ITASCA
Consulting Group, Inc.

7 April 1986

David Tiktinsky - SS623
U.S. Nuclear Regulatory Commission
Division of Waste Management
Washington, D.C. 20555

"NRC Technical Assistance
for Design Reviews"
Contract No. NRC-02-85-002
FIN D1016

Dear David:

Enclosed is the trip report for the meeting held at NRC-Silver Spring on 24-25 March, attended by Mark Board and Adrian Brown. Please call me if you have any questions.

Sincerely,

Roger D. Hart
Program Manager

cc: J. Greeves, Engineering Branch
Office of the Director, NMSS
E. Wiggins, Division of Contracts
DWM Document Control Room

Encl.
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ITASCA TRIP REPORT

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Consulting Group, Inc.

DATES: 24-25 March 1986

LOCATION: Nuclear Regulatory Commission
Silver Spring, Maryland

PURPOSE: (1) to review Final EA reference list for BWIP

(2) to determine remaining open issues regarding BWIP ES

(3) to define contractor workload for EA review preparation

ITASCA ATTENDEES: M. Board (Itasca Consulting Group)
A. Brown (Nuclear Waste Consultants)

PREPARED BY: M. Board

SUMMARY

In addition to Itasca personnel, attendees included P. Huck and A. Mukherjee (Engineers International), K. Wahi (GRAM, Inc.), M. Beus and M. Sokaski (USBM), L. Shiper (Sandia), J. Buckley, M. Natarajah, J. Kennedy, J. Greeves, H. Lefevre, N. Tanious, and J. Pearring (NRC).

Final Environmental Assessment (FEA)

The FEA review plan was distributed and will provide the basis for the upcoming final EA review. J. Buckley discussed the May (tentative) Appendix 7 site review. Mark Board went over the plans for the Lucky Friday Mine tour to be conducted prior to the site visit.

Quality Assurance

Jim Kennedy reviewed the Appendix B NRC QA requirements. A point was raised by A. Brown concerning NRC contractor QA requirements. Kennedy will examine the implications of QA on the contractors.

Conceptual Design

The BWIP 90% conceptual design review presentation held in Richland, 14-15 March 1986, by RKE/PB and M-K was distributed and examined. This presentation was attended by R. Cook. An interesting point from the meeting (as related by Buckley) was M-K's concern about in-situ stress at the RRL location and the possible movement of the RRL to a more favorable site. There is no evidence, however, that large stress gradients exist horizontally within the Hanford site. Points regarding the presentation include the following.

1. Max. flood is 20' ± above the shaft collar location.

2. Numerical studies by RKE/PB were not documented in the presentation. It is not known if Super-7T and BELP have been QA'd.

3. The strength criterion from Hoek and Brown (and the rock properties used) result in very small yield zones around the openings—much smaller than would be expected in reality. There is no discussion of the range of conservatism used in the assignment of properties.

4. Thermal analyses assume infinite body (no openings) and conduction only.

5. There was no discussion of heat effects on rock support.

6. There was no discussion of the role of jointing in rock stability. This is particularly important since there are some drift intersections in the mining plan where 3 tunnels meet.

ESTP Test Plan

The major comments of Engineers International and Itasca concerning the ES Test Plan were reviewed. Two of the major points discussed were:

(1) variability of the basalt

The highly variable nature of the basalt flows makes "point" measurements such as the plate bearing test of questionable value. The need for more excavation in the ES and measurements which provide an integrated rock mass response was discussed.

(2) The integration of information and data needs, in-situ testing plans, and model development is a major drawback of the test plan. The Systems Requirement Tree does not show clearly the thought process involved in design and risk assessment or the relationship of testing to model development and verification. In fact, the entire process appears to be somewhat haphazard in the plan.

It was determined that further discussion of the test plan would wait until a draft of the Site Position Paper on the in-situ testing was completed by Itasca in late May or June. Another meeting to discuss the plan will be organized at that time.

Constructability

A discussion of constructability issues relating to the BWIP site was held. Open constructability concerns were:

(1) the shaft liner method and support
We are currently waiting for BWIP report regarding this analysis.

