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**ITASCA**  
Consulting Group, Inc.

17 November 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 Progress Report No. 15 for the period 1-31 October 1986 on Task Orders No. 001, 002, and 003, Contract NRC-02-85-002. Also enclosed is the summary sheet for the October voucher. Please call me if you have any questions.

Sincerely,

*Roger D. Hart*  
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.  
rdh/ks

WM-RES  
WM Record File  
D1016  
Itasca

WM Project 10, 11, 16  
Docket No. \_\_\_\_\_

PDR ☒  
LPDR ☒ (B, N, S)

Distribution:  
\* D. Tiktinsky \* Joanne - ticket  
NSH  
(Return to WM, 623-SS) SAC

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## ITASCA MONTHLY PROGRESS REPORT

Progress Report No. 15  
NRC Technical Assistance  
for Design Reviews

17 November 1986  
Contract No. NRC-02-85-002

Reporting Period: 1 - 31 October 1986

### 1. INTRODUCTION

This progress report summarizes the work performed during October 1986 on NRC Contract No. NRC-02-85-002. Task Order No. 001 work consisted of document reviews and attendance at an Appendix VII Site Visit to Fluor Corp. in Irvine, California. For Task Order No. 002, work continued on the development of thermomechanical logic for MUDEC. Work on two point papers continued for Task Order No. 003.

### 2.0 ACTIVITIES DURING THE REPORTING PERIOD

- A. R. Hart attended an Appendix VII Site Visit to Fluor in Irvine, California, 1-3 October. The trip report was submitted on 10 October (Task Order No. 001).
- B. On 2 October, the following reviews were transmitted (Task Order No. 001):
  - (1) Itasca Review No. 001-02-24, "Chapter 2 — Geoengineering," Site Characterization Plan for NNWSI (Pink Draft); and
  - (2) Itasca Review No. 001-02-22, "Evaluation of Damaged Rock Zone Around Repository Openings," Rockwell Hanford Operations Computational Brief No. 573 (March 13, 1986)
- C. MUDEC Version 1.0 was sent to D. Tiktinsky on 3 October 1986 (Task Order No. 002).
- D. Itasca Review No. 001-02-23, "Geoengineering Design Parameters Workshop (Proceedings of a Workshop Held in Rapid City, South Dakota, June 25, 1985) by C. M. St. John and Kunsoo Kim (SD-BWI-TI-299) was transmitted on 7 October (Task Order No. 001).

**ITASCA**

- E. The trip report for the Geomechanics Modeling Review (held 15-16 September in Silver Spring) was transmitted on 7 October (Task Order No. 001).
- F. On 11 October, reference documents for in-situ testing were received from J. Peschal (Task Order No. 001).
- G. Progress Report No. 14 and Invoice No. 014-86-103 were transmitted on 13 October.
- H. The computer code FLAC, tested for thermal-mechanical analysis capabilities, was sent to D. Tiktinsky on 17 October (Task Order No. 002).
- I. On 20 October, Itasca Review No. 001-02-25, "Draft Test Plan for In-Situ Testing in an Exploratory Shaft in Salt," by Golder Associates (Battelle Memorial Institute Draft Plan No. EA-0207, March 1985) was transmitted (Task Order No. 001).

### 3.0 RESULTS

#### A. Document Reviews Completed in October:

- (1) "Chapter 2 — Geoengineering," Site Characterization Plan for NNWSI (Pink Draft)

Professional Labor: L. Lorig 6 hours

- (2) "Evaluation of Damaged Rock Zone Around Repository Openings," Rockwell Hanford Operations Computational Brief No. 573 (March 13, 1986)

Professional Labor: M. Board 8 hours

- (3) "Geoengineering Design Parameters Workshop (Proceedings of a Workshop Held in Rapid City, South Dakota, June 25, 1985) by C. M. St. John and Kunsoo Kim (SD-BWI-TI-299)

Professional Labor: M. Board 8 hours

- (4) "Draft Test Plan for In-Situ Testing in an Exploratory Shaft in Salt," by Golder Associates (Battelle Memorial Institute Draft Plan No. EA-0207, March 1985)

Professional Labor:	M. Board	4 hours
	R. Hart	4 hours

B. Document Reviews On-going in October:

- (1) BWIP In-Situ Test Plan

Professional Labor:	M. Board	20 hours
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- (2) "A Preliminary Assessment of Water Inflow into Proposed Excavations in the Cohasset Flow Interior," By F. M. Baker (Rockwell Hanford Operations "SD-BWI-TI-274, June 1985)

reviewed by NWC; labor hours to be reported next month

- (3) "Determination of an Upper Temperature Limit for Bentonite as a Backfill Component in a Nuclear Waste Repository in Basalt" by R. A. Palmer, R. G. Johnston, and M. I. Wood (Rockwell Hanford Operations RHO-BW-ST-47P, February 1983)

reviewed by NWC; labor hours to be reported next month

C. Other Works in Progress

- (1) verification of thermal analysis capabilities in MUDEC (Task No. 002)

