed. It is not the task of IDS to police PI data entry. It will be important to IDS purposes that manually entered data contained sufficient information to be identified later and IDS should encourage participants to supply (not mandatory) an expanded set of information that may help with later data reduction even where this information may be redundant to data in the file being entered. An example of a passive strategy for preventing lost data sets could be implemented by having the minimum required data set identification information part of a PI data entry screen used to upload data logger data and/or sign on for manual data entry. Minimum data set ID information needs to be developed by the IDS designers in cooperation with LANL as a separate design study supporting internal IDS data management.

1.2.1.1.1 Stored Data Contains Time & Instrument Source ID

Stored data shall include data value, time, date, and source ID. The IDS shall logically organize acquired data, based on acquisition time, date, and originating test. Note that each data value does not need the date and source ID, rather a logical collection of data values shall have date and source ID.

[Need to clarify underlined sentence above. Also, data supplied by manual data entry, portable data logger, etc., will include source identification and acquisition time and date only to the extent supplied by the participant.]

LANL: It is not important whether all data description items are included in each data record. Online and archive data storage space may be a factor in IDS design and cost. It makes sense to consider the option of storing data in identified files, minimizing record data contents and using data compression techniques. These issues could form a useful design study.
1.2.2 Data Conversion

Provide data conversion for IDS common data. Provide processor capacity and storage to accommodate data conversion processes and converted data items on-line and in permanent archive storage. Participant requirements for alarm monitoring and test evaluation at the ESF may require additional data conversions not yet identified. All converted data shall be clearly marked and noted in data files.

[Need to determine additional data conversions prior to RFQ specifications. Also, data supplied by manual data entry, portable data loggers, etc., will be marked and noted in the data files only to the extent supplied by the participant.]

LANL: Due to the long lead time in defining tests scheduled for 2-3 years from now, not all data conversions that will be used by participants can be defined as requested. Instead standard conversions should be included for temperature (for standard thermocouples, RTDs, and selected thermistors) and conversions for temperatures using individual calibration for each sensor. Other data conversion processes will be supplied or approved by PI's for use by IDS as instruments are identified and procured. An interim solution would be to survey users for instrument types they may use and develop data reduction processes that seem to apply. These would be included in the design subject to modification to meet user requirements when these details are available in the test planning process. Provision for non-standard or special software needed to accomplish this data reduction must be part of the software operating system design. If the final details of this information is critical to completion of the DRD it will have to be a TBD in the current version and included as part of DRD revisions at a later date when the information becomes available or as a best engineering estimate as described above. Procurement specifications must include some form of the details included in this discussion. A fairly complete set of preliminary requirements should be available from SNL since their testing program has recently been accelerated and expanded to accommodate construction monitoring used to evaluate tunnel safety.

1.2.2.1.1 Converted Data Items

Data conversion shall utilize copies of raw data as input to algorithmic procedures and produce new data items and files. The IDS shall automatically convert raw data to new data items with units and precision specified by participant requirements, by test procedures (to be determined by participants as test designs are completed), and by the IDS contractor for IDS common data.

[Need to determine additional data conversions prior to RFQ specifications. Also need to clarify that data supplied by manual data entry, portable data loggers, etc., will be converted only if specified by the participant.]

LANL: See discussion under 1.2.1.1 and 1.2.2 above.
1.2.2.1.2 Converted Data ID

Converted data shall be identified with acquisition time, date, converted value, source ID, and a converted data flag.

[Need to clarify that data supplied by manual data entry, portable data loggers, etc., will be identified in this manner only to the extent supplied by the participant.]

LANL: Data input to the IDS by manual data entry, portable data loggers, etc., will be identified in this manner only to the extent the necessary information is supplied by the participant.

1.2.2.2 Data Format Conversion

Data generated external to the IDS and supplied for inclusion in the IDS test database shall be entered into the IDS in an IDS-specified format. When the IDS must modify the format of the entered data to meet IDS data storage format requirements, the data format conversion shall use participant and/or IDS contractor-supplied format conversion algorithms accepted by TCO prior to inclusion into the IDS.

[Need to clarify entire paragraph. If the data is to be supplied in an IDS-specified format, there would appear to be no requirement for data format conversion.]

LANL: This requirement predates current IDS strategies and was based on developing a standard IDS data storage file format used by all participants. This paragraph must be modified to state that “Data generated external to the IDS and supplied for inclusion in the IDS test database shall be entered into the IDS in a defined PI or IDS-specified file format when data conversions are required. Utilizing the IDS for reformatting participant data files during data entry or transfer will not be supported. Users will be provided with the tools and workstations in the central computer complex to perform their own data set manipulations on working copies of their data files and online storage to save the resulting files.”

1.2.3 Test Controls

No requirements currently defined, TBD by participant requirements. Adequate system flexibility shall be incorporated into the design to allow test controls to be added to the IDS later in the testing program.

[Need to determine test control functionality requirements now to allow for flexibility.]

LANL: No requirements or definition at this time. Assume simple open-loop digital I/O will be required. No speed or calculated feedback will be required for standard control I/O, however, provision for calculating I/O response from input signals will be necessary.
1.3 Store

1.3.1 Recent Data Available On-Line

Provide on-line database storage for the most recent 30 days (minimum) of test data, configuration status, IDS component and instrument calibration data, and performance event logs, organized in an efficient manner for data access. Removal of data from the on-line database shall be approved by the TCO and determined by available storage requirements and participant needs for continued on-line access. Copies of all data removed from the on-line database shall be part of an archive process in accordance with YMP administrative procedure AP-5.1Q.

[Underlined sentence is understood to imply a TCO-approved procedural arrangement, rather than a changing directive.]

LANL: The underlined sentence is meant to imply a TCO-approved procedural arrangement, rather than a changing directive. LANL is the IDS data manager and needs to be procedurally involved in decisions to purge data.

1.3.2 IDS Data Archive

Provide an archive database (including raw and converted data, system performance logs, system and instrument configuration, calibration records, and performance event logs) for the operational life of the IDS. Archival to be accomplished within two hours of acquisition during normal operation. In case of computer or system failure, subsystem back-up data shall be archived on a priority basis when normal operations resume. Archived data files shall be organized in an efficient manner for data access using space efficient methods and algorithms.

[Need to determine if two hour archive is real or if once per day/week is more realistic. Is priority above such other tasks as data collection, etc.]

LANL: “Archival to be accomplished within two hours of acquisition during normal operation” is no longer appropriate to these requirements. Time to archive data should be related to overall system performance and risk of losing data as a result of central computer and/or subsystem failure. Archiving must be a priority activity for IDS. When IDS is restarted after a failure or scheduled down time, archiving may not be the most important priority item to accomplish at any arbitrary time during the restart sequence. If low risk data storage is utilized, archiving may take place once a shift or once a day as appropriate. The archive is meant to be an off-line backup that will preserve data through system failures that corrupt on-line data storage. To be effective, any proposed archiving strategy will have to account for the system configuration, risk of data loss, data accumulation rates, and other operational factors.
1.3.3 Backup

Provide storage of all data files on non-volatile media as a routine part of data processing without delay or undue accumulation in volatile storage.

*May require volume shadowing or similar concept*

LANL: This section of the FRD will be revised. On-line operational backup is intended to be an easily accessible function for creating the backup and restoring when necessary. Disk backup storage using volume shadowing or similar concepts is a satisfactory on-line solution. Archive backups are expected to use WORM (or similar technology) drives with optical disk storage as non-volatile media. The processes monitored by IDS are slow, open-loop tasks (as far as we know at this time) and elaborate (and high speed) disk shadowing may contribute more to system cost and maintenance problems than it adds to overall performance. An alternative might be DAT tape shift or daily backup. This could be a useful design study topic.

1.3.3.1 Non-Volatile Back-Up

Data files shall be written to a non-volatile back-up unit as often as practicable and no less than once per day.

*May require volume shadowing or similar concept*

LANL: Volume shadowing to magnetic media hard disk does not utilize a non-volatile backup media. On-line or off-line (utilizing a separate computer system) optical disk storage could serve as non-volatile archive backup; see comment in 1.3.3 above.

1.4 Access

1.4.1.1 Project Record Centers

A copy of the archive database or the current update to the database shall be distributed to Project record centers identified by the TCO for validation and storage as permanent Project records within ten days of acquisition in LANL data transfer format. Such transfers must comply with AP-5.1Q.

*Need to clarify 10 day requirement.*

LANL: The ten day requirement has been superceded by new YMP data management requirements. As IDS data manager, LANL will develop an IDS data management policy covering this issue. This section will be modified to substitute references to LANL policies and procedures in place of time constraints, data format, and YMP procedure references.

1.4.1.3 Others

Provide controlled distribution of archive test database information to other specified agencies as authorized by YMP. Distribution by physical delivery of storage media and/or printed text as required by YMP. Uncontrolled
distribution of data shall be accomplished by methods listed above and by
IDS network access, modem, and/or other telecommunications links
specifically identified by YMP.

[Need to clarify uncontrolled distribution.]

LANL: As IDS data manager, LANL will develop an IDS data
management policy covering this issue. This section be modified to
substitute references to LANL policies and procedures in place of YMP
procedure references. Uncontrolled distribution refers to IDS designers or
operations group distribution of IDS data not in accordance with LANL
data management policies and procedures.

1.4.2 On-line

1.4.2.1 Display, Print & Plot

Respond to on-line monitoring inquiries related to tests in progress and
completed tests, including on-line test database and archive test database
information. Need to display, print, or plot user-defined reports in response to on-line
inquiries related to on-line or archive database information or IDS periodic reports (???). Plots shall be
generated in a timely manner using BW and color 300 dpi resolution laser
printers and multi-color pen plotters with a resolution of 0.002".

[Need to determine adequate response performance to inquiries, displays, prints, plots,
user defined reports against archive test database information.]

LANL: On-line monitoring capabilities in the ESF will be to allow PIs to
monitor instruments during test installation and maintenance activities.
This will require fast screen updates since the PIs will expect instrument
response in human perceived “real time”. They will squeeze or tug an
extensometer, blow into a pressure gage, or grasp a thermocouple and
expect to see on-screen response. Also instrument single point
calibrations may be verified in the field during installation and checkout.
Both in the ESF and in the IDS central computer facility PIs may be
changing or controlling test activities that require human “real time”
response. Screen updates at text rewrite rates of 500-1000
characters/sec would be acceptable. Faster rates would be useful and
would identify the IDS as a powerful, responsive system. Graphics
displays would probably be generated locally or in a window of an X-Terminal
style work station and under these circumstances could update at
analogous rates to text speed. Prints plots and reports are expected to
be off-line processes and normal active print queues and associated
printing turn around times for mid-range equipment is acceptable. It will be
important that this printing facilities and output be available 24-
hours/day even if the IDS central computer is manned only during the day
shift. Testing activities are expected to span shifts and may need full IDS
facilities support at all times. Most displays and reports will use currently
available IDS database information. For long term effects archive data will
have to be made available. Since IDS users will have space to store active data sets they are using, it seems like a reasonable procedure to limit guaranteed availability of archived data to manned central computer shifts.

1.4.2.2 Periodic Reports

Each month, the IDS shall automatically prepare permanent record summaries of calibration, maintenance, configuration status, and instrument status, and distribute such reports to IDS archive storage, the TCO, and requesting participants. Each quarter, or on demand, the IDS shall automatically prepare summary data reports and graphs showing summary information of all acquired data.

[Need to clarify requirement for quarterly reports and graphs.]

LANL: The referenced quarterly reports only apply to IDS Common Data. Reporting on other data is outside the scope of currently defined IDS requirements. LANL as IDS Data Manager will determine the necessity of reporting other data.

1.5.1.1 Comprehensive List of Instruments

Maintain a current and historical listing, by part number, serial number, or unique identifier, of all instruments monitored by the IDS. Identical requirements apply to calibration checks, checkout tests, installation/acceptance tests, and operational tests. All test instruments shall be cross-referenced to applicable test activities. Test instrument status information shall be accessible on a read-only basis. Access to instrument list input, updates, and status shall be subject to user access restrictions.

[Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent supplied by the participant.]

LANL: Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent that it is supplied by the participant. Unless the referenced test, instrument, and descriptive information is supplied in standard IDS format (i.e., not embedded in a file) it will not be part of the IDS testing information database. IDS will have no controls on participant data entry into data or text files prior to manual or electronic transfer to IDS.

1.5.1.2 Instrument Interfaces

Maintain a current list of uniquely identified instrument interface, IDS I/O channel numbers, or other identifiers for all system interfaces. Identical requirements apply to calibration checks, checkout tests, installation/acceptance tests, and operational tests. IDS instrument interfaces shall be cross-referenced to applicable test activities. The time and date of IDS instrument interface change of status from inactive-to-active and active-to-inactive and associated user comments shall be recorded. Test instrument interface lists associated with individual tests shall be accessible.
on a read-only basis. Access to interface lists, updates, comment input, and status shall be subject to user access restrictions.

[Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent supplied by the participant.]

LANL: See discussion under 1.5.1.1 above.

1.5.1.3 IDS Configuration

Maintain an actively updated listing of all IDS instrument interfaces and data conversion components, external interconnections, and operating software versions. Change input to IDS configuration data shall be subject to user access restrictions.

[Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent supplied by the participant.]

LANL: See discussion under 1.5.1.1 above.

1.5.2 Malfunction Alarms

1.5.2.1 IDS Malfunction Alarm

Maintain diagnostics capable of detecting malfunctions in I/O signal converters and critical processor functions and provide an alarm at specified system interfaces to alert users and IDS M&O personnel.

[Need to be certain that signal converters are within IDS scope.]

LANL: All references in the FRD pertain to items within IDS scope. It is expected that PIs may supply signal converters for a limited number of instruments. Based on SNL experience at WIPP, we might also expect certain PIs to assign responsibility for maintenance and verification of PI installed equipment to IDS Operations (IDS Ops) at some time during the test lifetime. IDS design and IDS Ops expectations must include this option.

1.5.2.1.1 IDS Malfunction Alarm

Monitor signal converter I/O hardware and provide standardized converter input signals to determine converter performance. Processor hardware and software diagnostics shall be run at prescribed intervals as appropriate to verify system performance. The resultant data from these tests shall be screened against established reference values accepted by the TCO to detect errors or malfunctions.

[Need to be certain that signal converters are within IDS scope. Need to verify established reference values.]

LANL: All references in the FRD pertain to items within IDS scope. It is expected that PIs may supply signal converters for a limited number of instruments. Based on SNL experience at WIPP, we might also expect certain PIs to assign responsibility for
maintenance and verification of PI installed equipment to IDS Operations (IDS Ops) at some time during the test lifetime. IDS design and IDS Ops expectations must include this option.

Equipment verification test reference values should be related to the selected front end operational range. These values and checked accuracy will be independent of the actual instrument signal input and PI specified measurement accuracy. These tests are meant to determine whether the IDS equipment is within the specified equipment requirements. Reference levels will be determined as follows:

- by the designer as automatic IDS programmed ranges consistent with the converter range and accuracy criteria (i.e., thermocouple and vibrating wire front ends).

- by field personnel as manual or semi-automatic selections for input to IDS defining the selected range. Designer specific range vs accuracy for the target front end will always be used.

1.5.2.1.2 Performance Event Logs

Malfunction occurrences and all system diagnostic analysis results shall be entered into system performance event logs; identified by time, date, interface or component identifier; and contain sufficient descriptive information to identify a specific event from other similar occurrences. Available on a read-only basis.

[Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent supplied by the participant.]

LANL: See discussion under 1.5.1.1 above.

1.5.2.1.3 IDS Malfunction Alarm Interfaces

Automatically print and provide on-screen malfunction alarm messages at selected terminals and printers, including date and time and identifying the affected equipment or software. Historical alarm messages shall be available on demand from any system terminal. Access to malfunction alarm messages and reports will be subject to user access restrictions.

[Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent supplied by the participant.]

LANL: See discussion under 1.5.1.1 above for a general discussion. In general this function will not be applicable to manual data entry, portable data loggers, etc.
1.5.2.2 Instrument Malfunction Alarm

Detect gross instrument malfunction (i.e., open or shorted instrument wiring, no response, and out-of-range data) as specified by participants and provide an alarm whenever such malfunctions are detected. Identical requirements apply to calibration checks, checkout tests, installation/acceptance tests, and operational tests.

(Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent supplied by the participant.)

LANL: See discussion under 1.5.1.1 above for a general discussion. In general this function will not be applicable to manual data entry, portable data loggers, etc.

1.5.2.2.1 Malfunction Definition & Location

Monitor instrument output and screen against reference values provided by participants as an indicator of gross instrument malfunction. Identify specific instruments, test identification, and location by association with a particular instrument source ID. Participants are responsible for the accuracy of their provided reference values.

(Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent supplied by the participant.)

LANL: See discussion under 1.5.1.1 above for a general discussion. In general this function will not be applicable to manual data entry, portable data loggers, etc.

1.5.2.2.2 Instrument Malfunction Alarm Interfaces

Record instrument malfunction events in a performance event log. Identify by instrument identifier, time and date, and malfunction identifier. Automatically print and provide an on-screen instrument malfunction alarm message at M&O, system operator, and affected test terminal interfaces. Include instrument identifier, time and date, malfunction identifier, and associated test identification.

(Data supplied by manual data entry, portable data loggers, etc., will include such information only to the extent supplied by the participant.)

LANL: See discussion under 1.5.1.1 above for a general discussion. In general this function will not be applicable to manual data entry, portable data loggers, etc.
1.6 Operate

1.6.2 Unattended Operation

Provide unattended, automatic data collection under normal operating conditions. Abnormal conditions shall initiate an automatic set of procedures to detect, report, and log the abnormal conditions in the performance event logs. Where operator intervention or assistance is needed, the IDS will notify designated personnel.

[Need to clarify that, in the event of a computer outage (an abnormal condition), automatic procedures will not be available.]

LANL: It is expected that in the event of an ESF data acquisition station (DAS) control computer outage the central computer will log this problem. Failure of the central computer(s) (an abnormal condition), will result in central computer automatic procedures not being available. Event logs are expected on each DAS as well, although at a more primitive level that the central computer. These logs would note failure of communication with the central computer and other stations. This failure might be caused by a general ESF operations problem, LAN failure, central computer failure, or other events.

1.6.3 Maintenance & Operations

Provide subsystems, components, and functional elements that can be maintained on a regularly scheduled basis. Maintenance strategies shall be studied to provide the most useful and cost-effective program consistent with system reliability goals. All equipment calibration shall be traceable to NIST.

[Need to clarify responsibility for studies.]

LANL: IDS design studies are the responsibility of the designer.

1.6.3.2 Provide Data I/O Terminals & Remote Access

Terminals shall be provided for participant and IDS personnel as needed throughout the ESF. Locations shall be determined by participant and IDS M&O requirements. Remote, modem-based data communications shall be restricted to data transmitted to and/or received from specific user-originating locations, subject to user access requirements.

[Need to clarify that terminals may be workstations as well as terminals. Also need to determine maximum number to be provided.]

LANL: Data terminals may be dumb terminals, desktop computers, or workstations based on identified PI needs. These needs will be finalized as the Pls develop their criteria for terminals to support their on-site work. Some Pls may be planning to supply their own computers and/or terminals and IDS should try to anticipate these needs and provide and maintain the needed equipment if practical. For the initial design estimates it seems reasonable to assume that IDS will provide powerful desktop computers located in each identified PI work area in the IDS central computer room and an equal number (perhaps in a more suitable
enclosure) for use in the ESF. Additional units may be added as ESF testing activities intensify and the need for more equipment is identified. In the ESF, just a computer will not be enough. There will need to be electric carts or similar small vehicles available for PI use that contain built-in or fold-up desks or racks with appropriate lighting suitable for temporary use as operator stations for the supplied computers.

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     F Momuth, LANL, EES-13/LV, MS 527
     J Canepa, LANL, EES-13, MS J521
     L Engwall, CRWMSS M&O
     P Pimentel, CRWMSS M&O
     K Gidwani, CRWMSS M&O
     F Lane, CRWMSS M&O
     R Rosche, CRWMSS M&O
     EES-13/LV, LANL, MS 527
     CAG Files, Carlton, OR
Abstract
The TCO has identified the need for a network linking selected desktop computers into a workgroup. The primary objective is to share text and database files, graphics, and support e-mail. No formal objectives determining network capacity have been developed, however several issues impacting the choice of network are discussed including data throughput, complexity, maintenance, initial cost, upgrades, and related cross platform software. Based on identifying the least complex solution that satisfies current and future (2-3 years) needs, our recommendation is a basic AppleTalk network using Timbuktu software. This combination can be implemented on all Windows PCs and Macintosh computers in the office. This network can be expanded to include new users as needed, has adequate capacity to support identified tasks, has a low installed cost, and is easily maintained. Incremental upgrades are possible to improve network performance as needed. In addition, the database application, FileMaker Pro is recommended for Windows PCs and Macintosh computers as an office standard application. This flat file database is adequate for most office needs and is compatible with a distributed server network. WordPerfect files from DOS and Macintosh platforms are interchangeable.