(2) the shaft construction method
This provides a poor method for characterizing the site.

(3) construction in the vesicular zone
In the Cohassett flow, this could provide a safety and/or performance issue.

(4) the damaged zone
The damaged zone existing around all openings requires greater definition, particularly its effects on site characterization and performance.

(5) methane drainage
Methane drainage levels in the repository provide a possible safety issue which has not been adequately addressed.

(6) rockbursting
This is still an open characterization and safety issue.

(7) rock support
Rock support for the repository is an open item due to the long time periods required for support and the temperature levels under which the support must function.

(8) possible repository flooding
This is an open safety and performance issue.

Seals

The ES-I shaft seals were discussed by P. Huck and K. Wahi. The conclusions of this discussion were:

1. At present, the effects of short-term shaft seals on the long-term seals is not known.

2. There is no plan to monitor the performance of the short-term seals.

3. There is no performance data available on the chemical seal ring, such as its mechanical and hydrologic properties.

4. Mechanical behavior of the seal-rock system and its relation to the damage zone continue to be an open issue.

Level of Detail for Conceptual Design in SCP

Adrian Brown reviewed the level of design detail needed in the SCP. The following detail is required:

(1) gross detail on repository design, including excavation layout, sequencing, etc., as it affects site characterization;

(2) complete detail on the ES test facility, shafts, etc.; and

(3) complete detail on all other boreholes to be drilled.

Further discussion was postponed until the Generic Technical Position on Design Information Needs could be read by all individuals.

Cohassett Flow Thickness

BWIP must present details of analyses done to confirm acceptability of construction in the Cohassett. This includes groundwater flow and stability. There is a need for in-situ testing in the vesicular zone if construction may occur there. This issue remains open.

Thermomechanical Modeling

K. Wahi and M. Board discussed the validity of modeling assumptions as they apply to the BWIP site. It was brought out in the discussion that we currently know very little about BWIP's modeling effort. We must determine:

(1) the logic which BWIP uses to select models and how it relates to the in-situ testing;

(2) how models are being used in design and risk assessment;

(3) how models are verified and benchmarked;

(4) how the modeling of BWIP's contractors relates to in-house development; and

(5) the shortcomings of the current models.

Ventilation

The possibility of methane and high air temperatures exists in the repository. To date, we have seen no calculations to alleviate these concerns.

Proposed Work Effort

1. New references for the Final EA reviews were examined and will be reviewed by the contractors prior to EA review. These will be listed by J. Buckley in the meeting minutes.

2. A position paper on rockbursting will be written by Itasca; the USBM will review it.

3. Engineers International will review their past papers on shaft seals and update as necessary.

4. K. Wahi will write a position paper on modeling assumptions and their relationship to site characterization and design.

5. A list of thermal and thermomechanical codes which NRC has obtained and which are currently being benchmarked by ACRES, Inc. were reviewed by Buckley, Wahi and Board. In a future work effort, Wahi and Itasca will divide up these codes and become familiar with their theory and operation. A preliminary division of effort was discussed.

This work will begin when formally assigned by the NRC.

Respectfully submitted,

Roger Hart

for Mark Board
Itasca Consulting Group, Inc.

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COST BREAK-OUT

Labor

M. Board	26 hrs @ $22.02/hr	$ 572.52
A. Brown	33 hrs @ $74.13/hr	2,446.29
	TOTAL LABOR	$ 3,108.81

Actual Expenses

Travel		
Airfare (to WDC)		
Board		$ 580.00
Brown		370.00
Miscellaneous Travel Expenses (car rental, gas, mileage, parking)		284.59
Motel		
Board (2 nights @ $42.35/night)		$ 84.70
Brown (2 nights @ $42.35/night)		84.70
Meals		
Board		60.00
Brown		106.11

Miscellaneous Expenses

Board (telephone)		$ 8.65
Brown (telephone, copies, (word processing)		50.84
	TOTAL EXPENSES:	$ 1,629.59