1.0 Key Considerations
The following are key considerations for implementing a first time network in a mixed platform office:

- there must be an identified network manager resident in the office
- the physical network must be simple to maintain and understandable to the network manager
- the network protocol must be transparent for users and simple to maintain for the network manager
- there must be target applications available (not vapor) that run on the network
- there must be a clear incremental upgrade path available that substantially increases network performance

In addition to the listed considerations, it must be recognized that the TCO does not have on staff a dedicated computer/network specialist capable of maintaining a high end server based network (i.e., Novell). This is consistent with office staffing dedicated to identifiable WBS issues utilizing high end computer based tools and not developing specialized computer hardware/software experts. As office requirements develop in the next 2-3 years, revisions of the initially installed network should be able to accommodate increased network requirements without major changes. Should major changes in office network usage develop then a dedicated central server network could be required and the attendant dedicated computer/network expert and network administrator.
2.0 Possible Networks

2.1 Appropriate Networks
There are many networks available for DOS machines based on various protocols, however the dominant one is Novell. Microsoft has recently started shipping Microsoft Access specifically dedicated to Windows and supporting Microsoft applications. For Apple Macintosh computers there are several networks all based on the AppleTalk protocol with the most useful current offering Farallon's Timbuktu for Windows and Macintosh. The AppleTalk networks have been in use for years supporting DOS and Macintosh platforms in single and mixed environments.

Office desktop computer networks are based on one of two models; dedicated central server(s) or distributed servers. A server is the remote data store that a computer user accesses via the network. The user may be sending or fetching data from the server. The central server model contains one or more servers containing data and applications that all users have access to. These access privileges are defined by the network administrator and individual users do not communicate directly. The distributed server model identifies each user's computer as a potential server. Each user determines the availability of his or her computer files (if any) to the network, passwords, and provides local maintenance (backup and house keeping). Each user on a distributed network communicates directly with other users. It is inefficient to share applications on a distributed network.

- **Novell** uses a central server protocol and is quite complex and difficult to setup and maintain. It provides extensive cross platform connectivity. Although very powerful for a transaction intensive network it is expensive to install and requires a dedicated, highly technical network administrator to keep it running.
- **Microsoft Access** uses a distributed server protocol and is hard to setup and maintain. It provides no direct cross platform connectivity and is not suitable for a mixed platform environment.
- **Timbuktu** uses a distributed server protocol and is easy to setup and maintain. It provides cross platform connectivity for Windows and Macintosh only. Ports to other platforms must be made through terminal emulators. It provides standard networking features plus the ability to run one other remote computer on the network from the users computer.

We strongly recommend Timbuktu for the TCO network.

2.2 Network Software
Of particular interest to the TCO is developing database support for various reports planned to support field testing. The slickest and easiest to use database product for both Windows and Macintosh platforms is FileMaker Pro from Claris. This is a powerful flat file application that has been marketed for years for the Macintosh. The new Windows version has been available for about 6 months. Files are interchangeable between the Windows and Macintosh versions and with an AppleTalk network file sharing is possible over the network (a real plus). File exchange is possible for most major applications supported on both platforms (i.e., MS Excel, MS Word, WordPerfect).

2.3 Data Transfer Rates
Estimates for the actual throughput are are not useful at this time since no operating parameters for the network have been established. The current office equipment distribution supplying each user with a local printer off loads one of the main traffic items for this network. It is expected that there will be little or no network background traffic. Actual wait time experienced by a user attempting to
transfer a file will be the defining user interaction.

The most widely used multiplatform desktop computer network protocols are based on AppleTalk (native hardware or Ethernet) and Novell. Shown below are comparisons of AppleTalk using Farallon Timbuktu (native hardware) and Novell NetWare v3.11 (using Ethernet).

<table>
<thead>
<tr>
<th>Item</th>
<th>Size (bytes)</th>
<th>Transfer Time (min/max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AppleTalk</td>
<td>Novell</td>
</tr>
<tr>
<td>text documents, database files, e-mail</td>
<td>800K</td>
<td>30-120 sec</td>
</tr>
<tr>
<td>graphics files (AutoCad, Photoshop)</td>
<td>32M</td>
<td>25 min</td>
</tr>
</tbody>
</table>

Since most data transfers will be in the 5-100K range an AppleTalk network would be satisfactory. Very large transfers such as a 32M AutoCad file should probably be made on a transportable media such as an external hard disk, MO drive, or tape. Long transfers (10 min to hours) are vulnerable to corruption on any network and can lead to a very frustrating session. These long transfers will also be slowed down by other users accessing the network.

3.0 Recommendation
We recommend that the initial network be a basic AppleTalk protocol utilizing Timbuktu network operating system (NOS) and FileMaker Pro as the office database standard application.

3.1 Network Hardware and Software
Each Macintosh computer has basic AppleTalk network hardware (and Ethernet in newer machines) built in. Each Macintosh requires a copy of the networking NOS. Each Windows computer requires network adaptors as well as a copy of the NOS.

The following hardware/software network components will need to be purchased:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Qty</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farallon P/N SW447</td>
<td>Power Pack - Timbuktu for Macintosh 5.0</td>
<td>1</td>
<td>$295</td>
</tr>
<tr>
<td>Farallon P/N PN381</td>
<td>Windows Bundle includes: Timbuktu for Windows 1.0, PhoneNet adaptor card (ISA bus), PhoneNet connector (DB9), Cable and termination</td>
<td>10</td>
<td>$379</td>
</tr>
</tbody>
</table>

The following application software database applications should be purchased:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Qty</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>FileMaker Pro 2.0 Macintosh</td>
<td></td>
<td>1</td>
<td>$269</td>
</tr>
<tr>
<td>FileMaker Pro 2.0 Windows</td>
<td></td>
<td>5</td>
<td>$269</td>
</tr>
</tbody>
</table>

3.2 Network Wiring
New network wiring should be installed to accommodate anticipated upgrades. All wiring should be 4-pair, #24 AWG conforming to IBM type 3 or better. We recommend installing IBM type 5 wire and office jacks in a star configuration. The wiring schematic is TDB.
Appendix A

Attachments (not included in this copy):
1. Farallon data sheets 3-pgs.
2. Farallon Timbuktu article, Network Computing, 3/93, 3-pgs
3. Microsoft Access article, Network Computing, 3/93, 5-pgs

Cc:  N Elkins, LANL, EES-13/LV, MS 527
     D Boak, LANL, EES-13/LV, MS 527
     H Kalia, LANL, EES-13/LV, MS 527
     J Canepa, LANL, EES-13, MS J521
     EES-13/LV, LANL, MS 527
     CAG Files, Carlton, OR
MEMORANDUM

From: Jim Hall
To: Ned Elkins
Subject: Limiting J Hall’s Test Data Coordination Activities

Summary
The CAG IDS workload is increasing steadily as the IDS designers complete their administrative documents and begin to focus on design issues. These IDS commitments require essentially full time attention from J Hall. Continuing work on TCO field data issues is impacting my IDS work. I can make time available for a limited amount of high level database development management (i.e., the TFM database and other complex relational databases as they are developed), and related information management, hardware, and software issues. For these reasons it is important that my participation in test data coordination activities be limited.

Discussion
Earlier TCO data management discussions identified DOE’s understanding of a limited TCO role in field test data management activities (excepting IDS data management). It is expected that LANL testing data management will be handled by EES-13 data management personnel. The TCO has in place, or is building, an office and field team to staff, manage, and report on all TCO field activities including any remaining data related issues. This team appears to be developing the detailed reporting strategies and resulting reports in an acceptable manner. The intense day-to-day interaction and development of this team, and my obligations to IDS, precludes my effectively contributing to specific field data coordination task related issues. I will continue to be available to contribute to high level issues such as helping to define the overall role of the TCO in field test data management, managing CAG personnel developing complex database applications, advice on implementing office information systems, and office computer hardware and software issues.

Cc: N Elkins, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
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Summary
Comments on earlier versions of this document suggested that the M&O was having difficulty in composing a document that reflected a familiarity with YMP project management requirements, related project plans, and relevant QA issues. Their final plan is still lacking in most areas. The EP should be a high level management description of how the job will be managed to accomplish the technical goals. The plan doesn't have a strong central theme and seems to be a serial recitation of all the “important” points that the team could think of. There is a heavy emphasis on technical issues not particularly appropriate or important to this document. Although you and I had discussion with the M&O about the importance of coherent procurement policies and plans, there appears to be little actual understanding of YMP policies or Federal Acquisition Requirements (FAR) issues beyond a vague handwave in REECos direction. I have a concern that if anyone (especially an auditor) looks closely at this document the structural flaws and lack of consideration of impacts of some commitments will reflect on the credibility of the IDS itself. I think K Gidwani realizes that his group is so single-mindedly technically oriented that they really can’t accomplish production of a strong management document. To this end he has hired Bill XX from Fluor Daniel, Irvine as a consultant to write this document and other management documents they are preparing. This raises two questions for me:

- Is the new consultant any better qualified than the existing team to write the EP? The current draft is a weak document. Writing the EP and learning about IDS management issues first hand should be an important exercise for the M&O IDS team. Is the staffing of the team unbalanced or inappropriate if they cannot handle management issues internally?

- If M&O IDS managers are unwilling to write an EP themselves and “learn the ropes” do they or will they take management issues seriously? Bad management attitudes may impact procurement and QA issues later in the IDS development cycle. The present emphasis of
technical issues to the exclusion of appropriate management awareness and control plagued earlier IDS design efforts by LANL (Dale Coy) and EG&G with bad results for the program and IDS credibility.

K Gidwani has asked for comments to be incorporated into the next revision scheduled for Sep-Oct 1993. During the intervening months we will prepare additional comments for M&O consideration. Although the M&O is responsive, this has not lead to a successful EP yet. Hope springs eternal and maybe next the next revision will be a winner. Our observation of the present EP is that it is weak in the following areas:

1. concentrated definition of project scope (not technical details) in general terms through FY 96 and specific details through FY 93;

2. internal QA issues are not given adequate coverage, inter-organizational design interface details, and M&O subcontractor management/oversight strategies are described but without real detail that would allow a reader to understand what the managers of this task intend to do;

3. the rote listing of related DOE and other standards give no feeling that the authors have actually determined their application to YMP or the IDS. There is no discussion of cost & schedule impact of adopting any of the standard requirements.

4. Inclusion of inappropriate material such as Appendix C which contains unaltered pages from a document prepared by Fluor Daniel for Westinghouse supporting Hanford work illustrating an unexplained and ununderstandable point.

2. presentation of a concise IDS conceptual model or summary of basic design requirements;

3. clear definition of the organizational responsibilities of Fluor Daniel, all other participating contractors, and DOE relative to the purposes of the project, along with the specific organizational interfaces that directly affect IDS development;

4. identification and description of all other baseline requirements and management systems documents that must be considered in the development of the IDS;

5. description of the specific phases of project activity, broken down individually by planned activities and specific deliverables; FY 93 activities should be presented in detail, FY 94-96 at a conceptual level; and
6. provision of a detailed schedule for FY 93 activities, with all deliverables and milestones identified, and a conceptual schedule projected through FY 96.

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    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: The TCO needs to Appoint a Common Data PI

In past years TPO D Herbst supported the concept of a LANL Common Data PI for the ESF was necessary although none was appointed. Early in the history of IDS development common data was identified as test facility related data that was not associated with any particular test and was potentially of interest to test PIs. Planned measurements included drift air temperatures and humidity, near face rock temperatures, drift air flow volume, measurements of water mass transfer into and out of the ESF, construction and traffic related vibration, and other potentially test impactive items not yet identified. IDS equipment operational data had previously been included in common data, however these items are now the responsibility of the IDS designers/operators. The technical nature of the ESF common data items led to the realization that a more formal, scientific PI level person needed to be in responsible for these measurements and any resulting analysis. Planned M&O IDS designers and operators are inappropriate for this task.

The need for this PI to be identified has become an issue in developing the M&O IDS requirements since the IDS design group has no expertise in this area they have asked for clarification as to the source of the common data requirements. Definition of common data items, associated analysis (if any), and related IDS requirements are past due from the IDS perspective.

Based on the need to resolve the common data issue I suggest that N Elkins appoint or request the appointment of a potential candidate as the Common Data PI from existing LANL testing PIs. The primary tasks for this appointee (or others involved in the assessment) should include the following:

- study currently identified common data categories for necessity and completeness
- recommend disposition of common data measurements
- develop a common data plan
- work with Jim Hall to develop IDS functional requirements as needed

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Re: Electronic format MSDSs

A limited number of MSDSs are available in electronic format through Automated Office Systems. My contact there is Ralph S. Trigg (505-842-1247 Voice, 505-242-8522 FAX). In order to release MSDSs to us in Las Vegas, he needs verbal consent from Bill Hargraves’ (LANL HS5 Group, 505-667-2854) boss. Her first name is Barbara I believe. The place to start though is with Bill Hargraves. He will be able to get you in touch with his boss.

Another lead for MSDSs in electronic format is the Hanford Health Foundation (a DOE contractor). Contact Dr. William Meader. Chris Breeds has already had a discussion with Dr. Meader regarding MSDSs in electronic format, so you may want to wait and speak to Chris first. The phone number at Hanford Health is 509-376-7765.

Good luck.
MEMORANDUM

From: Jim Hall
To: Hemi Kalia
Subject: Comments on the M&O Engineering Plan (EP) March 1993 Draft #3

Summary
Comments on earlier versions of this document suggested that the M&O find the writers of the excellent Fluor Daniel IMACS Management Plan for Hanford and have them write the IDS Engineering Plan (EP). At least one member of the IMACS authoring team worked on the current version of the EP, however, this version is still unsatisfactory. Our most urgent concerns in this draft relate to the lack of support for a modular system, weak QA, and invocation of very impactive DOE orders that may be unnecessary.

General Comments
Major concerns in our review of this EP draft involved the following issues:

1) an almost total lack of attention to the concept of delivering discrete modules as necessary to support ESF construction and testing;

2) the commitment to using the M&O QAPP without really assessing whether or not it can adequately support the needs of the IDS. I think that at a minimum, the inter-organizational design interface needs of the IDS are not likely to mesh well with M&O QAPP requirements; also, the M&O's subcontractor management/oversight responsibilities are largely undefined in the engineering plan; and

3) the rote citation of DOE Order 1360-series standards. Have the authors really determined if they apply to YMP or the IDS? If so, the cost & schedule impact will be considerable.

The shell of an alternative EP outline is contained in comment 2. This could be readily expanded to a full outline if requested.
Specific Comments

1. Ref: Section 1.1; the first three paragraphs are of some casual historical interest, but do not seem to be particularly appropriate for the purposes of an engineering plan. In the fourth paragraph, it should be noted that activities related to IDS design and development commenced long before FY 93, and there are a number of significant errors in describing the basic purposes of the IDS. As currently scoped, the IDS will service the needs of the Exploratory Studies Facility (ESF); whether or not the IDS would be used to manage the acquisition of data from the construction and performance of a nuclear waste repository is problematical, and depends entirely on the results of the characterization effort and the suitability of the IDS design for the needs of a repository. It is recommended that no assumptions of this kind be made in this plan, and that it focus specifically on the mission of the IDS to support the needs of the construction of, and testing in, the ESF.

2. Ref: Section 1.2: the purpose of the plan is unclear; Figure 1 does not identify the organizations responsible for the activities shown. Table 2-1 does not:
   1. identify DOE responsibilities
   2. identify LANL as having approval authority over the DRD;
   3. identify the organization with approval authority over the FRD, RFQs, vendor bids, procurement specifications, vendor selections, test writeups, purchase orders, and other items.

The engineering plan should be Fluor Daniel's primary work-controlling document, and as such should be as unambiguous as possible. It is suggested that the purpose of the plan be plainly stated and be focused on the following points:

1. definition of project scope in general terms through FY 96 with specific details through FY 93;
2. presentation of a concise IDS conceptual model or summary of basic design requirements;
3. clear definition of the organizational responsibilities of Fluor Daniel, all other participating contractors, and DOE relative to the purposes of the project, along with the specific organizational interfaces that directly affect IDS development;
4. identification and description of all other baseline requirements and management systems documents that must be considered in the development of the IDS;
5. description of the specific phases of project activity, broken down individually by planned activities and specific deliverables; FY 93 activities should be presented in detail, FY 94-96 at a conceptual level; and

6. provision of a detailed schedule for FY 93 activities, with all deliverables and milestones identified, and a conceptual schedule projected through FY 96.

These points should be reiterated in the basic structure and content of the plan.

3. Ref: Section 1.4; the discussion of project phases does not recognize the fact that the IDS must be designed, procured, tested, and installed in discrete modules capable of servicing data acquisition needs associated with the integrated construction and testing schedule for the ESF. The IDS cannot be produced linearly as a complete system and successfully support the mission of the ESF. The "phasing" of the project should be driven by (and absolutely must be logically coordinated with) the overall operational needs, schedules, and purposes of the ESF. If ESF construction testing is the first need, then the first deliverable IDS modules must accommodate the instrumentation related to those tests; it follows that the initial phases of the design, procurement, testing, and installation efforts must focus on the first required modules, within the general constraints of the overall conceptual design for the complete system.

4. Ref: Section 1.4.1; it is unclear if the Phase 1 activities discussed here are the only activities anticipated for FY 93; see comment 3 above. It is suggested that the Section should be rewritten to specifically define the interface between Fluor Daniel's and LANL, with a focus on Fluor Daniel's responsibilities, and with enough detail to actually be able to initiate action as a result. Does LANL require Fluor input for FRD update or not; when will the FRD be finalized; when is submittal of the DRD required; are there specific baseline requirements documents that define the content, structure, and internal and external review/approval requirements applicable to the DRD and which modules need to be delivered to support ESF construction in FY 93? All of these questions need to be answered as part of developing these issues.

5. Ref: Section 1.4.2 and 1.4.3; see comment 3 above. In paragraph 3, the "IDS Supplier" is unidentified; if not Fluor Daniel, then who? Responsibilities for supplying the components of the IDS are confused with responsibilities for acceptance and testing.

6. Ref: Section 1.4.3; see comment 3 above. Why is no task summary provided for Phases I and II? Providing task summaries or appropriate cross references would be helpful.
7. Ref: Section 1.5; suggest reviewing the system description against the current version of the FRD for consistency. With regard to paragraph 2, especially the last two sentences, it should be noted that although sensor data specifications must be accommodated in the IDS design, the sensors themselves are not physically part of the IDS. They are part of the PI test instrumentation system.

7. Ref: Section 1.6, see comment 2 above. Sentence 3 in paragraph 1 is gratuitous and should be deleted. The roles of the participating organizations in the development of the IDS are inadequately described, particularly in the case of LANL since they will retain significant design control responsibilities throughout the project. The DOE's role must also be explained in detail, especially with regard to the performance of configuration audits as part of the acceptance of completed system modules.

8. Ref: Section 1.7; no schedules have been provided; see comment 3 above. If no ESF integrated schedule is available, how can FY 93 deliverable requirements be properly identified? In addition, how can the manpower estimates provided in Appendix B be considered legitimate when it is still unclear what deliverables need to be produced to support ESF construction testing? Under 1.7.1, the organizational interfaces and applicable design control mechanisms and procedures need to be explicitly defined. The holding of loosely scheduled project meetings to resolve the issues described in this section in all probability will not prove to be an adequate management approach, given the design control requirements of the OCRWM QARD (and the M&O QAPP that Fluor has committed to use).

9. Ref: Section 2.1; it is unclear why this section was included; mine safety requirements should be addressed within the context of the FRD or a separate mine safety requirements document, not this plan. This plan should describe how the requirements of the FRD (and other supplementary requirements) will be translated into an approved DRD and eventually a functional IDS.

10. Ref: Section 2.2; organizational interfaces with LANL are poorly defined; see comment 4 above. In the second paragraph on page 8, if Fluor will be conducting design studies with input from external suppliers and consultants, then so state. Completed design studies should be submitted to LANL for consideration in FRD updates, which may involve LANL coordination of formal external reviews by the PIs and DOE. The DRD will be produced and updated in response to the FRD and its updates, not directly as the result of one or more design studies.

11. Ref: Section 2.2, the purpose of preparing a summary report based on the issues identified in the third-level headings is unclear. The point of this effort must be to translate LANL FRD requirements into a DRD that is sufficiently detailed to guide the development of Design
Specifications for discrete components and/or system modules. The DRD will be routinely updated to accommodate FRD updates, some of which may be precipitated by design studies conducted by M&O IDS. The point of this discussion should be on identifying (based on review of the current FRD, the mission of the ESF, the ESF construction and testing schedule, and other current information) which (or even if) design studies are required to support LANL, so that the FRD can be updated in areas related to the first deliverable system modules. In any case, the DRD should be developed based on the current version of the FRD, and critical Design Specifications should be prepared to support procurement and testing of the modules delivered to support the first test(s). If LANL has requested M&O IDS to assist the effort by proposing specific design studies related to any of the issues discussed here, then identify such studies as planned deliverables and schedule appropriate submittal dates.

12. Ref: Section 2.4; multiple procurement specifications supporting discrete deliverable systems modules will be required, not a single specification as implied in this Section.

13. Ref: Section 2.5; if an implementation plan is required, then identify preliminary and final versions as deliverables and schedule appropriate submittal dates.

14. Ref: Section 2.9, seventh paragraph; it is our understanding that DOE configuration audits will be required in all cases as the basis for acceptance of each delivered system module into the ESF configuration baseline.

15. Ref: Sections 3.0 and 3.1; this is the first indication that modularity requirements and coordination of module deliveries with ESF construction and testing schedules have been considered. Suggest expanding and clarifying these issues as part of a plan Section that summarizes the conceptual design; see comment 2 above.

16. Ref: Section 4.1.1; what constraints on the M&O's IDS activities are represented by these specifications? If they apply because the FRD requires that they be considered by the IDS contractor, then they should be cited; if not, then it is recommended that they be deleted. Given the overall project sensitivity to (and potential for misinterpretation or misapplication of) requirements documents, great care must be exercised in the identification of requirements. The Engineering Plan should reference only those requirements that do in fact apply to the scope IDS development and the M&O's responsibilities as the IDS contractor.

17. Ref: Section 4.1.2; the plan should describe how the references cited here will actually be implemented by M&O IDS; i.e., reference the management systems, plans and procedures that the M&O IDS will actually work to.
18. Ref: Section 4.3; have the applicability of the DOE Orders cited in this and other Sections (e.g., 5300.1, 1360.1A) to the YMP actually been confirmed by the YMPO or by OCRWM? Since the effect of implementing these orders is significant in terms of the planning structure and cost requirements for the project, and hence to the structure and content of this plan, such a determination should be obtained as soon as possible. If no specific YMPO requirement for their use exists, then all such references should be purged from the document.

19. Ref: Section 4.4; has FIPS publication compliance been confirmed by the YMPO as being mandatory for the IDS? see comments 16 and 18.

20. Ref: Section 4.5; DOE/RW-0214, ASME NQA-1 (1989 is current, and the ANSI qualifier has been dropped), and portions of NUREG-0856 (as defined by DOE/RW-0214 Section 19) are applicable to the IDS without question. The YMP QAPD (read OCRWM QAPD) is not applicable. Applicability of the remaining standards must be determined prior to the issue of this document; see comments 16 and 18.

21. Ref: Section 4.6, 4.7; see comments 16, 18; applicability must be determined prior to incorporating their provisions into this document.

22. Ref: Sections 4.8; the Fluor Daniel has committed to adopting the TRW QAPP for the IDS task, with no modifications or adaptations identified. If this is the case, then the M&O contractor's role in training and qualification of Fluor personnel and their larger role in the management of Fluor's subcontract should be explained in detail. It is suspected that Fluor will not be able to fulfill the IDS mission without having to initiate some modifications or exceptions to the M&O QAPP. How, for instance, will interface requirements between Fluor and LANL be managed within the context of the TRW QAPP? How does the design interface management process defined in the M&O QAPP even address the needs of the IDS, given the stake in development shared by Fluor, LANL, and REECO? It is strongly suggested that the QAPP be reviewed against the actual needs of the IDS, as currently scoped. In this review areas of potential conflict should be identified, and QAPP modifications or special case alternatives should be developed in order to ensure that the management system represented by the QAPP actually supports the needs of the IDS.

23. Ref: Section 4.9; M&O QAPP requirements for software verification and validation will take precedence over the references cited in Section 4.9; see comment 22.

24. Ref: Section 4.10; the YMP Configuration Management Plan applies to completed ESF components and YMP configuration items, and does not directly apply to the design or
development phases of such items prior to their completion. An M&O IDS configuration management program must apply during the development phase and support modular delivery concepts if it is going to work. Configuration changes to delivered and accepted modules will affect the design and development of future modules, and conversely, configuration changes during development or testing of modules may engender changes that must be picked up in the delivered configuration. In other words, the local M&O IDS configuration management system employed by the IDS contractor must be capable of interacting with the higher level YMP configuration management system throughout the development and delivery of the IDS.

Note that the configuration management procedures provided by the M&O only address software; all elements of the IDS (hardware, software, and documentation) must be addressed. It is recommended that the M&O IDS produce a configuration management plan as one of its first deliverables, and support it with M&O procedures, if they are available and appropriate.

25. Ref: Sections 4.11, 4.12, 4.13, 4.14; The applicability of DOE Order 1360.2A to the YMP needs to be confirmed; see comments 16 and 18.

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solely dependent on a well written and approved (by M&O QA) purchase specification, proper procurement procedures (controlled by procurement QA procedures), followed by incoming inspection (controlled by inspection QA procedures) to verify that the delivered system and services meet the procurement specifications including all ordered items delivered, hardware and software tests OK, complete documentation, delivery of services, and any other items covered in the procurement. The specification development, procurement, and inspection activities must be covered by the applicable, existing M&O (and REECo if involved) QA procedures. The vendor does not need a QA program or to be involved in any way in YMP QA matters.

2  Pg 8, Sect. 6.1.1, para 1  Just ask for the documentation you want or state that the standard documentation that accompanies the system is adequate.

3  Pg 9, Sect. 6.1.2, para 1  Software validation only applies to site characterization models on this project. Validation involves pier reviews, and basic issues of software design that go beyond the scope of commercial off-the-shelf programs. Verification that the software meets the manufacturer's claims is enough.

4  Pg 9, Sect. 6.1.4, para 1  Replace “validated” with “verified”.

5  Pg 9, Sect. 6.1.5, para 1  No baseline should be opened for commercial software. Reports on the current status of the system should be included in normal internal M&O documentation and reports. These documents and reports will be part of an overall M&O reporting baseline. Rewrite to replace all references to “validation” with “verification”.

6  Pg 9, Sect. 6.2, para 1  Change the portion of the 2nd sentence “will allow DOE or its contractors to use the purchased software without further procurement negotiations.” to add to the end of the sentence “as allowed under the terms and conditions of the license agreement(s).”
Specify the basic modem hardware baud rate (i.e., baud) before application of software speed-up protocols.

7  Pg 11, Sect. 7.2, para 2
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From: Jim Hall
To: Hemi Kalia
Subject: Meeting notes for the WIPP/YMP Data Monitoring Information Exchange Meeting, Fri, Feb 25, 1993

Summary
The main goal of this meeting was share test data monitoring techniques and experiences from Yucca Mountain and other government funded sites to broaden the perspectives of YMP participants and the M&O IDS design team. Central issues included developing a data acquisition philosophy and design, field experiences with instrumentation and data acquisition equipment, field test data management, and impactive peripheral issues such as calibration, cabling, and operations. Three groups were represented at the meeting; YMP, WIPP, and USBM. Hemi Kalia (LANL) presented the YMP testing program and an IDS overview, Kumar Gidwani (M&O Fluor Daniel) and Frank Lane (M&O Fluor Daniel) presented the current status of the IDS design, Tom Schultheis (SNL), Susan Pickering (SNL WIPP), Andrew Orrell (SNL WIPP), and Tom Carrasco (Westinghouse WIPP) presented various aspects of WIPP data acquisition details, Kanaan Hanna (USBM, Denver) presented the latest details on a comprehensive data acquisition system under development by the USBM, and Larry Costin (SNL) presented his recent experiences in preparation for the YMP Starter Tunnel Construction Monitoring Test. The following attachments are provided: {notes & slides} The remainder of this memorandum summarizes individual presentations made during the course of this meeting.

Presentation by Hemi Kalia (YMP, LANL)
Hemi Kalia gave the opening remarks introducing the purpose of the meeting and welcoming participants. In the absence of Ted Petrie, Deputy Director Engineering and Development Division (EDD) of the Yucca Mountain Site Characterization Project Office (YMPO) H Kalia continued to give T Petrie’s presentation. He identified IDS as the central data acquisition system for the Exploratory Studies Facility (ESF) testing program. The IDS is actually composed of several independent systems with a common data archiving computer for acquired data. The presently...
identified IDS systems are; test data acquisition, mine safety, and organizational computers performing autonomous data acquisition will be connected to the IDS Local Area Network(s) (LANs). Not all tests in the ESF will be connected to the IDS, however, IDS will support all tests identified for electronic data acquisition. IDS will be designed, operated, and maintained by the TRW team operating at YMP as the CRWMS M&O. Los Alamos develops IDS design requirements in cooperation with participant scientists and perform data management for the IDS output data. IDS capital item procurements are delegated to REECO and capital and operating budgets through 1999 have been developed, reflecting the large scope of this task. The IDS will service approximately 15,000 data input channels at maximum expansion. The IDS will operate in the two access ramps, connecting drifts and main test area. The IDS life is estimated at 10-15 years, however, the useful life may be lengthened to monitor on-going tests and the IDS may finally be integrated into repository data acquisition systems as they are developed. It is essential that the IDS be a robust and maintainable design to meet these long term goals.

Presentation by Kumar Gidwani (YMP, M&O Fluor Daniel)
Kumar Gidwani described the current state of the M&O ID design. The M&O have been working on IDS starting in FY93. Their design goals are being developed based on earlier work by other participant involved with IDS design during Title 1 ESF design activities. The IDS will be composed of several separate data acquisition and control systems for test data acquisition, mine safety, and common data. operating autonomously. Each of these systems will operate autonomously and be connected to the central IDS data archiving computer via a facility wide, high speed local area network (LAN). The network will use redundant fiber optic cables as the main data highway for all test data, voice, and video transmission. Data from the archiving computer will be saved in specific principal investigator (PI) storage areas. Controlled copies of the acquired data, calibration records, and system performance logs will turned over to LANL for data management transfers to PIs and DOE.

There will be a number of data collection stations located at strategic positions in the underground facility. These data collection stations may be associated with one or more test activities and will contain a complete computer controlled data acquisition system including local data storage. Required local operating parameters will be downloaded from the main computer (on the surface), stored locally, and used to define the operation of the local unit. Data collection stations may be located in controlled atmosphere cabinets or in modular buildings depending upon the specific IDS requirements for that station. The current IDS design identifies the data collection unit as a standard, individually configured, modular unit. Where the number of monitored channels at a specific location exceeds the capacity of a single data collection unit, multiple units will be used. Modular instrument pigtails, extension wiring, instrumentation cable termination, and communication and video panels are also planned, with expansion based on using multiple modular cables and wiring panels as needed. The front end signal termination and and conditioners
will be standardized for increased maintenance efficiency and system economy. Each data collection unit will multiplex instrument signals and digitize them one at a time for storage.

At the time of the first IDS installation in the ESF in 1995 the central archiving computer and supporting equipment will be installed in the surface IDS facility, a LAN stub will be in place and ready for expansion to service new tests as needed, and there will be an inventory of about 1000 data collection input signal conditioner points available for installation in the data collection units. Cable, termination cabinets, and supporting equipment will also be available.

Consideration is being given to the federal agencies requirement to use the GOSSIP network data communications format. This is preliminary since it is not clear that these requirements apply to YMP. As the surface facility is developed, software and work stations support for PI test monitoring and preliminary data evaluations during installation and operation of tests will be provided at the surface. Data terminals will also be provided underground as needed to monitor instrument performance at any phase of test installation or on going test activities. The surface IDS computer facility has been identified as a high security area and will have no windows or skylights. Kumar proposes to include “small green plant(s)” to bring a feeling of well being to the closed in workers in this facility.

Presentation by Frank Lane (YMP, M&O Fluor Daniel)
Mr Frank Lane provided additional detail on proposed IDS hardware planning and constraints. He noted that wire lengths may impose limits on measurement accuracy for some instruments or transducers. IDS data collection units will be located near each test, however, individual instruments may be connected by several hundred feet of wire to the signal conditioner located in the data collection unit. For instruments that suffer unacceptable signal deterioration under these conditions, a local signal conditioner may be necessary nearer the instrument. All instrument wiring will be terminated in modular instrument cable termination racks located centrally for groups of instruments. Multi-pair cables will be used to extend the instrument signals from the termination racks to the signal conditioning front end “points” located in the data collection unit. Each input point signal is routed through a multiplexer to an analog-to-digital converter and stored as raw data. Each raw data item is normalized to engineering units, using system calibration and PI supplied instrument calibration information, and stored. Periodically the locally stored raw and normalized data are uploaded to the surface data archiving computer over the IDS LAN.

Presentation by Tom Schultheis (SNL)
Tom Schultheis opening remarks included the acknowledgement that this sort of technical information exchange is very exciting to him and very important to the meeting participants. It allows SNL to share their rich history of WIPP field experiences, first hand, with YMP personnel who will be facing similar challenges in the ESF. Although he is no longer participating in WIPP
testing activities, however, he was actively involved as a senior principal investigator, planning, installing, and monitoring a number of major tests. Based on his experience at WIPP and other field testing programs he was very enthusiastic about the use of fiber optic cables for the network and anywhere else they are appropriate. He felt that the plan to include data, voice communication, and video as part of the local area network was a very good idea. He also suggested that those planning data presentations should consider the idea of using animated or time motion presentations similar to a "data movie" to include the time dependent component of the variables presented. He next presented an overview of the testing program at WIPP including the following:

- Heated pillar
- Barrel corrosion
- Sealing
- MITS where glass and metal parts from 9 countries are undergoing an on going in-situ effects test. This test has been in progress for about 5-1/2 years.
- Canister test
- Barrel crush test
- Ceiling load cells
- Floor extensometers

There have been some dramatic roof falls in heated drifts. A robot has used for some preliminary investigation of dangerous situations. Cable placement and gage installation is very important in these high risk areas to minimize the effects of the roof falls on data acquisition during the time when some very interesting data is available.

Discussion:
- Cable length limitations to preserve thermocouple measurement accuracies at WIPP were not needed. Cables several hundred feet long are routinely used. Measurements are made with an integrating voltmeter that effectively filters periodic noise mixed with the signal.
- A portable data acquisition unit (mini-shed) has been very useful for permeability tests in the undisturbed zone.
- Heated rooms experience about 3X the salt creep rate as ambient temperature tests.

Presentation by by Susan Pickering (WIPP, SNL)
In relating her WIPP experience to YMP, Susan Pickering noted that multiple IDS participants will drive costs up over a single user system, create user interface problems that will need to be dealt with as an on-going part of IDS development, and contribute to scheduling problems. Interface issues will include determining responsibilities for installation, maintenance, calibration, and data distribution and reporting. She observed that since participant PIs responsible for testing will be
the primary target users of IDS, these PIs will drive all IDS requirements. At WIPP both "raw
data" and normalized data converted to engineering units representing the measured parameter are
saved. Saving both raw data and engineering units provides a certain redundancy, however the
everseous quantity of data items may make it impossible to effectively review or use the raw data.
At WIPP data is generated continuously at varying rates, however certain data items may be
reported as a single data value per day, week, or month reflecting the rate of change of the test
parameter. It is important to have a meaningful relationship between the data acquisition rates and
the actual needs of the PI for a useful data record. Respec is a SNL subcontractor for geotechnical
instrumentation issues and has helped the WIPP team identify potential instrumentation and select
instruments for particular applications. The primary instrument control mechanism at WIPP is the
Gage Sheet. This document contains the entire history of the gage and is related to its test location
history. There is no provision for PI programming of any functions of the WIPP data acquisition
system. All requests for specific data acquisition functions are implemented by the data monitoring
group.

Presentation by Andrew Orrell (WIPP, SNL)
Andrew Orrell re-emphasized the status of the data acquisition activities as a WIPP service to
support PI test activities. An important aspect of gage selection is calibration and testing to
determine gage usefulness and application appropriateness. Off site testing at WIPP is performed
in potash mines located nearby. WIPP has found this testing program to be very important since
there has been an on-going need to evaluate candidate gages and develop a set of proven, standard
gages for similar measurements. Similar considerations apply to the need to evaluate cabling and
other gage installation and maintenance hardware. Gage installation, cabling, termination, and
general data acquisition related wiring need to have been designed with the flexibility to
accommodate unplanned changes in tests and new requirements as they develop. Grounding and
electrical interference problems need to be considered as part of the overall system design to
minimize their effects and accommodate special solutions when needed (i.e., input signal
isolation). Gage calibration is an important in-house activity for WIPP. The WIPP calibration
facilities use standards supplied and periodically calibrated to NIST certified secondary standards at
the SNL calibration lab. Calibrations record gage transfer characteristics and excitation
dependence. The scheduled re-calibration time for the gage is noted. ALL PIs working at WIPP
work to the same field guidelines. At WIPP labor is provided through EGG/REECo, standard
cables and gages have been pre-qualified for use in the testing program. Field installation activities
will be similar at YMP where REECo will provide underground drilling and equipment installation
crews.

Limited data analysis facilities are available on-site at WIPP. Recorded gage measurements can be
plotted using programs available on the Mod Comp control computer to show the absolute
measurement vs time or trends.
Discussion:

- A major concern for YMP is that all of the installed instruments have an adequate calibration documentation and/or be calibrated to correct standards using appropriate procedures.
- WIPP uses reference gages not installed in the test, but in similar conditions to evaluate the long term calibration of inaccessible gages by inference.
- At YMP there may be substantial manually entered data that needs to be verified. WIPP has not viewed manually entered data as a cause for concern since it represents such a small fraction of the data collected.
- Mains power quality at WIPP has never been very good since the site is at the end of a distribution feeder servicing other industrial users in the area. Power quality has actually deteriorated over the years as new industries develop in the area and the WIPP site development continues. The worst problems experienced are during active mining operations. The data acquisition system does not use isolated feeders, although a separate backup power generator services the data acquisition system and computer. It is important to evaluate the data acquisition power needs for the life of the project during the design phase to ensure adequate power is allocated to data acquisition and that it meets overall system requirements.

Presentation by Ray Carrasco (WIPP, Westinghouse)

Westinghouse operates two independent data acquisition systems separate from the testing program. One system provides mining construction monitoring to evaluate geotechnical and test operational safety conditions. The second system monitors fire and mine safety related items. The construction monitoring system is made up of individual data collection units located in the area of interest and directly wired to gages. Each data collection unit continuously gathers data according to a pre-programmed schedule. At periodic intervals, technicians download each unit's data into a computer connected to the unit. This data is used in the Westinghouse field office for analysis and review. This approach has proven to be reliable, effective in meeting changes in underground conditions, and adequate for the data monitoring requirements. Manual data is recorded on an instrument field installation sheet and/or an instrument field data sheet. These sheets provide a uniform and understandable format for all manual data. The central fire and mine safety monitoring system uses a central computer connected to fire, radiation, and ventilation sensors located throughout the facility. The capabilities of this commercial system are specifically designed for mine safety. This specialization of purpose is preserved by keeping it completely dedicated to mine safety and separate from other underground data monitoring systems.

Presentation by Kanaan Hanna (USBM)

My notes failed here!!
Presentation by Larry Costin (YMP, SNL)
Larry Costin described the laborious YMP test approval process that each PI must go through to qualify their test for implementation and support. Each specific Test Plan must be approved by the Project Office (DOE). After Test Plan approval and near the time that the test is to start the LANL Test Coordinator’s Office writes two field activity control documents for the test; a Test Planning Package describing the overall field activities and a Job Package describing the specific activities required to install the test. As part of the test planning and approval process, analysis are performed to identify and approve proposed uses of impactive tracers, fluids, and materials (ITMs), test-to-test interference impacts, test-to-facility impacts, health and safety issues, and biological impacts. All of these issues lead to increased controls on the testing activity that are beyond PI control causing potential delays and frustration. SNL maintains a test database using the Ingres database application for YMP data. Current planning is to use the program ArchInfo as a data manipulation front end to access test data files and YMP GIS 2-dimensional map coordinates to generate plan view reports on instrument locations. Planned test data reports will contain data tables, graphs, and maps. An issue for PIs is whether the planned YMP implementation of test data storage in the YMP Technical Data Base (TDB) can identify and control data that was placed there with good intentions but later identified as bad data.

General Discussion
- DOE sets YMP testing priorities. The LANL TCO is involved in negotiating specific test priorities based on their overview of the testing program and knowledge of the field work.
- WIPP strongly recommended that all underground cables meet MSHA requirements. The YMP is currently exempt from MSHA regulation and inspection, however, the MSHA cable specifications are very important in minimizing poisonous gas formation during a fire from burning cable insulation and will help to reduce underground personnel risk.
- Gage maintenance is significantly aided by on-line computer diagnostics run on a routine schedule for evaluating gage condition. WIPP has established a procedure for identifying a failed component and flagging the operator. Once the component is identified, failure evaluation follows a QA procedure for determining an actual failure, replacement where possible, noting changes to the system, and other supporting activities.

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Ron:

Here is some promotional material regarding the new Paradox for Windows. It looks fabulous. The presentation last night was very impressive and exciting. All of the shortcomings of Paradox 4.0 have been overcome. This product can now deliver beautiful reports (to rival any Macintosh application like Filemaker Pro) and is more flexible than ever. I strongly recommend you consider Paradox for Windows for your JP/TPP database. The only concern with Paradox for Windows is that you must run it with MS Windows. If you anticipate using your database on machines without Windows or without sufficient processor speed or RAM to support Windows, this is not the product to use.
From: Jim Hall  
To: Hemi Kalia  
Subject: CAG Report 93-02, Draft TCO Field Testing Data Coordination Strategy

Attached is a preliminary rough draft of the CAG report describing a proposed approach to the TCO data coordination task. This report is a direct result of our general discussion meeting held on Fri, Feb 12, 1993 in the LANL TCO conference room. This report is not meant to be a discussion of the rationale or merits of the TCO management decision to develop this activity. Our intent was to provide alternatives for accomplishing the target task and an assessment of the value to the project of each identified approach.

From our perspective the strongest option for LANL and the most valuable to the DOE is one based on a direct mandate from DOE for LANL to provide independent test data technical assessment, directly reporting to DOE with the work covered by LANL's QA program. For LANL to pursue this approach there would need to be a buy-in from the DOE and the LANL TPO identifying LANL resources for this task. LANL would have to fully define their technical assessment goals, plans, and policies, and WBS and budget impacts for DOE approval. This would also involve definition of LANL internal responsibilities and resource allocation and LANL responsibilities to DOE and other participants. Implementing these plans would require MOUs or Project Office directives to participants identifying LANL's role, responsibilities, and interfaces with each participant.

The Feb 12 meeting consensus identified a less powerful role for LANL, similar to the DOE supported technical assessment described above but consisting of independent test data technical oversight not linked to any QA program role. In practice the consensus identified approach is substantially different from the same activity under QA control and working directly for DOE. In our opinion, this approach has little benefit for LANL or DOE and should not be implemented. We perceive that a “no QA role” technical assessment would duplicate, at least a part of, other participant QA controlled effort, without a QA role LANL has no power to bring recommendations
to a DOE forum for serious consideration, DOE implementation of LANL recommendations relies on personal sales efforts and influence by TCO staff, is similar to other participants kibitzing and attempting to manipulate project policy without a formal mandate, offers little value to the project, is not cost effective in TCO budget or resources, and should not be pursued. These issues are covered in Section 1 and 2 of the report.

In keeping with the TCO request to describe a program for implementing test data coordination based on the Feb 12 meeting consensus, we have prepared some preliminary descriptions of how such a program might work in Sections 3-5 of the report. These descriptions are base on the option described in Section 2.4 (no QA), are meant to be preliminary, and are presented for discussion to build a final task description. The activities shown would apply to all four options described in Section 2 with other option implementations including the addition of QA controls. In developing this task it became clear that the Field Test Coordinator is the key staff member functionally central to this activity. Although the target task is data coordination, the broad scope of this task touches on many related activities surrounding the duties of the Field Test Coordinator and the TCO staff supporting his activities. Organizational comments in the report are not intended to define TCO policy. They are included to illustrate reporting relationships that are important to understanding our present view of the data coordination task scope and function and may require considerable revision to meet final TCO goals and/or constraints.

Attachment: CAG Report 93-02, 14 pgs.

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Yucca Mountain Project
TEST COORDINATION OFFICE (TCO)

DRAFT
TCO
FIELD TESTING
DATA COORDINATION
STRATEGY

Revision 0.1

Prepared By

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1.0 Summary

As part of the DOE direction to LANL for test coordination LANL has evaluated several options for test data technical oversight. The option described in Section 2.4 has been selected as the operating premise in which LANL will provide ESF test data coordination consisting of participation in planning and field oversight of participant data monitoring as outlined in Figure 1. Pre-test planning will encompass all test data impactive issues including IDS oversight, development of participant data monitoring requirements, and evaluation of general test data integrity issues. Although substantial planning for each test will have been completed before the activity reaches the field, unanticipated problems may arise that impact data gathering activities. LANL field engineering personnel, representing the full set of test activities, will be on hand to assist participants work through solutions to correct the effected data monitoring activities as needed. In the case that the data impacting problem cannot be resolved using normal test coordination processes, LANL will refer the matter to the M&O and/or DOE as an informational advisory for corrective action. Periodic TCO field test coordination reports will be issued including data coordination activities.
Figure 1 – TCO Data Coordination Overview

**ESF Data Acquisition Activities**
- Participant Test Planning
- Participant Data Management
- IDS Development & Operation
- Construction Monitoring
- IDS Data Acquisition
- Non-IDS Data Collection
- TFM Data Collection

**TCO Data & Testing Summary Reports**
- Monitor participant data acquisition plans and field work
- Work with participant to correct problem

**LANL TCO Data Management**
- Action needed to capture quality data
- Unable to resolve problem with participant

**DOE Manager**

**Field Data & Records**
- Corrective action

**"Raw Data"**

**Participant Data Archive**
- All data records including "raw data"

**Participant RPC**
- Data records derived from "raw data", reviewed by PIs, and approved by participant organization
- "Raw data" records

**Copies of Field Data & Records to Participant PIs**
- Reviewed and accepted field data records

**Pls Process Data & Records**

**Project TDB**

**Project CRF**
2.0 LANL Test Data Technical Oversight as Part of Project QA Programs

There are a number of legitimate technical oversight roles that LANL could perform that would provide benefit for the Project Office involving more or less QA program activities. The overall benefits to the project increase in direct proportion to LANL’s independence of action relative to the M&O. Unfortunately, as LANL’s independence of action increases, M&O control over related QA matters would decrease. LANL’s pursuit of this activity could be interpreted by the M&O as an incursion on their scope-of-work requiring DOE management resolution of responsibilities. To provide the most useful technical oversight input to the corrective process, a QA mandated program is the strongest LANL technical oversight position. Four major options for LANL technical oversight have been identified in order of decreasing usefulness to the project as a whole and are listed below. Acting on anything less than the option described in Section 2.1 below will result in decreased effectiveness in implementing resulting LANL recommendations. Potential cost benefit to the program and utilization of TCO resources must be evaluated prior to adopting any of these options, however, our recommendation is that only options described in Section 2.1 and 2.2 are cost and resource effective and should be the only ones considered for implementation by the TCO.

2.1 Independent Technical Oversight Under DOE

Independent technical oversight, performed under LANL’s own independent management assessment program, auditing program, and/or surveillance (inspection) program, with corrective action referred to the Project Office for resolution with the M&O is the strongest option for LANL. This option gives LANL the greatest amount of freedom of action and has the greatest potential for meaningful input to YMP performance improvements. LANL would be essentially acting as a DOE oversight agent, and in this role LANL would be at least partly insulated from any issues related to M&O acceptance of corrective action responsibility. Potential resistance from the M&O for this option would be best handled by implementing this option as independent management assessments, rather than audits or surveillances. Implementing this option would require assignments of responsibility best formulated in MOUs between LANL, DOE, and the M&O. Significant QA plan or procedure modifications would probably not be required or recommended.

2.2 Independent Technical Oversight Under the M&O

Independent technical oversight, performed under LANL’s own independent management assessment program, auditing program, and/or surveillance (inspection) program, with corrective action referred to the M&O for resolution. This option gives LANL freedom to perform meaningful kinds of oversight evaluations, and is preferable to more restrictive options since LANL would be operating under their own QA program, not under M&O procedures or supervision. The value of this option to the Project Office comes only as a result of M&O willingness to act on LANL recommendations. The alternative is specific direction or requirements from the Project Office to the M&O to consider LANL corrective action requests. Such direction to the M&O could result in resistance to implementing useful actions. Implementing this option would require assignments of responsibility best formulated in MOUs between LANL, DOE, and the M&O. Significant QA plan or procedure modifications would probably not be required or recommended.
2.3 Independent Technical Oversight Linked to the M&O QA Program

Independent technical oversight under linked to the M&O's QA program through participation in the M&O's independent management assessment program, auditing program, and/or surveillance (inspection) program, with the M&O retaining responsibility for training, planning, and corrective action. This is a weak option for LANL since it gives the M&O effective veto power over LANL oversight activities. The M&O would control the procedures used, would lead and/or direct the effort, and would retain ultimate authority over the corrective action process. This option is challenging but not threatening to M&O responsibilities, and although LANL would have a fairly significant role, benefit would accrue to the project only if the M&O recognized LANL as a valuable technical resource, placed a real value on their input, and, most importantly, were willing to act positively on LANL recommendations. The alternative is specific direction or requirements from the Project Office to the M&O to respond to LANL input. If such direction to the M&O resulted in resistance to acting on LANL input all value to the project is lost. Implementing this option would require assignments of responsibility best formulated in MOUs between LANL, DOE, and the M&O. QA plan or procedure modifications would probably not be required or recommended.

2.4 Independent Technical Oversight Not Linked to Any QA Program Role

Independent technical oversight not linked to any QA program role is probably the least effective option and the weakest LANL option for bringing benefit to the program. Any benefits to the project from yet another external oversight would likely be offset by confusion over responsibilities for corrective action. An “uncontrolled” oversight process would probably overlap the management assessment, surveillance (inspection), and/or auditing programs that should already exist or will soon be implemented by the M&O and/or other participants. This option would require some kind of planning or procedure development effort even if it is not part of the formal LANL QA program. Implementing this option would require assignments of responsibility best formulated in MOUs between LANL, DOE, and the M&O.

It should be noted that this is the current option being used by the TCO for test data coordination. Without formal involvement in QA processes this option has no inherent strength. Its strength comes from a commitment by TCO management to pursue these activities and convince (sell?) the M&O and/or DOE on implementing LANL TCO management recommendations. In the case of resistance or opposition from the M&O or other participants, TCO management would be in the position of convincing DOE to adopt their positions over others that may be officially mandated by their own QA programs and scope-of-work to be the responsible implementers. This approach seems unlikely to succeed in the case of controversial TCO recommendations which is probably where TCO recommendations will be most valuable.
3.0 TCO Data Coordination

The TCO data coordination activities described in Section 3, 4, and 5 of this report are based on the TCO adopting the management option described in Section 2.4 Independent Technical Oversight Not Linked To Any QA Program Role and is managed as a QA N/A task.

3.1 DOE Strategies Impacting TCO Data Coordination

Current Project Office test data management strategies include the following items that impact LANL planning for test data coordination:

- Test “raw data” will not be stored in active DOE databases. All “raw data” will be stored in participant archives in the original physical format (i.e., tape, notebook, photograph).
- Only processed data records, inspected and approved by the participant organization, will be stored in the TDB.
- All test data records in DOE data management and data archive systems will be identified by TDIF number. If a particular data record part of a record “set” each record package will have additional TDIF cross-reference(s) relating all data packages in the “set”.
- “Raw data” will move from the field to the participant test Records Processing Center (RPC) without interaction with other participants or DOE.
- There will exist a mechanism at the participant RPC allowing semi-automatic transfer to the DOE CRF of a duplicate of all incoming test data. The physical format of the data transferred to the CRF may have to be changed from the original “native” format to printed-on-paper based records to allow the CRF meet current requirements that they maintain a copy of all of their archived materials on microfiche.

3.2 TCO Data Coordination Goals

The primary activities of the LANL data coordination task are shown in Figure 1 and listed below with a brief description:

3.2.1 Pre-Test Planning
Review planned data monitoring activities and check participant readiness.

3.2.2 Integrated Data System (IDS) Oversight
Review IDS availability to meet testing schedule requirements.

3.2.3 Field Data Monitoring Problems
Provide participant field assistance as needed to help resolve data collection problems.

3.2.4 Unresolved Data Collection Problems
Track unresolved data collection issues with an advisory report to Project Office staff.

3.2.5 Unplanned Data Collection
Track unplanned data collection activities to check that the data items are included in the appropriate participant test data archive.
3.3 Restraints on LANL Data Coordination Activities

3.3.1 TCO Not Involved in Test Data Collection
The LANL TCO scope-of-work and WBS categories do not include direction nor identification of task(s) to collect or archive data.

3.3.2 IDS Data Distribution
When LANL managed the IDS effort directly, LANL was also identified as the IDS data manager. Consistent with other recommendations in this report, we recommend that the IDS operator provide a very simple IDS data management function of archiving all IDS data locally at the IDS as described in the current IDS Functional Requirements Document (FRD). The operator would periodically (on a PI designated schedule) distribute participant data packages with an exact copy to the Project Office Central Records Facility (CRF). Based on current IDS design concepts, this would be a highly automated process appropriate to IDS operations and not part of other M&O, participant, or Project Office data management or related activities.

4.0 TCO Data Coordination Activities

4.1 General Description
To provide support for the ESF test program, the LANL TCO will review participant data collection planning against a test planning checklist prior to the start of field testing activities. As testing moves to the field, the TCO will continue to work with participant field personnel as needed to support field data collection activities to produce expected, quality data.

4.2 Staff Responsibilities
IDS staff matrix management organization is shown in Figure 2. The functional management organization for the data coordination team necessary to support Field Test Coordinator activities are shown in Figure 3. Data coordination duties for key TCO staff member participating in this activity are summarized below:

4.2.1 Field Test Coordinator
The Field Test Coordinator (FTC) will act and report on participant field activities related to in-progress test planning packages and field testing activities as follows:

- Direct the Field Test Engineer.
- Report participant and subcontractor data collection activities including unusual or impactive data collection events.
- Assist Field Test Engineer, working with participants, to resolve field data collection issues as appropriate.
- Report unresolvable data collection problems for DOE management action.
Figure 2
TCO Data Coordination Matrix
Organization Chart

Figure 3
TCO Data Coordination Functional Organization Chart
4.2.2 Field Test Engineer

The Field Test Engineer (FTE) will act and report to the TCO Field Test Coordinator on participant field data collection as follows:

- Observe participant and subcontractor data collection activities.
- Observe IDS operation and maintenance performance.
- Report summary observations of participant and subcontractor data collection activities.
- Assist participants to resolve field data collection issues as appropriate.
- Report unusual or impactive data collection events.
- Report unresolvable data collection problems for FTC action.

4.2.3 Test Data Coordinator

The Test Data Coordinator (TDC) will report to the TCO Field Test Coordinator on items related to in-progress test planning packages and field testing activities as follows:

- Informal preparedness review of participant test plans and supporting QA plans and procedures for ESF data collection and archiving.
- Report on the disposition of unplanned data collected as part of the ESF test and monitoring activities.
- Report on data management impacts of unusual ESF data collection activities and make remedial recommendations as needed.

4.2.4 IDS Coordinator

The IDS Coordinator will report to the TCO Field Test Coordinator on items related to in-progress test planning packages and field testing activities as follows:

- Changes in participant IDS requirements as testing plans are finalized.
- Informal preparedness review of participant furnished data acquisition equipment.
- IDS planning schedules and anticipated readiness effecting current tests.
- IDS deficiencies that impact current test plans.
- IDS production and installation schedules supporting testing schedules.

4.3 Data Coordination Activities

4.3.1 Field Test Coordinator

The Field Test Coordinator (FTC) will have principal responsibility for the data coordination activity. The FTC will work with Test Data Coordinator (TDC), the IDS Coordinator, and Field Test Engineer(s), (see Figure 4) who will provide review, observation, coordination, and reporting assistance to the FTC on ESF data collection and data item disposition issues. The FTC will coordinate and merge reports from supporting staff in the TCO and the field to generate management reports covering data coordination activities, unusual events, data collection preparedness and/or field problems, problem resolution, and anticipated activities.
Review Test Plans
- Review data management plans & procedures
- Review non-IDS data monitoring methods
- Verify IDS requirements & planned availability
- Verify TFM records processing

Monitor Test Plan implementation
- Monitor data acquisition methods
- Monitor non-IDS data monitoring methods
- Verify IDS schedules and configuration
- Verify IDS data acquisition processes
- Verify TFM records processing & transfer to TCO

Monitor Test Plan conformance
- Monitor on-going data acquisition methods
- Monitor non-IDS data monitoring methods
- Verify on-going IDS performance
- Verify on-going IDS data acquisition processes
- Verify TFM records processing & transfer to TCO

 IDS Coordinator
 TFM Data Coordinator

Field Test Coordinator

* Test Data Coordinator
* IDS Coordinator
* TFM Data Coordinator

Trough all phases of data collection

Monitor Participant Data Collection Plans

Activity moves to the field

Monitor Participant Field Preparation for Data Collection

Preparation completed

ESF Data Collection

Data & records

Participant Field Personnal Control Field Data & Records

Data & records moved to participant site

"Raw data" records

Approved records

TFM as-built records

TCO TFM Database

Project TDB

Project CRF

Data Monitoring Activity Reports

Planning, information & reports

Test Planning Packages

Formatted field & office data reporting items

Field Testing Database

Test Summary Reports

Problems with data collection

Work with participant to correct problem

Action Needed to Capture Quality Data

Unable to resolve problem with participant

DOE Manager

Corrective action

Participant TPO & PIs

Participant RPC

Data & records

"Raw data" records

Approved records

TFM as-built records

TCO TFM Database

Project TDB

Project CRF
4.3.2 Field Test Engineer
During the field phase of the activity, Field Test Engineer(s) will monitor data collection activities to observe first hand that data is collected as described in the participant and TCO test planning planning documents and subsequently processed into participant archives (see Figure 5). It will be particularly important that the Field Test Engineer closely monitor specific data collection activities to identify data collection activities not covered under existing plans and assist participant organizations to identify and retain this data and move it to their participant test data archive.

4.3.3 Test Data Coordinator
The Test Data Coordinator will provide review and assessment information on participant data collection activities to the FTC (see Figure 6). This information will be developed primarily from review of participant planning and supporting documents. The purpose of these reviews is to provide verification that data collection planning and other related data issues are completed before planned field test activities are started.

4.3.4 IDS Coordinator
The IDS Coordinator will provide review and assessment information on IDS readiness to support planned participant data collection activities to the FTC (see Figure 6). This information will be developed primarily from review of IDS design, planning, procurement, and supporting documents and monitoring of IDS design support of participant test requirements. Critical assessment of the success of the IDS design will be early, successful acceptance testing of the final IDS products in a timely manner that will allow participant evaluation of IDS usefulness.

5.0 Reports

5.1 Reporting Responsibility
Primary reporting on data coordination will be performed by the Field Test Coordinator as part of periodic field test coordination reports. These FTC generated reports will be supported by status and summary reports from the supporting team staff. The schedule for these reports is TDB.

5.2 Field Test Database (FTDB)
To reduce the personnel overhead for publishing these reports and provide timely information it will be the TCO goal that all reporting information be stored in a field test database (FTDB) equipped with an automated report generator for rapid production and consistent format.

5.3 Schedule for a Preliminary FTDB
A primary goal for FY93 will be to complete the requirements, preliminary design, and documentation of this database and implement a preliminary FTDB for testing and evaluation.
Figure 5 – Field Test Engineer

Field Test Engineer

- Works with participant to resolve problem

1st level data collection problem

- Unable to resolve field problem
- Field data collection problem
- Problem Advisory

Participant Field Preparation for Data Collection

2nd level data collection problem

Immediate assistance required to resolve data collection problem

Field Test Coordinator

Monitor Participant Field Preparation for Data Collection

Summary Reports

Test Data Coordinator

IDS Coordinator

Data Collection Problem Identification and Recommendations

DOE Manager
Figure 6 – Test Data Coordinator

- Review Test Plans
  - Review data management plans & procedures
  - Review non-IDS data monitoring methods
  - Verify IDS requirements & planned availability

- Review on-going data acquisition methods
  - Verify IDS schedules and configuration
  - Verify IDS data acquisition processes

- Review on-going IDS performance
- Review on-going IDS data acquisition processes

Data Coordination Summary Reports
- Includes test data information related to test planning and field testing activities

- Test Planning Packages
- Field Test Coordinator
- Test Summary Reports
- Data Coordination Input to Test Planning
- ESF Data Collection
  - Preparation completed
  - Monitor Participant Field Preparation for Data Collection
  - Activity moves to the field
  - Monitor Participant Data Collection Plans

- Test Data Coordinator
LANL TCO TFM Database Draft Description

1.0 Database Users

The LANL TCO TFM DB is designed to assist three primary user groups: 1) LANL personnel and primary investigators, 2) persons responsible for the analysis and approval/disapproval of TFM application requests, 3) the TFM DB Administrator. These three groups will use the TFM DB for different purposes and will have different access privileges as appropriate for maintaining the integrity of the database.

Level 1 Users: General LANL personnel and primary investigators —
This group will have complete read-only access privileges to the database. No Edit, Add, Delete, or Review menu options will be accessible to this group. If a Level 1 user finds an error in the database, wishes to add information to the database, or believes information should be removed from the database, request for the change must be submitted in writing to the DB Administrator. A written disposition of such requests will be returned to requestors once the request has been reviewed and appropriate action taken.

Level 1 users are anticipated to use the database for the following purposes:
1) Lookup TFM for global approval, restriction, and usage information.
2) Lookup project and test package TFM information.
3) Lookup TFM for name or ID# used in database.
4) Lookup TFMs in a particular category or referred to by a particular alias.
5) Lookup a borehole, common name location, or N/E coordinate for TFM information.

Many of these queries may be made in order to develop a TFM User Request form without violating naming conventions or global usage restrictions.

Level 2 Users: Persons responsible for the analysis and approval/disapproval of TFM application requests —
This group will have complete read-only access privileges to the database. In addition, these users will have limited editing privileges: While all Add, Edit, and Delete menu options will be disabled, these users will have access to Review menu options. Review menu options will apply only to TFM User Requests. In Review mode, analysts will be able to edit analyst related TFM application request fields such as Analyst (name of analyst reviewing request), Request status (approved, denied, pending), Status date (date decision was rendered), and Status remarks (comments regarding the analyst’s decision on a TFM application request). Although analysts will be responsible for providing global usage approvals and usage restrictions for specific TFMs, like Level 1 users, Level 2 users will submit such information in writing to the DB Administrator.
Level 2 users are anticipated to use the database for the following purposes:
1) Review specific TFM application requests included in TFM User Request forms.
2) Lookup TFM usages within ranges of boreholes and other TFM application locations.
3) Examine MSDS and other characteristics related to TFMs.
4) Consider proximities and concentrations of TFM applications.
5) Establish some global TFM usage restrictions/freedoms.

Level 3 Users: TFM DB Administrator —
This individual will have complete read and write access privileges to the database. All menu options and database application functions will be accessible and operable for this user. The DB Administrator will be the person responsible for maintaining the integrity of the database by screening all change requests, forwarding such requests to other persons for inspection when appropriate, making all changes to the database personally, and responding in writing to change requestors with disposition information. The DB Administrator will also be responsible for creating new user accounts, assigning passwords, and granting/denying user access privileges.

2.0 Database Architecture

Data Captured:
The LANL TCO TFM DB is a relational database capable of capturing and interrelating information about nine entity sets or things: Applications, Documents, Locations, TFMs, Persons, Classifications, MSDSs, Aliases, and Organizations.

Applications are specific instances of a particular TFM being applied to the YMP site (i.e. on Feb. 3, 1993, 500,000 gallons of went into borehole xyz).

Documents are TFM User Request forms, Test Planning Packages, Job Packages, memos, and any other documents pertinent to specific TFM applications. The type of document, identification number, description, author, submittal number, date, related TFM application requests (for TFM User Requests), and parent (i.e. for a TFM User Request form, the TPP or Job Package under whose umbrella the request is made) are all captured.

Locations are three-dimensional surface coordinates (N, E, and elevation). Each coordinate captured may have an associated borehole (about which ID#, DIP, DIP direction, and length are all captured) and common name (like North Portal).

TFMs are tracers, fluids, and materials. The classification (logical TFM type or grouping), characteristics (TFM_notes), unit of measure (Unit_type), global quantity approved for use, total amount used on the site, and total range requested for use on the site, and alternative names or aliases are all captured or calculated.

Persons are users of the database, authors of documents, analysts, and anyone about whom the DB Administrator feels it is appropriate to capture information such as name, phone, and organizational affiliation.

Classifications are logical groupings of TFMs.
MSDSs are Materials Safety Data Sheet data obtained from LANL and other approved sources.Aliases are alternative names by which TFMs are known.**Organizations** captured are those with which Persons are affiliated and any others the DB Administrator feels are appropriate for inclusion in the TFM DB.

These entity sets and data attributes included in each are detailed in the attached Data Dictionary and illustrated in the LANL TCO TFM DB ERD.

**Data Relationships:**
Relationships between these nine entity sets are illustrated by the LANL TCO TFM DB ERD (entity relationship diagram) attached. An ERD describes the static relationship between data about different things or entities. Boxes represent entities and lines represent relationships.

The relationships described by the attached LANL TCO TFM DB ERD are as follows:

1) For each TFM Application, there can be only one Location (Remember, Location is a surface position. While an application may be underground and within a linear positional range (all captured information), it will correspond to only one surface Location).
2) For each Location, there can be many TFM Applications.
3) For each Application, there can be only one TFM (an Application is the use of ONE TFM).
4) For each TFM, there can be many Applications (water can be used many times).
5) For each TFM, there can be only one Classification.
6) For each Classification, there can be many TFMs.
7) For each TFM, there can be only one MSDS.
8) For each MSDS, there can be only one TFM.
9) For each Person, there can be only one Organization.
10) For each Organization, there can be many Persons.
11) For each Document, there can be only one Person.
12) For each Person, there can be many Documents.
13) For each Application, there can be many Documents.
14) For each Document, there can be many Applications.
15) For each TFM, there can be many Aliases.
16) For each Alias, there can be many TFMs.

Inferences can be made from these relationships as well. On the ERD, Applications is related to **Related_documents**, Related_documents is related to **Documents**, Documents is related to **Persons**, and **Persons** is related to Organizations. If follows then that Applications is related to Organizations. This means that, given a TFM Application, the database knows the Organization affiliation of the person requesting that TFM Application.
Possible Queries:
The database architecture facilitates an enormous set of queries or questions users may ask about the data. A few examples of queries different user may find useful are as follows:

1) What are all the TFMs in the database? Show them to be by name, alias, category, and ID#.
2) What are the characteristics and MSDS information about a TFM?
3) What are all the TFMs in a specific Category which have been applied to a three-dimensional location range?
4) How much of a specific TFM has been applied to a specific borehole?
5) Is a TFM globally approved for use? Are there any global restrictions on its use?
6) Who requested a specific TFM Application and what TPP or Job Package was it for?
7) What other TFMs were requested with this one?
8) What other TFMs have been applied to the location where this one was applied?
9) By what other names is this TFM known?
10) Who approved/disapproved this TFM Application request, when, and why?

User Interface:
The way in which users will ask questions of the TFM DB will be through the use of an intuitive user interface. The menu structure of this interface and a few examples of user screens are attached.
Summary
A scheduled meeting was held on Thu, Feb 4, 1993 to discuss LANL TCO policy issues relating to support of M&O IDS design effort, TCO support of IDS for test data acquisition, and TCO support for testing data management including IDS and other test data and records. The object of the meeting was to formulate preliminary strategies in one or more of these areas. The discussion centered primarily on the SNL Starter Tunnel construction monitoring test and TCO test data management issues. Preliminary IDS and data management positions were outlined in a handout.

Action items:
1. The TCO must develop a comprehensive test data management strategy
2. The TCO must work with SNL to integrate the M&O IDS into the Starter Tunnel construction monitor test

Comments
The discussion of TCO support for M&O IDS activities resulted in the following observations:

- **N Elkins:** The TCO should continue to support IDS as part of LANL’s participant test program support. LANL’s primary goal is to ensure that data acquisition is available in a timely manner for each scheduled test. IDS is the primary responsibility of the M&O. The TCO should provide limited support for M&O IDS design efforts concentrating LANL resources on specific testing related issues such as electronic data formats, IDS/TCO test data management interface, and IDS availability to meet testing schedules. The TCO must monitor M&O IDS design and procurement tasks to the extent necessary to provide credible advice to participants on whether to rely on IDS or build their own data acquisition systems (organizational computers). If organizational computers (OCs) are fielded by participants, these OCs might be connected to an IDS available at some later date, however, IDS may not be needed if data management practices have established satisfactory data flow to participants and the Project Office. It is much more important for TCO resources to be...
directed to developing the TCO’s data management strategies and plans than providing
intensive help to the M&O at this time.

- **H Kalia:** IDS is a fundamental part of the Project Office commitment to the testing
  program and the project DR specifies that there shall be an IDS. This is the course that TCO
  IDS managers has been following up the present. Participant controlled OCs are a
  disruptive and uncontrolled (under the IDS umbrella) elements of IDS and should not be
  encouraged as an alternative to IDS, only as an alternative to complete failure of the IDS
design and procurement activity. A TCO perception of IDS problems serious enough to
impact testing schedules should be communicated to DOE for intervention with the M&O to
bring IDS back on track in time to meet testing schedules. Since DOE originated the IDS
requirement they must be the one to rescind the IDS requirement and direct participants to
field OCs. The TCO should continue to provide assistance to the M&O IDS team to be sure
they get started correctly in supporting testing needs. In cooperation with the M&O, the
TCO should attempt to reduce the amount of detailed functional requirements supplied to
the M&O. As an alternative the TCO should develop the M&O IDS-LANL-Participant
interface to allow the M&O to develop detail requirements through direct contact with PIs
with TCO oversight. The TCO should continue to review documents, plans, interface
activities, procurement specifications, vendor progress, acceptance testing, facilities and
installation planning, and field activities to ensure that participant testing requirements have
been met and that IDS will be available to support each test as needed. These activities go
beyond the schedule related events detailed in test planning documents, since TCO IDS
personnel will be making long range estimates of IDS readiness and effectiveness that that
will impact TCO data acquisition related recommendations to DOE.

- **J Hall:** The TCO has to have a single, well understood strategy for IDS and test data
  management. Without redirection, IDS policies from FY91/92 and current DOE design
documents and plans are the drivers for the TCO/M&O IDS interface modified by currently
funded TCO WBS categories and PACs applying to IDS. IDS test data management has
been applied to well understood (by IDS practioners) but narrow category of electronic
records output from the IDS archive. Broadening the scope of TCO test data management
to include other data and records will require development of new TCO goals and policies
in cooperation with PIs and DOE. Reviews of existing project data management practices
has made it clear that LANL is not currently identified in participant data flow to their own
LRFs or the CRF. There are no missing high-level elements of data flow from participants
to DOE. There are certain details that could be potential problems affecting the
completeness of DOE records for ALL test and construction activities. To become a part
of the test data management activities, supplemental to identified IDS data management,
LANL must develop the schema and justify their activities as part of convincing the PIs and
DOE that such an effort is needed and justified.
As the discussion progressed it was clear that, in addition to the test data management issue, several issues need further clarification:

1. To what extent should LANL support M&O development of the mine safety IDS?
2. To what extent should LANL support M&O involvement in the SNL Starter Tunnel construction monitoring test?
3. To what extent should LANL support M&O construction related data acquisition?
4. What will be the criteria for TCO support of IDS vs independent participant development of their own data acquisition capability?
5. How will the TCO monitor and evaluate IDS readiness for scheduled tests?

Test data management discussions centered around the point that LANL must ensure on-time data acquisition availability for each scheduled test and provide needed data management functions to support “raw data” availability to DOE. Points to confirm or for further development and/or action include the following:

1. Does LANL manage test data? Yes, however, the TCO role in test data management beyond IDS is not defined.
2. PIs now have a complete test data management process.
3. The TCO has identified a potential problem in timely transfer of participant “raw data” to the CRF. LANL needs to recommend that the DOE establish a policy for ALL participants to submit “raw data” to the CRF in a timely manner (e.g. within 2 weeks).
4. The TCO has in place or will develop the following data management items:
   4.1 provide test data tracking provisions in test plans
   4.2 provide criteria for test data tracking and special LANL test data management issues in test plans
   4.3 TCO provides field personnel with responsibility for test data acquisition monitoring with special emphasis on monitoring PI activities in the following areas:
      4.3.1. ensure that data acquisition activities performed according to test planning packages and LANL criteria
      4.3.2. identify PI data acquisition and data management problems and assist the PI in resolving these problems and needed changes in their field program
      4.3.3. monitor or perform IDS data transfers to the CRF

In addition it is important for the TCO to begin working with the participants to develop standardized data formats (and associated issues) for all types of test data to help maintain a uniform basis for recognizing and accessing data from each participant.
Test Data Flow Demonstrating the Proposed LANL Data Management Role

This diagram resulted from considerations of how test data will flow from the test activity to participant PIs and project databases and CRF. The current TCO concept of LANL test data management functional activity is shown as a starting place for further discussions.

Cy: N Elkins, LANL, EES-13/LV, MS 527
J Canepa, LANL, EES-13, MS J521
EES-13/LV, LANL, MS 527
CAG Files, Carlton, OR
To: Chris Breeds
From: Gillian Hall
Date: January 24, 1993
Re: LANL TCO TFMDB

I have continued work on the database design and have produced the attached revised ERD and data dictionary. Your FAX of Jan 18, 1993 introduced several new issues not covered by the original database design, and while I have integrated some, I have questions about others as follows:

1) You mentioned the need to capture “key TFM properties and characteristics” which might be represented as “single values”, “equations or tables”. My suggestion for handling this requirement is the provision of a memo field into which any amount of data may be entered (i.e. a single value up to a large table). The limitation of this solution is that no searches may be conducted on a value in the memo field. If this limitation is acceptable, the memo field solution is the simplest and most easily implemented.

2) You discussed the need to “retrieve descriptions of spatial changes to in-situ conditions”. We need to discuss this issue at greater length. I feel it may be beyond the scope of our database since the M&O is apparently conducting extensive impact analyses for their own database to which our analysts will have access.

3) The issue of downloading “geologic and hydrogeologic data” from GENISES will also require further discussion. How would this data be used? How would it be related to the data we are already capturing with the existing database model? Are you proposing that a positional query might be made for geologic and hydrogeologic characteristics?

4) We discussed the facility to report all TFM residing within a given range of a given position. This is built-in to the current database design and is limited to a cube-shaped range. Facilitating radius, sphere, cylinder, etc. range queries will be much more difficult. Will these additional geometric shapes provide added utility to analysts which outweighs the difficulty (cost) of providing them?

5) Finally, we discussed the idea of calculating a “range-of-influence” for a TFM application as a function of the TFM, the amount used, and the position of the application. I have two thoughts
Regarding this facility. First, if geologic and hydrogeologic data are integrated into the system (#3), the calculation of "range-of-influence" becomes a very complex modeling problem the results of which may not be reliable. Second, because of the difficulties involved in generating a reliable "range-of-influence" even without the complication of geologic and hydrogeologic data, I suggest we leave such judgements up the analysts by providing the query facility in which the analyst requests all TFMs applied within any cubical range from any given position. This solution, although not as elegant as a modeling solution, will provide only actual data and will relieve us of any responsibility for the provision of questionably reliable data extrapolated from a complex mathematical model.

I was finally able to reach Bill Hargraves in the HS5 group in Los Alamos regarding the MSDS database. He is more than willing to help and is sending a complete list of all materials catalogued in the MSDS database (about 14,000) on diskette. When we isolate a subset of these for use in our database, he will send complete MSDS data for that subset on diskette. This seems very promising. I will not flesh out the MSDS data entity in the TFMDB design until we have received the actual MSDS data on diskette and have determined what attributes are to be captured by our database. I think one important task for us on our next LV trip will be to identify those TFMs on which we want to maintain MSDS data (from the list Hargraves sends). Receipt of the MSDS list from Mr. Hargraves will also provide us (with Ron and maybe Brandstetter) the opportunity to begin development of a list of TFM categories as Ron requested.

An addition you may notice to the ERD is a data entity called Aliases. This comes out of a discussion I had with Jim Hall before I started work on the project. The idea that a user might think of a particular TFM by a trade name or by a name other than the one we decide to use as the primary name in our database seems inevitable. Providing a set of aliases for each TFM may make the system easier to use by facilitating the lookup of TFMs by a variety of names. When an alias is associated with more than one TFM_name (TFM_ID), the user can be presented with a list of the associated TFMs and asked if the desired query is to be conducted using the entire set or a subset of one or more TFMs.

I will send you a more easily understood description of the TFMDB design (textual restatement of the ERD) over the weekend.
From:   Jim Hall  
To:     Hemi Kalia  
Subject:   Preliminary Starter Tunnel Functional Requirements

Summary
Preliminary requirements for the Starter Tunnel mine safety monitoring portion of the IDS have been developed in cooperation with John Peters (M&O MK). A target operational date, data measurement requirements and a minimum data I/O capabilities have been developed. In addition to mine safety monitoring, this initial IDS installation will be used to test and evaluate mine monitoring concepts and IDS field performance issues requiring equipment expansion and configuration modification capabilities. These Starter Tunnel functional requirements will become part of the more comprehensive ESF mine safety functional requirements and will be incorporated into the next revision of the LANL Functional Requirements Document (FRD).

Functional Requirements

1.0 General Requirements
The IDS mine safety system will consist of remote data collection centers in the Starter Tunnel linked to a central computer located in the N Pad area near the N Portal. Basic requirements are as follows:

1.1 Operational date: The mine safety system shall be installed, checked out, and operational on Mon, May 17, 1993

1.2 Location: The permanent location for the primary central computer shall be in the Change House. Temporary housing shall be determined by site construction space limitations, however, the central computer must be located on the N Pad near the N Portal.

1.3 Environmental Controls: The central computer temporary and/or permanent building shall be provided with suitable heating, ventilating, and air conditioning (HVAC).

1.4 Equipment storage: Protected storage for working spares and uninstalled equipment shall be provided in the central computer building or in a convenient location in the N Pad area.

1.5 Power sources: The entire mine safety system shall operate from a single source of mains power. The central computer building shall be provided with a battery powered uninterruptible power supply (UPS) connected exclusively to the mine safety system. This UPS shall be rated to support continued operation of the entire mine safety system after the loss of mains power while supplying a conservative fraction of its full rated load to allow for future expansion of the Starter Tunnel mine safety monitoring activities. The UPS shall provide continuous power for a period of time long enough to allow an orderly shut down of
the central computer (if this shut down is an operational procedure) and sufficient time for site standby generators to come on-line, providing backup mains power to the system.

1.6 Back up mains power: Back up mains power shall supply power to the IDS, building A/C sufficient to keep the central computer operating within rated conditions, and building emergency lighting. Refueling strategies should make this alternate mains power available indefinitely without interruptions of longer than the rating of the IDS UPS.

2.0 Central Computer User Programming Capabilities

The mine safety system central computer shall be capable of being configured by a local operator or by a remote user connected via modem. The central computer user shall have the capability for user programming to develop and/or support the following items:

2.1 Sensors: Select and identify active sensors, measurement range, and engineering unit conversion algorithms.

2.2 Analog input alarms: Set alarm limits associated with each analog input. Each analog input channel shall have two adjustable high and low alarm limits providing two levels of “out of bounds” alarm above and below the set point. There shall be provisions for each alarm limit to control a digital output for external signalling and process control.

2.3 Digital input alarms: Each digital input channel shall be provisions to control a digital output for external signalling and process control.

2.4 Alarm displays: Program the display of alarms on the central computer screen.

2.5 System configuration displays: Construct graphical representations of sensor physical layouts including symbols and text.

2.6 Data display: Display current data on the system configuration displays. Display collected data for operator review.

2.7 Data storage: Store collected data in a local database for operator review awaiting uploading to the main IDS central computer archive database.

2.8 Data storage, display, and printing: Support limited on-line data storage on a hard disk in recognizable files, application program and data backup, modem data transfers, data deletion, and limited data analysis (graphing and trending). The system will include a printer located near the central computer to produce printed copies of screen information and programmed reports.

3.0 System I/O Capabilities

In addition to those capabilities mention above, the system shall provide for the following I/O capabilities:

3.1 Optional auto dialer for alarms: An option for an auto dialing annunciator system with a programmable dial-out phone number and pre-recorded voice message for each digital input
shall be provided. Each dial-out phone number shall have at least two alternate numbers to dial if the annunciator detects a busy signal or no answer on the primary number dial out.

3.2 Modem hardware: High speed (up to 14,400 bps basic rate) telephone line modem(s) with secure remote dial in capability (such as dial back to the originating number and password ID). All remote attempted and successful connections shall be logged in a permanent file.

3.3 Remote operation: Software to support remote operation of the central computer via modem or direct cable link to a local desktop computer. Remote operation via modem will include data downloads and full display selection and screen display of the central computer functions from a remote location on the NTS (FOC), in Las Vegas, or at another location designated by the M&O at a later date.

4.0 Specific I/O Requirements

The hardware and software shall have capabilities for monitoring and controlling 7 digital inputs, 11 digital outputs, and 14 analog inputs (no analog output requirements have been identified at this time). There shall be provisions \geq 30\% spare channel capacity in the installed equipment and provisions for expansion to double system capability. The primary UPS parameter of interest is battery voltage, however, other parameters may be available that could indicate more details of the status and condition of the UPS. The usual mode for comprehensive UPS communication is an RS232 port on the UPS polled by the central computer. Detailed requirements for the preliminary list of I/O functions are listed in Appendix A. As shown in Appendix A, Table 1, Items 1-5 represent two sets ventilation fan controls and Item 18 represents an 8-bit digital output interface to a standard telephone dialer used for emergency signalling.

Cy: N Elkins, LANL, EES-13/LV, MS 527
    J Canepa, LANL, EES-13, MS J521
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
### Appendix A

I/O Details

**Table 1 I/O List**

<table>
<thead>
<tr>
<th>Comment or Measurement</th>
<th>Number</th>
<th>Sensor Type</th>
<th>Chan Type</th>
<th>Sensor Type</th>
<th>Alarm</th>
<th>Accuracy</th>
<th>Resolution</th>
<th>Full Scale</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Safety Air volume</td>
<td>Al 2</td>
<td>Y2a,b</td>
<td>0.5%</td>
<td>5 sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Safety Fan pressure</td>
<td>Al 2</td>
<td>Y2a,b</td>
<td>0.5%</td>
<td>5 sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Control Y1a N/A N/A</td>
<td>Fan on/off (control)</td>
<td>Dry contact</td>
<td>DO 2 1</td>
<td>5 sec</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Safety Fan on/off (sense)</td>
<td>Dry contact</td>
<td>DI 2 1</td>
<td>Y2a</td>
<td>N/A</td>
<td>N/A</td>
<td>5 sec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Safety Fan vibration</td>
<td>Dry contact</td>
<td>DI 2 1</td>
<td>Y2a,b N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>5 sec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Safety Carbon monoxide</td>
<td>Gas concentration</td>
<td>AI 1</td>
<td>X Y2</td>
<td>5%</td>
<td>1 part/FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Safety Carbon dioxide</td>
<td>Gas concentration</td>
<td>Al 1</td>
<td>X Y2</td>
<td>5%</td>
<td>1 part/FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Safety Nitrous oxide</td>
<td>Gas concentration</td>
<td>Al 1</td>
<td>X Y2</td>
<td>5%</td>
<td>1 part/FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Safety Methane</td>
<td>Gas concentration</td>
<td>Al 1</td>
<td>X Y2</td>
<td>5%</td>
<td>1 part/FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Safety Flammable gases</td>
<td>Gas concentration</td>
<td>Al 1</td>
<td>X Y2</td>
<td>5%</td>
<td>1 part/FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Safety Smoke alarm</td>
<td>Air borne articulate</td>
<td>Al 3</td>
<td>X Y2</td>
<td>5%</td>
<td>1 part/FS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Safety Fire-UG pwr center #2</td>
<td>Dry contact</td>
<td>DI 1</td>
<td>1</td>
<td>Y1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Safety Fire-Surf pwr center #1</td>
<td>Dry contact</td>
<td>DI 1</td>
<td>1</td>
<td>Y1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Safety Voltage to tunnel</td>
<td>Dry contact</td>
<td>DI 1</td>
<td>Y1</td>
<td>N/A</td>
<td>N/A</td>
<td>5 sec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Data Total power to tunnel</td>
<td>V-A</td>
<td>AI 1</td>
<td>2</td>
<td>N</td>
<td>0.5%</td>
<td>≥0.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Safety UPS pwr to IDS</td>
<td>UPS battery volts</td>
<td>Al 1</td>
<td>3</td>
<td>Y2</td>
<td>0.5%</td>
<td>≥0.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Safety Trouble horn</td>
<td>Dry contact(s)</td>
<td>DD 1</td>
<td>b,d</td>
<td>N/A</td>
<td>N/A</td>
<td>Sound horn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Safety Auto phone dialer</td>
<td>Dry contact(s)</td>
<td>DD 8</td>
<td>d</td>
<td>N/A</td>
<td>N/A</td>
<td>Dial out</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2 Sensor Details**

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dry contact, Form A, open in fault condition</td>
</tr>
<tr>
<td>2</td>
<td>Low impedance analog output voltage, 0-10VDC, 10VDC full scale</td>
</tr>
<tr>
<td>3</td>
<td>Specified by the IDS designer - dependent on the UPS selected</td>
</tr>
<tr>
<td>X</td>
<td>Proprietary gas concentration sensor</td>
</tr>
</tbody>
</table>
### Table 3 Alarm Logic

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1x</td>
<td>One level of alarm required. The first level results in an alarm associated action, x.</td>
</tr>
<tr>
<td>Y2yz</td>
<td>Two levels of alarm required. Level 1 results in warning action y. Level 2 results in action z.</td>
</tr>
<tr>
<td>Yna</td>
<td>Display alarm on the computer screen only, no other alarms.</td>
</tr>
<tr>
<td>Ynb</td>
<td>Sound a warning horn only in the tunnel and at the changing building.</td>
</tr>
<tr>
<td>Ync</td>
<td>Shut down the associated equipment.</td>
</tr>
<tr>
<td>Ynd</td>
<td>Optional automatic telephone dialer executes preprogrammed dialing sequence. Requires 8 DO channels.</td>
</tr>
<tr>
<td>N</td>
<td>No alarm required</td>
</tr>
</tbody>
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MEMORANDUM

Date: Wed, Jan 20, 1994
From: Jim Hall
To: Ron Oliver
Subject: Recommendations for TFM IBM PC equipment for the TCO

Summary
Included are recommendations for TFM IBM clone PC. I have assumed that an existing letter/legal size LaserJet type printer is available for this task.

Details
CPU
Dell 433/L Ssystem 8MB RAM
UltraScan 15FS color monitor, non-interlaced
230MB hard disk,
Combo 3.5 in and 5.25 in floppy disk drive
Tape back up 250MB w/5 pre-formatted tapes
Fax modem - 9600 baud fax & data (not a 2400 baud modem!!)
Preloaded MS DOS 5.1, Microsoft Windows v3.1, and a mouse

Scanner
Hewlett Packard ScanJet w/HP Accupage software 1200
Sheet feeder option 500

Software
Database Paradox 4.0 - PRE LOADED 510
Utilities PC Tolls 8 - 3.5 in 130
After Dark 2.0 for Windows 30
Communications ProComm Plus for Windows 100
Optical Character Recognition Caere - Omnipage Professional 700
Note - May come bundled with the HP scanner above at a better price
Date: Thu, Jan 14, 1994
From: Jim Hall
To: Ron Oliver
Subject: Recommendations for Apple Macintosh equipment for the TCO

Summary
Included are recommendations for Macintosh equipment to support a new staff member and a laser printer to service a mixed IBM/Mac office.

Details
CPU
Mac IIvx
12MB RAM
240MB hard disk,
CD-ROM drive
Mac extended keyboard, mouse
System 7.1, QuickTime
Cost: 3500

Trackball
CoStar Trackball, platinum
Cost: 90

Backup and offline storage
MO Drive
Ocean Microsystems - Vista V256
Cost: 1800
DGR Technologies - DGR 256 REM
256 MB cartridges - 5 @ $100/ea
Cost: 500

Monitor
16 in color
E-Machines T-16 II (no video card)
Cost: 1300
19 in color
E-Machines T-19 II (no video card)
Cost: 2300

Printer
Mac dedicated
Hewlett Packard LaserJet 4M w/Mac cable
Cost: 3000
Shared
RealTech Laser w/10MB RAM
Cost: 2200

Scanner
U-Max UC-630 w/PhotoShop
Cost: 1200

Software
General
Microsoft Office
Cost: 900
Drawing
Deneba - Canvas
Cost: 300
Graphics
Aldus - FreeHand
Cost: 400
Backup
Dantz - Retrospect
Cost: 150
Communications
MicroPhone Pro
Cost: 250
Word processing
Wordperfect
Cost: 300
Planner
Claris - MacProject Pro
Cost: 400
Database
FileMaker Pro 2.0
Cost: 300
File exchange
DataViz - MacLink Plus/PC 7.0 w/DOS Mounter
Cost: 150
To: Chris Breeds
From: Gillian Hall
Date: January 10, 1993
Re: Design for Tracers, Fluids, and Materials Database for LANL TCO -- TFMDB

Attached is a revised proposal for the TFMDB design presented using an entity relationship diagram (ERD). As we discussed in Las Vegas last week, the boxes represent entity sets (things about which data is collected) and lines represent relationships between entities where arrows represent cardinality (no arrow meaning one and an arrow meaning greater than one). The key symbols in entity boxes indicate the unique identifier for instances of the entity. For example, every instance of Location is uniquely identified by its key of Location_x, Location_y, and Elevation.

The following are a few of the queries facilitated by the design expressed by the attached ERD:

- What TFMs have been applied to a specified location?
- What TFMs are proposed for a specified location?
- What bore holes have been completed?
- What bore holes have been planned?
- What TFMs have been applied or are planned for application in a specified bore hole?
- What is the total amount of a specified TFM which has been requested (range)?
- What is the total amount of a specified TFM which has been used?
- What TFMs are used/requested in a specified TPP, CIP, TFMR, or other document?
- What is the author and date of a specified document?
- At what locations has a specified TFM been applied or is a TFM being requested for use?
- What documents provide information about a specific TFM application (request, use, analysis, disposition, etc.)?
- What documents provide information about a specific TFM or TFM application?
- What documents are authored by a specific person?
- What persons are affiliated with a specific organization?
- With what organization is a specified person affiliated?
- What is the composition of a specified TFM? (This relates to the MSDS for each TFM and many more detailed queries will likely be possible. For now, however, the MSDS entity set has limited attributes due to a lack of information regarding the availability of MSDS data.)
- Has a specified TFM application been approved? If so, are there any limitations or stipulations to the approval?
- Who is the analyst addressing a specific TFM request?
- What TFMs have been given a global approval for use?
- Does a specified TFM application exceed a globally approved maximum quantity for the site?
In support of the M&O IDS design task, LANL must develop a strategy for IDS support for USGS underground testing activities. Early IDS requirements (FY93-94) may include support for the USGS Launch Chamber Radial Borehole Test (RBT) and perched water tests. To ensure that IDS requirements are considered as part of the testing agenda, I suggest that an IDS representative (J. Hall) participate in TCO/USGS meetings where testing issues possibly related to IDS will be discussed.

IDS needs additional information on the following specific issues for each test:

1. Identify each test activity to be supported and its location in the ESF.
2. Describe the planned equipment configuration for each test.
3. Provide a complete description of each IDS measurement, data item, and equipment interface.
4. Note the required IDS availability at the start of each test.
5. Describe an acceptable interim data gathering plan if IDS is unavailable at the start of testing.
6. Provide a trade-off summary of early vs. late availability if appropriate.

Cc: N. Elkins, LANL, EES-13/LV, MS 527
    R. Oliver, LANL, EES-13/LV, MS 527
    EES-13/LV, LANL, MS 527
    CAG Files, Carlton, OR
To: Hemi Kalia  
From: Jim Hall  
Subject: Fluor Daniel IDS Management Issues

After your review and consideration of this document I recommend that you forward a copy or a TCO memo containing the write-up to Kumar Gidwani with a copy to Larry Engwall (at K Gudwani’s request) for their use. K Gudwani asked that a fax copy be sent to his Irvine, CA office this week if possible (he will be in the M&O/LV office next week). The fax cover sheet should specifically request an expedited delivery to him.

Kumar Gidwani  
Fluor Daniel, Inc.  
3333 Michelson Drive  
Irvine, CA  92730  
Tel  714/975/2133  
FAX  714/975/5271

Summary  
As a subcontractor to TRW, Fluor Daniel will be the responsible contractor for IDS design. The first IDS task will be to develop appropriate plans and procedures for IDS project management, procurement, and subcontractor management controls and guidance. Based on earlier experience with other IDS contractors, a brief summary of project management issues, plans, and associated activities has been developed to help alert the M&O to important IDS management issues. These observations are meant to assist the M&O not dictate policy or preempt M&O planning responsibilities. Certain observations involve issues that are dependent on the contractual agreements between TRW and Fluor Daniel. We have assumed that Fluor Daniel is a TRW subcontractor, however we have no knowledge of their detailed contractual agreements, scope-of-work assignments, or other contractual agreements that may effect IDS management issues discussed below. Since the relationship of the M&O designation to actual contractual requirements is unknown, the prime contractor, TRW, is the primary management reference used here. When
the M&O is referenced in this document, M&O refers to the combined resources of TRW and its subcontractors.

PROJECT MANAGEMENT CONSIDERATIONS FOR THE DEVELOPMENT OF THE YUCCA MOUNTAIN PROJECT INTEGRATED DATA SYSTEM

1. INTRODUCTION

This document discusses a number of critical project management considerations that should be incorporated into the development of the project organizational structure and overall management approach for the design, development, installation, and operation of the Yucca Mountain Project (YMP) Integrated Data System (IDS). These recommendations are based in part on observations of problem areas encountered by previous contractors, particularly with regard to the management of subcontractors, interfaces with other participating organizations, and the development and implementation of appropriate and effective Quality Assurance (QA) plans and procedures. It is hoped that this document will facilitate the planning efforts of the contractors now responsible for the design and development of the IDS.

Management responsibilities for this portion of the YMP project have been subject to several changes in recent months, and several assumptions have been made in this document that should be noted. It is assumed that TRW will retain overall management responsibilities for the project, but that primary responsibilities for IDS design, development, and testing will be assigned to TRW's primary IDS subcontractor, Fluor Daniel. It is also assumed that Los Alamos National Laboratory (LANL) will continue to coordinate the development of the functional requirements for the IDS design, will have design review and approval authority, will coordinate design input and change request requirements from other YMP project participants, and will be involved in the acceptance of individual deliverable IDS modules prior to completion of Department of Energy (DOE) YMP configuration audits and subsequent acceptance into the overall YMP configuration baseline. In addition, it is also assumed that Reynolds Engineering and Electric Company (REECO) will retain procurement authority for IDS hardware and other major capital items.

We do not have details of the TRW/Fluor Daniel contracts and can only assume that they are similar to other DOE contracts that identify TRW as the prime contractor and Fluor Daniel as a TRW subcontractor. These contractual relationships must be reflected in planning and other QA related documents that describe the specific tasks (Scope of Work or some similar description) that Fluor Daniel is to perform as the IDS designer. These contractual issues will certainly be a part of auditing TRW and Fluor Daniel performance on IDS tasks.
2. PROJECT MANAGEMENT PLANNING

Because of the complexity and changeability of the organizational interfaces that affect the design and development of the IDS, it is absolutely critical that project management be carefully planned and documented in a manner that is flexible, responsive, and easily understood across several different organizational boundaries. It is recommended that Fluor Daniel prepare a comprehensive Project Management Plan (PMP) for the IDS. Their corporate background in the nuclear waste and process control fields eminently qualifies them for this task. As an alternative, TRW must either prepare the IDS Project Management Plan (PMP), or specifically address the IDS program within the TRW (M&O?) PMP that addresses all TRW YMP activities. The PMP should be considered the highest-level contractor management document prepared for the IDS. It would be subject to DOE review and approval, and absolutely must be kept current with all contractor arrangements, participating contractor assignments, deliverable schedule changes, and all technical scope modifications. Regardless of whether or not the IDS PMP is a separate document or part of a more comprehensive plan, it must address all contractually defined DOE project management requirements (e.g., DOE Order 4700.1). The PMP should also address the following issues:

- Definition of external organizational interfaces;
  All external organizational interfaces must be precisely defined. Such interfaces will include LANL (design input, functional requirements definition, design review, acceptance testing), REECO (capital item procurements), the DOE Yucca Mountain Project Office (YMPO, for configuration audits and review and approval of all Memoranda of Understanding, the PMP, and supporting QA program plans), and any other organizational interfaces that may affect the management of IDS development tasks by TRW and its subcontractors.

- Identification of primary subcontractors and description of subcontractor management procedures;
  All proposed service subcontractors should be identified. The PMP should require that major service subcontractors such as Fluor Daniel should be provided a Statement of Work (SOW) or other suitable document developed within the context of TRW's service procurement procedures that defines the subcontractor's specific technical responsibilities, identifies those aspects of project management that will be retained by TRW, identifies specific subcontractor responsibilities relative to external project interfaces, and allows for a task order or work release system that, at TRW's discretion, is capable of providing additional detailed instructions for specific work items.

- Memoranda of Understanding with other IDS participants;
  The PMP should also require that Memoranda of Understanding (MOUs) or equivalent documents be developed between TRW and LANL, REECO, and any other participating
contractors with functional responsibilities related to the design and development of the IDS. All MOUs should be provided to the DOE for review, and should be appended to the PMP when approved. Any subsequent modifications to MOUs should be made within the context of a PMP change, since other sections of the document may be directly affected.

- Description of the supporting Quality Assurance program structure;

The IDS PMP should also describe, in general terms and/or by specific references, how the project management structure defined by the PMP will be supported by a QA program that meets the specific requirements of the OCRWM YMP Quality Assurance Requirements Document (QARD). The PMP should also describe the document distribution, approval, and change control processes that will apply to the PMP.

3. QUALITY ASSURANCE PROGRAM CONSIDERATIONS

The following sections describe a number of areas related to the the development of a supporting QA program that should receive special planning emphasis.

3.1 Subcontractor QA Program Management Approach

The subcontractor QA program management approach selected by TRW (and by Fluor Daniel with respect to their IDS subcontractors) will also be critical to the success of the IDS. Generally speaking, three main approaches to subcontractor QA program management should be considered. These options differ in appropriateness on the basis of:

1. the extent and complexity of technical scope,
2. the technical capabilities of the subcontractor,
3. the overall experience of the subcontractor with the OCRWM geologic repository program,
4. the subcontractor's capabilities relative to 10 CFR 50 Appendix B based QA program requirements. Each option has its advantages, depending on these variables.

- Option A: the prime contractor's QA program is extended to cover all subcontractor activities. This approach is most suitable for small subcontractors who are assigned limited or very narrow technical scopes, or who have little or no experience in the implementation of QA programs based on 10 CFR 50 Appendix B or ASME NQA-1 requirements. It requires that the prime contractor assume responsibilities for subcontractor personnel training and qualification, and requires active management and oversight of the subcontractor's technical activities by the prime. An example of a subcontractor requiring this option might be a small commercial firm with no previous YMP or DOE experience but with specific technical experience in designing
local area networks for installation in industrial environments.

- Option B: the subcontractor and the prime agree to a teaming arrangement (reflected in contractual agreements) in which both contractors contribute to the development of a project-specific QA program that draws on the resources of both contractors. This approach works best in situations in which both contractors have significant technical capabilities and share technical and management responsibilities for the success of the project. Joint ventures would also be well served by this option.

- Option C: the prime contractor requires each subcontractor to develop a comprehensive QA program that addresses all aspects of the subcontractor’s technical scope. In this approach, the program is subject to approval by the prime prior to use, and is subject to periodic assessments by the prime to verify its continued adequacy. This option works best when the subcontractor has broad technical responsibilities, relevant technical experience, and significant experience in working under 10 CFR 50 Appendix B or ASME NQA-1 based QA program requirements.

From an examination of the forgoing, Option A seems inappropriate for a major subcontracting arrangement such as the one between TRW and Fluor Daniel, especially given the extensiveness of Fluor Daniel’s experience and their historical involvement with the DOE’s geologic repository program. The potential gains that might be derived from working to a single set of procedures are likely be offset by the increased management costs that would be incurred by the prime, as well as the retraining costs, potential confusion, and potential quality problems resulting from imposing unfamiliar (and perhaps inappropriate) system requirements on the subcontractor. It may also be observed that, at least in the context of the geologic repository program, the QA program resources developed by individual organizations tend to support their particular technical strengths. Since subcontractors are generally selected to address program areas in which a prime has insufficient technical and/or personnel resources (and for which the subcontractor is well qualified), it follows that the prime contractor’s QA program in all probability will not be technically adequate in the project areas supported by the subcontractor.

Option B is potentially applicable to the IDS program, but its appropriateness hinges entirely on the question of how much technical scope is retained by the prime and how much is assigned to the subcontractor.

Given the experience and capabilities of the primary subcontractor, and the probable unsuitability of Options A and B, Option C is probably the most cost-effective approach available to the prime contractor. Generally speaking, if the subcontractor is experienced in working under OCRWM QA program requirements, an internally managed subcontractor QA program will support a greater level of technical autonomy, the provision of a broader range of technical services, and will require
less specific direction and day-to-day management involvement by the prime. It is therefore suggested that TRW require Fluor Daniel to adapt their existing resources as necessary to the preparation and support of a project-specific QARD designed specifically to address the technical and organizational responsibilities defined by the TRW PMP described in Section 2. The subcontractor's QARD would be subject to TRW review and approval, and would be subject to appropriate monitoring, review, surveillance, inspection, and/or auditing controls, as invoked by TRW's own QA program.

3.2 Procurement/Material Control Interface Management

The procurement controls defined in the TRW QARD (and/or, if authorized, subcontractor QARD) should be evaluated to ensure that the role of REECO is well understood with regard to the procurement of major capital items. Responsibilities for definition of procurement requirements, interface with REECO procurement services, requirements for inspection and acceptance of items or services, procedures for handling the return or replacement of defective items or equipment, definition of acceptance testing responsibilities, and other procurement-related activities must be carefully defined. Even if Fluor Daniel works entirely under the TRW QA program, it is recommended that subcontractor personnel be assigned primary responsibilities for definition of procurement requirements, and inspection and/or acceptance testing for items and equipment whenever such requirements are identified as a condition of the procurement.

Classes of item, equipment, material, or service procurements that may be initiated by TRW or Fluor Daniel without going through REECO must be explicitly defined. Responsibilities for the warehousing or controlled storage of accepted items, materials, and equipment must also be well-defined, with all external organizational interfaces identified.

3.3 Design Qualification

Because certain design activities (e.g., preliminary functional requirements definition) have already taken place, and certain materials and equipment items have already been procured, the TRW QARD (and/or, if authorized, subcontractor QARD) should provide controls for evaluating and, as appropriate, qualifying previous work. In other words, the TRW PMP should define the conditions and applicable controls that will determine how TRW or Fluor Daniel will accept previous work into the design process and/or the overall IDS configuration.

3.4 Management of Design Interfaces and the IDS Configuration

The design process described by the TRW or subcontractor QARDs must carefully define the roles of LANL and/or other participating contractors, as well as subcontractor responsibilities for supporting the design process. The design process should consider the overall configuration
management needs of the IDS, especially since it will be developed and installed module by module. The hardware and software configuration items represented in each deliverable module must be entered into the overall IDS configuration management database after completion of acceptance testing, prior to presentation to the DOE for configuration audit, and prior to delivery and installation. The contractor or subcontractor's configuration management system must be capable of identifying all required changes to system modules after acceptance into the YMP configuration and installation, through the completion and installation of the entire system.

Since the major portion of IDS design and development will be performed by Fluor Daniel subcontractors, the planning for having the subcontractors meet the applicable IDS QA requirements will be critical to the success of the IDS program. Subcontractors must be assessed for their ability to develop and support a successful internal QA program meeting Flour Daniel/YMP standards. This will require reviewing their existing QA programs, plans, and procedures, their applicable QA and management experience, and their specific capabilities and personnel resources for required QA tasks. Simply passing QA and other requirements to subcontractors will not suffice to meet YMP QA requirements. Fluor Daniel must demonstrate and verify during the course of the task that the subcontractor can and does actually perform the work contracted for including any QA related tasks.

For IDS component subcontractors that cannot or will not participate in a suitable internal QA program the TRW/Fluor Daniel procurement procedures must allow the definition of specific procurement requirements for equipment, testing, and documentation that qualify the products (hardware, software, and documentation) under the existing M&O QA plans and procedures. Fluor Daniel must also provide procedures to define procurement requirements for factory acceptance tests, on-site acceptance tests, and warranty conditions with the appropriate levels of control meeting Fluor Daniel QA requirements. TRW/Fluor Daniel must demonstrate that their own QA program and staff are adequate to support these subcontractor management functions (and other IDS management functions) during the development, review, and approval of their IDS QA program.

3.5 Software Quality Assurance Program Management

The TRW QARD (and/or, if authorized, subcontractor QARD) must incorporate or address minimum requirements for development of a software QA plan and supporting procedures meeting the applicable requirements of Section 19 (and Section 19 of Appendix A) of the OCRWM QARD. Tested and accepted versions of deliverable software and its associated user documentation should be considered discrete IDS configuration items, subject to the same configuration management controls after entry into the system baseline as for system hardware.
3.6 Nonconformance Reporting and Corrective Action System

The contractor's (or, if authorized, subcontractor's) QARD should carefully define the controls that will apply to the acceptance testing of deliverable modules, especially with regard to undertaking prompt and effective corrective actions whenever system nonconformances or operational problems are observed. Because corrective actions may have a significant effect on other system elements in any phase of the development process (e.g., design, procurement, assembly, testing), or on previously accepted, delivered, and installed modules, the corrective action process must be designed to be especially responsive and must be adequately staffed. The corrective action system must also be capable of prompt responses to externally observed nonconformances or problems, including those observed during YMP configuration audits or by users of installed portions of the system. User documentation provided with delivered modules must specifically identify the problem reporting protocols that will trigger the corrective action process.

Cy: N. Elkins, LANL, EES-13/LV, MS 527
   EES-13/LV, LANL, MS 527
   CAG Files, Carlton, OR
Summary
Fluor Daniel (FD) will be the prime contractor for the IDS, assume all system responsibilities, develop appropriate plans and procedures for project management, IDS design, software development, procurement, and subcontractor management controls and guidance. A brief summary of the plans and associated activities is as follows:

- Develop an IDS Quality Assurance Plan (QAP) and supporting procedures as a subset of the higher tier TRW QA Project Plan
- Develop a software QAP and supporting procedures
- Develop a Project Management Plan and supporting procedures
- Provide training for all IDS personnel in the applicable plans and procedures
- Maintain records
- Provide change controls
- Develop a defined concept and very specific details for subcontractor management
  Complex subcontractor requirements require more FD management work
  Simple procurements require less FD control and management effort
- Note that the FD takes the complete responsibility for the IDS program
  Simple subcontractor items require fewer controls and less management
  All software (vendor and FD generated) must meet software QA requirements

QA Plans and Procedures
Since FD is a subcontractor to TRW, the FD IDS QAP will be a subset of the FD QAPP which in turn will be a subset of the TRW QAPP. All QA plans will conform to the governing OCRWM YMP standards and requirements. The IDS QAP and procedures will be developed for IDS use or derived from existing plans and procedures that have been reviewed by IDS personnel and found adequate as-is or have been revised for IDS use.
Project Management Plan and Procedures
Before any technical documents can be formally approved for use in IDS planning, design, or procurement there must be a TRW/YMPO approved IDS Project Management Plan (PMP) and supporting procedures (including document preparation, review, and control) in place. The PMP will in turn support lower level plans including the SQAP. The PMP must track the applicable requirements of DOE 4700-1 referenced in the TRW/DOE and TRW/FD contracts. The PMP will identify and document the internal FD QA assessment capability and identify supporting procedures. The change control system for FD's internal plans, procedures, documents, and record management systems will be identified in the PMP. A description of the training program for all FD IDS QA program procedures should be included also.

Software QA Plan and Procedures
The Software QA Plan (SQAP) and procedures will be an adjunct to the FD IDS QAP. This SQAP will be required to control the development of any IDS software written by FD used in the ESF. This SQAP can be made a useful tool for managing subcontractor software development and off-the-shelf software procurements from subcontractors.

Subcontractor Management
Since the major portion of IDS design and development will be performed by FD subcontractors, the planning for having the subcontractors meet the applicable IDS QA requirements will be critical to the success of the IDS program. Subcontractors must be assessed for their ability to develop and support a successful internal QA program meeting FD/YMP standards. This will require reviewing their existing QA programs, plans, and procedures, their applicable QA and management experience, and their specific capabilities and personnel resources for required QA tasks. Simply passing QA and other requirements to subcontractors will not suffice to meet YMP QA requirements. FD must demonstrate and verify during the course of the task that the subcontractor can and does actually perform the work contracted for including any QA related tasks.

For subcontractors that cannot or will not participate in a suitable internal QA program the FD procurement procedures must allow FD to define specific procurement requirements for equipment, testing, and documentation that qualify the products (hardware, software, and documentation) under the existing FD QA plans and procedures. FD must also provide procedures to define procurement requirements for factory acceptance tests, on-site acceptance tests, and warranty conditions with the appropriate levels of control meeting FD QA requirements. FD must also demonstrate that their own QA program and staff are adequate to support these subcontractor management functions (and other IDS management functions) during the development, review, and approval of their IDS QA program.
FY92
Trip
Reports
Date: Wed, Jun 24, 1992
To: Hemi Kalia
From: Jim Hall
Subject: Las Vegas Trip Jun 22-25, 1992

Summary

Mon, Jun 22, 1992
• Trip from CAG offices in Carlton, OR to the TCO in Las Vegas, NV.
• Met with Hemi Kalia to discuss the RSN and M&O FY93 IDS development proposals and plan a strategy for responding to DOE with (informal) comments reflecting LANL assessment of proposal related impacts and concerns.
• Started a review of the two IDS proposals and developing draft notes.
• Contacted J Beckett (EGG/EM x47448) to get a delivery commitment on maps ordered by H Kalia. He agreed to expedite them and try for a Wed, Jun 24 am delivery of at least part of the maps. They are being prepared in the EG&G RSL facility.

Tue, Jun 23, 1992
• Started to draft IDS design proposal comments.
• The MAT financial evaluation group evaluating the CAG FY92 cost proposal recently moved. I tracked down my contact, Darren Knox, and found he is on vacation this week. I informed J Jefferis (MAT procurement officer) of the delay.
• Began to investigate available surplus equipment suitable for TFM and a resident Mac to eliminate transporting a CAG computer to the Las Vegas office.
• Tried to contact Al Pratt (605 667-1033) about available computer equipment. He is out of the office this week and will be back Mon, Jun 29.
• Tried to contact Los Alamos EES Division property person Dale Sarano @ 667-7675. He was unavailable.
• Met with H Kalia and N Elkins to discuss reduction of available funding for CAG FY91 activities.

Wed, Jun 24, 1992
• Finished RSN and M&O IDS design proposal comments.
• Met with R Oliver for informal training in Test Planning Packages and to discuss TFM details for the Fran Ridge Test Plan.
• Met with H Kalia and ???... (M&O/FDI) to discuss the M&O IDS design proposal.
• Met with Jim Beckett (EGG/EM) and Elaine Ezra (EGG/EM) for more details on possible use of EGG database facilities.
• Met with C Milligan to discuss a draft TFM reporting form.

Thu, June 25, 1992
• Returned to CAG offices in Carlton, OR
Date: Wed, Jun 3, 1992
To: Hemi Kalia
From: Jim Hall
Subject: Las Vegas Trip Jun 1-3, 1992

Summary

Mon, Jun 1, 1992
- Trip from CAG offices in Carlton, OR to the TCO in Las Vegas, NV.
- Met with Jim Beckett (EGG/EM) for continued discussion of the TDB and GIS platforms as possible resources for the TCO TFM in process database.
- Met briefly with R Oliver to discuss the TFM issues raised in the Fran Ridge plan he is preparing.

Tue, Jun 2, 1992
- The DOE Technical Data Management Workshop scheduled for today has been cancelled and is not currently rescheduled.
- Continued with TFMDB planning
- Met with Jim Beckett (EGG/EM x47448) and Elaine Ezra (EGG/EM x47449) to discuss preliminary planning for TCO use of their TDB/GIS facilities in FY93.
- Met with R Oliver for informal training in Test Planning Packages and to discuss TFM details for the Fran Ridge Test Plan.
- Continued to review TCO file documents related to the TFM task.

Wed, Jun 3, 1992
- Met with H Kalia to discuss using the EGG/EM database management facilities as part of the TCO TFM database development.
- Met with Jim Beckett (EGG/EM) and Elaine Ezra(EGG/EM) for more details on possible use of EGG database facilities.
- Met with C Milligan to discuss a draft TFM reporting form.

Comments

Hemi identified specific tasks to be completed during FY92:
1. Bar chart style report detailing the number of test holes and pits planned or used through FY92 and FY93 if possible
2. Bar chart less detailed including FY94-FY95 projections including ESF tests, surface tests, and construction activities
3. Develop a LANL TFM Data Management Procedure
4. Have a preliminary database in place
5. Enter some preliminary data
6. Understand the relationship of the TCO TFM database with the TDB
7. Develop a computer equipment and software list needed for FY93

Developing the TCO TFM database will involve design work that includes standard software design methodology for user requirements and design details. The database will be based on a commercial software package. This will somewhat simplify the design detail. Early identification of the level of system performance, amount of data, data types, and reports requirements will help identify the actual hardware and software selected.

Much of the TFM data input to the TCO TFM database will come from the TCO generated test planning packages that basically distill user requirements and projected TFM usage out of submitted test plans. Since the input data will need to be traced to its QA approved source some referencing scheme will need to be implemented. Preliminary discussions resulted in the following requirements being identified:

- **TCO TFM database input information**
  - Material used
    - Type
    - Description
    - Composition
  - Quantity
    - Planned usage
    - Actual usage
  - Location
  - Disposition
    - Permanent part of facility
    - Removed
    - Abandoned
    - Mitigation (if required)
  - Performance Analysis impacts
    - Results
    - Controls (if needed)
  - SNL construction and repository related PAs
  - M&O test-to-test related PAs
  - Input data reference

- **TFM data I/O**
  - Users can remotely input data for inclusion and query the database
    - Only designated TCO personnel will be able to enter or transfer data to the database
    - User data input forms may be used requiring manual data entry in the TCO
    - Field reports will be made by point of contact (or designated) personnel only
  - Database reports include:
    - Standard reports that document TCO TFM activities to DOE
    - Other reports that provide specific TFM details to the TCO, PIs, SNL, and M&O
Analysis reports that document systematic information (i.e., total amounts, distribution through the site, and projected levels in out-years)

- **Constraints**
  Other reports that provide specific TFM details to the TCO, PIs, SNL, and M&O

- **Design**
  Other reports that provide specific TFM details to the TCO, PIs, SNL, and M&O

Discussion with J Bennett (EGG/EM) was very interesting. The TDB concept has been extensively modified since my last exposure several years ago. The merging of the SEPDB into the GENYSIS (Geographic Nodal Information and Value System) portion of the TDB and the inclusion of GIS data in GENYSIS creates a very complete basic set of spatial data that will be very valuable to TFM work. J Bennett's concept of GENYSIS as a working level tool with no configuration management oversight or constraints resolves some of my reluctance to utilize the TDB for the TCO TFM work.
Date: Wed, May 20, 1992
To: Hemi Kalia
From: Jim Hall
Subject: Las Vegas Trip May 19-20, 1992

Summary

Tue, May 19, 1992
- Trip from CAG offices in Carlton, OR to the TCO in Las Vegas, NV.
- Met with H Kalia for a preliminary discussion of the TFM inventory system task.
- Started a review of TCO file documents related to the TFM task.

Wed, May 20, 1992
- Attended the DOE Technical Data Management Workshop. The workshop was cancelled due to poor attendance. It is rescheduled for Wed, Jun 3, 1992.
- Met with H Kalia and C Milligan for a TFM task background discussion and preliminary planning for FY92 TFM activities.
- Met with H Kalia, C Milligan, and Jim Beckett (EGG/EM) for an informal TDB introductory meeting.

Comments

Hemi identified specific tasks to be completed during FY92:
1. Bar chart style report detailing the number of test holes and pits planned or used through FY92 and FY93 if possible
2. Bar chart less detailed including FY94-FY95 projections including ESF tests, surface tests, and construction activities
3. Develop a LANL TFM Data Management Procedure
4. Have a preliminary database in place
5. Enter some preliminary data
6. Understand the relationship of the TCO TFM database with the TDB
7. Develop an computer equipment and software list needed for FY93

Developing the TCO TFM database will involve design work that includes standard software design methodology for user requirements and design details. The database will be based on a commercial software package. This will somewhat simplify the design detail. Early identification of the level of system performance, amount of data, data types, and reports requirements will help identify the actual hardware and software selected.
Much of the TFM data input to the TCO TFM database will come from the TCO generated test planning packages that basically distill user requirements and projected TFM usage out of submitted test plans. Since the input data will need to be traced to its QA approved source some referencing scheme will need to be implemented. Preliminary discussions resulted in the following requirements being identified:

- TCO TFM database input information
  - Material used
    - Type
    - Description
    - Composition
  - Quantity
    - Planned usage
    - Actual usage
  - Location
  - Disposition
    - Permanent part of facility
    - Removed
    - Abandoned
    - Mitigation (if required)
  - Performance Analysis impacts
    - Results
    - Controls (if needed)
  - SNL construction and repository related PAs
  - M&O test-to-test related PAs
  - Input data reference

- TFM data I/O
  - Users can remotely input data for inclusion and query the database
    - Only designated TCO personnel will be able to enter or transfer data to the database
    - User data input forms may be used requiring manual data entry in the TCO
    - Field reports will be made by point of contact (or designated) personnel only
  - Database reports include:
    - Standard reports that document TCO TFM activities to DOE
    - Other reports that provide specific TFM details to the TCO, PIs, SNL, and M&O
    - Analysis reports that document systematic information (i.e. total amounts, distribution through the site, and projected levels in out-years)

- Constraints
  - Other reports that provide specific TFM details to the TCO, PIs, SNL, and M&O

- Design
  - Other reports that provide specific TFM details to the TCO, PIs, SNL, and M&O

Discussion with J Beckett (EGG/EM) was very interesting. The TDB concept has been extensively modified since my last exposure several years ago. The merging of the SEPDB into the GENYSIS
(Geographic Nodal Information and Value System) portion of the TDB and the inclusion of GIS data in GENYSIS creates a very complete basic set of spatial data that could be valuable to TFM database work. J. Beckett's concept of GENYSIS as a working level tool with no configuration management oversight or constraints resolves some of my reluctance to utilize TDB resources for the TCO TFM work. His description of their databases includes space separate from the formal database used as working areas for data related or supporting submissions to the TDB. These user areas can be configured to merge with the larger map files on demand to produce very high level report products. If the TFMDB was configured in this way, reports from tabular data to 3D maps could be generated as needed.
FY92 Memos & Other Products
Date: Thu, Aug 20, 1992
To: Hemi Kalia
From: Jim Hall
Subject: Comments on the Draft M&O IDS Proposal with a cover letter dated July 22, 1992

Summary

The proposal is a very high level document without much supporting content. The M&O proposes to manage a vendor supplied turnkey IDS without providing details of their management strategies and plans that will result in a successful program. They touch on the need to provide the correct information to the vendor, but there is no substantive development of their critical role as managers of this procurement including the unique needs of the PIs and project constraints (QA, testing schedules, performance contingencies, system usefulness at each phase of completion). Based on this proposal I believe the M&O has an incomplete understanding of IDS.

I have the impression that the M&O perceives IDS development as simply defining a black box specification for bid, accepting the low bidder, and bolting the delivered product in place. IDS is not meant to do a fixed task such as run a gas pipe line or power house. IDS is an ESF utility and its role and requirements will probably continue to develop as the ESF design is refined. The IDS exists to service PI requirements not to dictate limitations and inflexible interface requirements on the PIs. This proposal needs to reflect an understanding of the growing nature of IDS development and the ability to accommodate new PI and project requirements as they develop. Integrating these understandings into a vendor management plan is missing from this proposal.

The proposal text minimizes LANL's role in helping to define IDS. As the representative of PI consensus for IDS issues LANL will be actively involved in all planning and technical review issues.

General Comments

1. The plan is written as if the IDS were almost entirely a vendor development task. The M&O planning hierarchy must address the full scope of IDS development, and should be completely defined in no uncertain terms in the project management plan. A project management plan must define the hierarchical arrangement of the planned tasks, plans and procedures identified as applicable, to be modified, and/or developed to achieve the technical and quality goals of the
project as they are defined in the FRD and the other detailed requirements of the DOE IDS SOW. Software development plans and supporting procedures are a subset of the overall IDS planning hierarchy. How vendor(s) will comply with project QA requirements needs to be addressed as well.

2. Identification of an adequate suite of high level planning documents is missing from this proposal. The logical and defensible development of IDS hardware and software strategies depends upon a structured process of identification, evaluation, review, and selection. This is not meant to straight jacket creative or clearly beneficial choices. The intent is to provide a structured, defensible method for accomplishing tasks that can withstand hostile audits. There may be a significant difference between the familiar and friendly M&O experiences with well defined commercial and government tasks. This project will inevitably be subjected to a hostile wide-open public/commercial environment. We must expect devils advocate style, nit-picking audits from SAIC (YMPO) as our most friendly environment. Audits by NRC and interveners will be hostile. It is especially important in task definition documentation and early requirement and engineering specifications to avoid having made choices prior to providing detailed technical studies and report providing descriptions, evaluations, cost benefit, and other analysis pertinent to the selection or decision. Prior to the final decision or selection these studies will be reviewed by LANL (and perhaps others), comments resolved, and approved for use. These studies and reports would logically follow after a design requirements document has been finalized at least in draft form. Certain studies could start immediately based on LANL concurrence of the technical impact. However, reporting or citing results or conjectures in planning level documents must await approval of the studies.

3. There is a subtle and very significant difference between the reliability requirements for a gas pipeline or a NRC monitored nuclear power plant and the IDS environment. The IDS is operating in what is essentially an extended lab environment in an underground testing facility. This application requires a high degree of data integrity, however, in all but a very few cases of non repeatable short term (minutes or hours in duration) tests very high system reliability is not critical. It is important that the whole system not break at once, it is important that the data be acquired and stored without getting fouled up, and it is important that the system is calibrated and maintained to the required standards in a routine manner. It is not important that the system not break down. Of course, we want the IDS to be "reliable" and not break down very often. The IDS must work adequately for several years while remaining flexible enough to permit phased system hardware installation and equipment modifications and upgrades to meet later requirements. The IDS will reside in a controlled environment performing its task repetitively, watched over 24 hours a day by trained maintenance crews ready to repair it when it breaks. There is a great deal of CPU time that could be used for routine diagnostic checks and documented system corrections. We dream of an IDS that performs like a Maytag washing machine ad, but we have always planned for ongoing repair and maintenance programs. Very high reliability and fault resistant systems must be justified by studies or PI requirements.
Specific Comments

1. Ref: Section 1.0, Executive Summary, Project Methodology, Bullet 2; Fluor Daniel has the single responsibility for all aspects of the IDS development, NOT any subcontractors.

2. Ref: Section 1.0, Budget and Schedule; it is not clear that the M&O approach provides “better” (better than what?) control of costs. It is sufficient that their approach provides adequate controls that are up to date, understandable to YMPO, and defensible during audits.

3. Ref: Section 1.0, Budget and Schedule; is the referenced Configuration Management (CM) program YMP CM, M&O CM, or vendor CM?

4. Ref: Section 1.0, Budget and Schedule; it is not the function of Configuration Management (CM) to control costs or contribute to cost controls. In fact a poorly designed and/or administered CM system may contribute to excess costs. This issue needs clarification or should be deleted.

5. Ref: Section 2.0, IDS Scope and Objectives, para 1, line 7; “certified” should be changed to “controlled”. This confusion of certified and controlled documents raises the issue of how well the M&O understands YMP QA concepts and requirements.

6. Ref: Section 2.0, IDS Scope and Objectives, para 1, bullet 1; it is not clear that the proposed M&O IDS would represent cost savings compared to independent efforts. Duplication of effort is not necessarily bad (i.e. independent support staffs for work groups). These items have never been IDS issues. More appropriate issues are the providing data format and equipment interface protocols available for all users. Possible extensions of IDS maintenance to appropriate PI equipment as individual long-term tests mature should be mentioned.

7. Ref: Section 2.0, IDS Scope and Objectives, para 5, line 7; what is the constraint on IDS providing “complex” control functions for tests if requested by the PIs. The IDS exists to service PI needs. Arbitrary limitations on services provided without discussion of specific PI requests creates a real impression that IDS will dictate usage to the PIs. This is unacceptable.

8. Ref: Section 3.1, Design Development, para 1; it is implied that the M&O will update the FRD. The FRD is the responsibility of LANL and is part of LANLs test coordination activities.

9. Ref: Section 3.1, Design Development, para 2; The M&O should develop the IDS phased testing and construction plans based on Project Office schedules. The FRD does not contain equipment deployment schedules.
10. Ref: Section 3.1, Design Development, para 2; M&O scheduling for timely deployment of IDS should not be impacted by “the modular construction and implementation of the IDS”. A modular system may make such efforts easier to plan and conceptualize for those outside the IDS team, however, they have no actual technical impact. Timely deployment will be determined by the competency of the task manager (M&O) and not the modularity of the system.

11. Ref: Section 3.2, Design Package Preparation; this section does not address necessary M&O/LANL interfaces for LANL technical review activities, acceptance testing observation, or YMP configuration audits.

12. Ref: Section 3.3, Procurement and Follow-On Support; this section does not address necessary M&O/LANL interfaces for LANL technical review activities, acceptance testing observation, or YMP configuration audits.

13. Ref: Section 3.5, Training and Maintenance, para 2; since the vendor will be developing both the hardware and software, what is the rationale for vendor hardware maintenance and M&O software maintenance? Software field modifications are likely to be needed and vendor personnel seem most qualified for maintenance including upgrades and modifications.

14. Ref: Section 3.5, Training and Maintenance, para 2; hardware maintenance will be needed 24 hours/day. Over the life of the testing program portions of PI test equipment may also become part of the M&O maintenance responsibility. What is the rationale for long term vendor support of this activity vs M&O personnel?

15. Ref: Section 4.0, Project Methodology; the prime function of the IDS is to support PI data acquisition for planned (and unplanned) ESF tests. Project methodology must include recognition of this factor as the basis for IDS and acknowledge the need to support evolving PI requirements. This is an important issue in developing an M&O (and resultant vendor) understanding the functional client for IDS is the PIs who will ultimately use it. The IDS project is not an independent M&O project. The Project Office gains significant data reporting advantages using an integrated DAS serving all PIs. This advantage can only be maintained if the IDS accurately reflects PI needs and PIs use it. Satisfying the PIs is more important than all of the issues currently cited in Section 4.0.

16. Ref: Section 4.2, Modular Design, para 2; another advantage of the proposed modular approach is reduced spares inventory, standardized calibration and maintenance, and useful repair options (substitution, swapping, and borrowing).
17. Ref: Section 4.2, Modular Design, para 2, item 1); since the number and type of transducers connected to the IDS is specified by the PI, it is not clear how “adding redundant back-up modules” would achieve higher reliability.

There is a subtle and very significant difference between the reliability requirements for a nuclear power plant and the IDS environment. The IDS is operating in what is essentially an extended lab environment in an underground testing facility. This application requires a high degree of data integrity, however, in all but a very few cases of non-repeatable short term (minutes or hours in duration) tests very high system reliability is not critical. It is important that the whole system not break at once, it is important that the data be acquired and stored without getting fouled up, and it is important that the system is calibrated and maintained to the required standards in a routine manner. It is not important that the system not break down. Of course, we want the IDS to be "reliable" and not break down very often. The IDS does not need the fault-tolerance of a missile guidance system that must work perfectly, once. Nor does it need the incredible reliability of a nuclear reactor controller, protecting lives and the environment. The IDS must work adequately for several years while remaining flexible enough to permit phased system hardware installation and equipment modifications and upgrades. The IDS is, after all, just sitting in a controlled environment performing its task repetitively, watched over 24 hours a day by trained maintenance crews ready to repair it when it breaks. There will be great deal of idle compute time available for routine diagnostic checks and documented system corrections. We dream of an IDS that performs like equipment depicted in a Maytag washing machine ad, but we have always planned for ongoing repair and maintenance programs. Very high reliability and fault tolerant systems must be justified by studies or specific PI requirements.

18. Ref: Section 4.3, Quality Assurance Planning and DOE Requirements; M&O QA plans must include Configuration Management procedures that encompass the entire IDS at each deliverable phase, and must support delivery of a documented system configuration that will successfully pass the DOE configuration audit resulting in acceptance into the YMP configuration baseline. M&O CM procedures must mesh with YMPO CM requirements in order to properly manage changes to delivered system modules that may have been previously accepted into the YMP baseline.

19. Ref: Section 4.4, Vendor Support, line 2; the intent of this section is unclear. The M&O will administer contracts with the IDS vendor(s) and will be the requester for any vendor services prior to installation. After installation vendor requests originating from IDS users and be directed to M&O maintenance personnel.

20. Ref: Section 5.1.1, Design Approach, last para; the identified value engineering (VE) effort may produce useful input for IDS. It is very important that VE or other engineering studies performed by a third party (not the IDS design team) be carefully reviewed by IDS and LANL to determine possible unanticipated impacts on IDS, PIs, and the testing program before any
recommendations based on the studies are submitted to the Project Office.

21. Ref: Section 5.1.2, Design Plan, first para; the wording “A standard IDS interface will be established ... to simplify IDS design ...” implies that there will be only one interface for PI equipment connected to the IDS. It will be very helpful to IDS and PIs to have standardized interfaces and interface protocols. PIs may use different DAS platforms for particular tasks and a single interface standard for all external computer based equipment is inappropriate in this proposal. It is not the responsibility of IDS to dictate standards to the PIs. IDS must accommodate PI needs and contribute practical and useful engineering value in the process. Developing one standard VAX interface and protocol in cooperation with PIs should work out since each lab will be developing their own software and can include the appropriate interface drivers. A single IBM PC RS-422 style interface seems practical for the same reasons. Because of the nature of using PCs, IDS should be prepared to provide interface drivers for particular hardware configurations customized as necessary for a particular PIs needs. Programmable logic controllers (PLCs) may be used as equipment controllers in some tests. PLCs tend to have very proprietary interface protocols and a single PLC interface and interface protocol may not be possible. It will be very important that the IDS not just say no to any PI request for interface drivers even where the hardware may not be part of the currently identified IDS configuration. IDS is not just an off the shelf black box supplied to the PIs on a take-it or leave-it basis. IDS has the responsibility to meet PI needs as currently defined or developed at a later time. In addition there must be provisions for adding new, custom interface protocols as part of IDS expansion capabilities to accommodate changes in the testing program.

22. Ref: Section 5.1.2, Design Plan, para 2; M&O management of the IDS contract negotiations and award will be a critical first step in ID development. Government subcontract negotiations are very sensitive to vendor favoritism and misuse of vendor supplied information. A supplier contesting the award of IDS could substantially impact the ability of IDS to support the testing program and the viability of the IDS itself. This could result in imposing additional DAS development tasks on impacted PIs possibly delaying or causing tests to be cancelled. This consideration is particularly critical because of the likely accelerated IDS development cycle that will be associated with DOES decision to proceed with testing. Even with the best managed procurement, the award may be contested. Contingency plans for this eventuality must be part of M&O IDS planning.

23. Ref: Section 5.1.2, Design Plan, System Definition and Scope, last sentence; it will be necessary to accurately define the IDS specification for the vendors. The implication here is that certain data will be identified and excluded permanently from IDS. IDS is a DAS and data collection utility for the testing program. The IDS team must evaluate and provide appropriate engineering recommendations and accommodation as appropriate for ESF related data. It is not IDS function to dictate a closed “pure” DAS. IDS must accept and evaluate proposed uses for IDS
capability and provide considered engineering evaluations and recommendations on feasibility and impacts (equipment & personnel costs, program impacts, etc.) for the proposed uses.

24. Ref: Section 5.1.2, Design Plan, QA Requirements; this section doesn’t even address project QA buzz words. This leads me to question M&O familiarity with any YMPO QA requirements that will significantly impact IDS development.

25. Ref: Section 5.1.2, Define External Interfaces; I am confused as to the intent of this section. Are the interfaces referred to program interfaces between participants or equipment interfaces that are part of the IDS hardware/software?

26. Ref: Section 5.1.2, Design Plan, Data Reduction Techniques; contrary to the text, data reduction techniques are not imperative. They might be useful in some circumstances but are inappropriate as a standard data processing for IDS. The basic requirement for IDS is to record ALL test data generated by PIs for the project record. The PIs may decide to compress, delete, or modify data sets supplied to them by IDS for their own purposes. This is not an IDS option for archived, raw data. PI data sets stored on IDS that are not part of the archived data set may be modified in any way needed by the PI or by IDS for the PI. This is a PI option. IDS engineering data sets stored on IDS (not archived data sets stored on IDS) for providing data to user interfaces could use compressed data sets where appropriate.

27. Ref: Table 6.1, IDS-Engineering Cost Only; it will be important to identify low level engineering support beyond FY96 to accommodate ongoing hardware/software bug fixes, upgrades, and overall system maintenance.

28. Ref: Section 8.0, IDS Team Organization Chart; QA personnel must be shown on this organization chart.
Date: Tue, Jun 23, 1992
To: Hemi Kalia
From: Jim Hall
Subject: Comments on the RSN and M&O IDS Design Proposals

Summary of the Proposal Content
Different management and philosophy of the Integrated Data System (IDS) development process have been proposed by RSN and the M&O. The RSN approach represents the next step of ongoing RSN IDS development activities. The RSN proposal identifies a complete in-house design and engineering team responsible for all aspects of IDS development. After designs are completed, components would be procured on a competitive bid. The M&O approach limits the design team to high level systems engineering and specification development. After development of IDS definition specifications, the M&O proposes to contract system design, equipment design, fabrication, software development, installation, installation checkout, changes, and documentation to a competitive bid vendor. There is an expectation that preliminary contacts with interested vendors will assist the M&O to refine the specifications to include appropriate design details and identify alternate approaches to implementing the IDS.

Comment Summary
The RSN proposal reflects a credible readiness to restart their effort. The M&O proposal has little technical content and seems to be a rewrite of documented IDS concepts. The major thrust of the M&O proposal is that a vendor, not the M&O, will design the IDS. The M&O proposal raises several important issues as outlined below:

1. The M&O is proposing a variation on an earlier IDS design contract with EG&G
2. Historical IDS development problems are not addressed
3. The M&O seems unaware of the extent of Project structural requirements
4. The benefit to the Project of an M&O subcontractor IDS design is not developed
5. The proposed M&O procurement process has potential problems for YMP
6. The benefit to the Project of this procurement process is not developed
7. The proposed procurement and design processes may involve unacceptable risk
8. No risk mitigation strategies are mentioned
9. No vendor control process is developed

Proposal Comparisons
Lack of tangible information in the M&O proposal makes a detailed technical comparison of the two proposals impossible. Observations about the approach used in each proposal are as follows:

• The RSN proposal reflects a credible readiness to restart their effort. RSN worked on IDS design for most of FY91 and their IDS team was successfully integrated into the Project structure. New IDS contractors seem to take the better part of a year to integrate program requirements into their way of doing business.
The M&O proposal seems to be a to-do list based on documented IDS work to date with little new information. Although their proposal identifies elements of the design and related program constraints, there is no reason to expect that they have a thorough understanding of probable impacts of Project structural requirements on planned M&O IDS activities. The M&O IDS is at the bottom of this learning curve. M&O IDS budgets and schedules need to be carefully reviewed to help them understand how Project requirements may impact their estimates.

The M&O IDS design concept includes the vendor (actually several vendors during the pre-bid period) as the system designer. The M&O is proposing the same basic contractual arrangement used to hire EG&G as the IDS designer preceding RSN. How and where this vendor design activity will be controlled and monitored is not developed. If the vendor is strongly involved in the design effort they will be producing design requirements documents, design studies, etc. It is clear that the M&O has experience in selecting vendors and entering into contracts for product. It is not clear how their contracting experiences relate to YMP needs. Since the IDS design effort will be a controlled activity it is not clear what function the M&O will serve in the design phase. Design details can most effectively be worked out between the vendor and LANL as technical coordinator for the testing program and PI IDS requirements. In this area the M&O would simply represent an additional pass-through step complicating the design interface. Prior IDS design programs have separated design and software development from equipment procurements to mitigate non-performance impacts and provided Project capability for the most critical design activities. The issue here is the risk to IDS availability due to a non-performing vendor.

The M&O IDS vendor procurement strategy includes activities that may not be in the Projects best interest. Pre-qualifying vendors makes sense since it will be important that the best available vendors bid on this job. Limiting the bidders to this pre-qualified group or some other select list may be impossible. As the M&O has observed (section 2.0, paragraph 6 & 7 and Section 3.0, paragraph 4) this system is not unique and the are many potential vendors. Since vendors are also identified as system designers, alternative designs to the M&O concepts will certainly be proposed. Pre-bid briefing of selected vendors may create problems. Extensive pre-bid or post-bid discussions, design sessions, bid specification building, etc. may be used as evidence of a prejudicial process and create additional procurement problems. The basic issue here is the risk to IDS availability due to challenges to the procurement process.

Historical Background
IDS development started in 1983 based on the Project concept that a central data acquisition and data management facility was needed. The IDS was expected to monitor instruments, acquire data, store the data in a standardized format easily accessible by the PI on-site, and distribute the stored data to PIs and the Project Office on a regular schedule. The original IDS development including basic hardware and software specifications and extensive hardware and software development was done at LANL. This task was subsequently terminated when the project testing schedule was delayed. When IDS restarted in 1987, EG&G in Las Vegas was selected as the IDS designer with LANL acting as project managers. This effort reviewed the first design and updated the system requirements based on current PI needs. Title 1 IDS designs were prepared and reviewed. Specific PI testing requirements were identified and integrated into the design. During this time the Project underwent a substantial QA upgrade effort and the EG&G IDS team was heavily involved in
upgrading the EG&G QA program covering IDS. Another delay in the testing program resulted in cancellation of the EG&G contract. The change of Project A&E resulted in RSN being selected to support the IDS design during FY91.

Initial IDS efforts by LANL and EG&G made important contributions to the understanding of IDS design and implementation issues and development of IDS requirements. Both efforts also were troubled by problems that need to be understood as part of evaluating the correct approach for further IDS development.

Timely IDS specifications was a persistent problem caused, in part, by the difficulty in getting specific IDS requirements from the PIs. The PIs, of course, haven’t had much specific information to supply to the IDS team since many of the test designs are still in preliminary stages with little or no real IDS requirements information. In addition, some PIs (and their data acquisition ideas) have left the Project and some PIs had a reluctance to share preliminary requirements that may later be identified as wrong. The IDS designers contributed to PIs distrust of IDS by aggressive solicitation of requirements and tough, punitive attitudes when the PIs did not respond satisfactorily. Many the IDS design requirements need to be developed in the absence of firm PI input and later modified as necessary to accommodate actual requirements. Part of LANLs task is to develop credible estimates for missing design information in cooperation with the PIs to provide the designers with firm design requirements. These “best engineering estimate” requirements are transmitted to the designers to be integrated into the formal design process. There will certainly continue to be changes and revisions of the defining IDS specifications as part of PI test plan development and changes in PI concepts of data acquisition needs for specific tests. This approach implies a phased implementation and perhaps a phased design. A key issue here is that these changes must be able to be integrated into the design in a timely manner with minimal schedule impacts.

Who acquires the data is a current IDS issue. Data acquisition directly from test instruments was originally part of the defining IDS rationale that envisioned a limited scope data acquisition requirement (the testing program was smaller then) that concentrated all data acquisition and data management activities under IDS. Early in the IDS development process a protocol was established that assigned PIs responsibility for all test instruments and short connecting cables routed to IDS junction boxes near each test. Major cabling from the junction boxes to the IDS and all IDS functions were the responsibility of the IDS designer/contractor. This protocol was undermined by the inability of IDS to support PI data acquisition needs for Prototype Testing in G-Tunnel (FY88 & FY89) and requirements of some PIs for very special data acquisition techniques (this is an ongoing issue). These problems led to the identification of “organizational computers” developed by PIs to support their own data acquisition activities. The scope of organization computer activities are currently arrived at by negotiation between LANL, as the IDS design requirements developer, and individual PIs. In the past the PIs have had different ideas for using organizational computers depending upon their perception of schedule urgencies, IDS designer responsiveness, funding issues, and their own assessment of IDS contribution of risk to their tests success.

Program requirements were often ignored or not integrated into planning for IDS development activities resulting in very unrealistic schedules and budgets. This resulted in repetitive missed deliverable schedules, confusion for the designer about priorities, and low morale within the design team which, of course, made matters worse.

IDS issues must be properly prioritized to emphasize design and implementation in a timely
manner. As responsibility for major IDS task decisions was diffused and moved from the PI-LANL-test oriented axis to arbitrary schedule pressures and “us-vs-them” attitudes developed in the IDS team, the designers contact and understanding of real PI needs diminished. This led to shifting goals that caused alienation of PIs and additional demoralizing of the IDS team and ultimately hurt the design effort. The missing element here was the failure to recognize the importance of the fact that IDS is an ESF utility used principally by the PIs. The focus of all design work is to provide the PIs with a system to meet their needs as closely as possible. To work successfully, IDS development must be a team effort driven by PI needs. All other requirements are secondary. These other issues are certainly important and need to be addressed. The key issue here is the designers primary responsibility to provide an IDS product that meets PI “needs”. Interacting with the PIs with a “you do it my way or shut up” sort of management style will not work in the interests of the Project. Requirements, specifications, or other formal intermediate products are secondary to the primary goal of a timely, effective IDS.
This memo transmits a draft LANL TFM Management procedure. I've revised the approach represented in my earlier outline to accommodate the latest version of the DOE Yucca Mountain Site Characterization Project Tracers, Fluids, Materials Management Plan (YMP/91-23).

I've done my best to provide a complete yet simple procedure to define the TFM tracking activity, however, I believe there are some major flaws with the approach. These flaws are primarily organizational having to do with the YMPO plan and LANL's lack of program authorized muscle to aggressively pursue this kind of program that crosses so many organizational boundaries. One would be hard put to design a system that could cause more potential delays to the program. The organizational interface requirements are as numerous as the opportunities for delays in review responses or final approval actions. I am particularly concerned with the fact that the latest version of YMP-91-23 requires YMPO authorization prior to the TCO initiating any evaluation actions, and also requires YMPO approval of all recommendations coming out of the TFM evaluation process. LANL's authority and general involvement is extremely limited, but somehow the message has to get across to the reviewers (SNL, the M&O Contractor, the T&MSS/ES&H group, and YMPO) that they must provide adequate support for the process represented in LANL's internal TFM procedure in order for TFM evaluations to be performed in an orderly and timely way.

My main concern, however, is that no matter how friendly and useful the TFM database is, or how smoothly the evaluation process works, the evaluation response and YMPO approval times may not be adequate to support processes that depend on the information. LANL may end up to be the bad guy since they have the identified coordination role for all TFM review activities. I strongly suspect that the effort to evaluate TFM items already in the procurement/acceptance/installation cycle or presently in use will be enormous. Designers should access the TFM evaluation process to qualify their materials lists prior to the development of procurement specifications and purchase requisitions; if TFM items are not listed as approved in the database, they will have to be individually evaluated. If TFM items have already been purchased and are in existing inventories, they will have to be similarly evaluated prior to being issued for use. If TFM items have already been issued, then TFM discrepancies exist that will likewise have to be individually evaluated to determine appropriate disposition and corrective action requirements. In all cases, the QA programs of every contractor with information needs that are serviced by the TFM database and/or the TFM evaluation process must be revised to specifically require the necessary interfaces. TFM inquiries and evaluations should be made as early as possible, and all contractors need to recognize their part
in the process of item definition, procurement, and issue for use or installation. As an example, if the facility or test designers leave TFM inquiries up to REECo during the procurement process, delays will occur every time a TFM item is conditionally accepted or rejected by YMPO and acceptable alternatives will have to be worked out across yet another organizational interface. If no inquiries are made until after the item is procured or issued, the cost and effort necessary to resolve the problem will be compounded enormously.

I also do not understand why regulated hazardous materials are exempt from the TFM evaluation process by YMP/91-23; they would seem to me to be among the most critical items that should be subject to these controls. I believe their exclusion is a serious flaw in the proposed TFM program that has been identified to evaluate and record the usage of all TFMs. There is no indication in the YMPO TFM Plan for how these two groups of substances will be coordinated or integrated. At the very least it seems that there will be duplication of review and record management functions.

As you can see from the text and flowchart (Exhibit 1) the emphasis of the procedure is on highly structured record keeping under the direction of the TFM Database Manager. The decision to make the TFM chief hancho a records manager rather than a technical person was finally arrived at when I realized that technical support for external reviews is totally defined and internal TCO technical support will have to come from a variety of "experts" depending on the specific TFM and test being evaluated. The primary TFM task will be developing record packages, cajoling reviewers into performing on time, and maintaining the TFM database. The fate of particular TFMs will be the responsibility of the various TFM "champions" with special interests in them (PI/PCOs, engineering groups, and hallway TFM officianados). These struggles must be isolated from TFM record keeping activities and the TFM Database Manager will act as the scorekeeper. I haven't put together a an internal TCO TFM organization chart at this time.

Secondary considerations for the TCO maintaining the TFM program for FY93 include continuity and minimizing testing impacts. The TCO work on TFMs to date has been primarily developing a schema for accomplishing the task. The following issues need consideration:

• As TCO TFM tracking methods are developed and refined the TCO umbrella will allow immediate evaluation of testing impacts and may serve the best interests of the testing program.

• It is not clear that the M&O or other likely inheritors of the TFM program are ready to proceed in a manner that is in the best interests of the testing program. Aggressive development of TFM tracking through FY93 may provide a firm basis for a well founded continuing program that could be passed to others in-whole or parts without jeopardizing testing.

An aggressive TFM program would involve 1-1/2 to 2-1/2 combined FY93 FTEs for the TCO and EG&G plus the purchase of a minimum of $12K of TCO hardware and software.
Date: Tue, Sep 22, 1992

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Subject: YMP Documentation Inventory

Andrew:

We have noted the physical locations of YMP related hard copy documents including copies of CAG generated documents, project communications, on-loan documents, personal notes and records, and related papers. These locations could change at some time in the future depending upon contract completion phases, return of loaned documents to LANL, office reorganization, and other unforeseen events. As a record management method, physical locations of documents does not seem to be a very useful technique since location may change at any time. Maybe this is just a paperwork weight check?

All of CAG's YMP related documentation is located in our Carlton, Oregon office as follows:

Bookcase 09/shelves 1 & 2
Filing Cabinet 01/drawer 3
Upstairs Storage Area/boxes 9, 10, 11, 12

Jim Hall

President
Computer Applications Group, Inc.