Professional Labor:	R. Hart	7 hours
	L. Lorig	1 hours
	M. Mack	77 hours

- (2) site technical position on in-situ testing at NNWSI (Task No. 002)

Professional Labor:	L. Lorig	68 hours
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- (3) rockburst potential at BWIP Point Paper (Task Order No. 003)

Professional Labor: M. Board 61 hours

D. Other Works Completed

The thermal version of FLAC, with documentation, was transmitted.

4.0 QUALITY ASSURANCE

Correspondence, document review logs, and trip logs were monitored and updated. BWIP and NNWSI documents were received and catalogued.

5.0 DIFFICULTIES

No specific difficulties were experienced during this reporting period.

6.0 ACTIVITIES PLANNED FOR THE NEXT REPORTING PERIOD

- A. The following document reviews (Task Order No. 001) will be completed and submitted:

- (1) "A Preliminary Assessment of Water Inflow into Proposed Excavations in the Cohasset Flow Interior," By F. M. Baker (Rockwell Hanford Operations "SD-BWI-TI-274, June 1985); and
- (2) "Determination of an Upper Temperature Limit for Bentonite as a Backfill Component in a Nuclear Waste Repository in Basalt" by R. A. Palmer, R. G. Johnston, and M. I. Wood (Rockwell Hanford Operations RHO-BW-ST-47P, February 1983)

- B. Work will continue on preparations of the following papers:

- (1) rockburst potential at BWIP point paper (Task No. 003);

- (2) site technical positions on in-situ testing at NNWSI (Task Order No. 002); and
  - (3) identification and prioritization of major underground system components for NNWSI (Task No.003)
- C. The testing of thermal logic in MUDEC is to be completed (Task Order No. 002).
- D. The final thermomechanical point paper is to be submitted pending receipt of comments from NRC (Task Order No. 002).

7.0 MEETINGS/TRIPS DURING THE REPORTING PERIOD

- A. R. Hart attended an Appendix VII site visit to Fluor Corp. in Irvine, California, 1-3 October

R. Hart                      34 hours

(Note: labor hours for September portion of the trip, to SRPO in Columbus, were reported in Progress Report No. 14)

8.0 SCHEDULE AND COST PROJECTION

The billing summary for the October invoice is attached. Costs are well within the limit authorized for all three task orders.

Respectfully submitted,



Roger D. Hart  
Program Manager  
17 November 1986

Attach.  
rdh/ks

VOUCHER

Payor's Name and Address

U.S. Nuclear Regulatory Commission  
Division of Accounting  
Office of the Controller  
ATTENTION: GOV/COM Accounts Section  
Washington, D.C. 20555

Payee's Name and Address

Itasca Consulting Group, Inc.  
P.O. Box 14806  
Minneapolis, Minnesota 55414

(a) Contract Number: NRC-02-85-002  
(b) Title of Project: Technical Assistance  
for Design Reviews of High-Level Waste  
Geologic Repositories  
(c) Voucher Number: 015-86-124  
(d) Date of Voucher: November 14, 1986  
(e) Contract Amount: \$1,312,270.80  
(f) Fixed Fee: \$ 104,981.66

Individual to contact:

John J. Markham (612-623-9599)

(g) This voucher represents reimburseable costs from October 1 thru October 31, 1986

	<u>AMOUNT BILLED</u>	
	<u>(k) Current Period</u>	<u>(l) Inception to Date</u>
(h) <u>DIRECT COSTS</u>		
(1) Direct Labor	\$ 6,709.19	\$ 60,059.61
(2) Materials, Supplies and Noncapitalized Equipment	-0-	-0-
(3) Consultants	-0-	66,391.41
(4) Travel - Domestic	(129.00)	13,826.96
(5) Subcontract	803.38	25,382.21
(6) Other Costs	332.64	3,750.41
TOTAL DIRECT COSTS	7,716.21	169,410.60
(i) <u>INDIRECT COSTS</u>		
G & A Expense 106% of Cost Element (1)	7,111.73	63,663.19
TOTAL DIRECT AND INDIRECT COSTS	14,827.94	233,073.79
(j) FIXED-FEE EARNED	1,186.24	18,645.89
(m) TOTAL AMOUNTS CLAIMED	16,014.18	251,719.68
(n) ADJUSTMENTS	-0-	-0-
(o) GRAND TOTALS	16,014.18	251,719.68

# SUPPORTING INFORMATION

TASK ORDER-001  
TASK 2 DOCUMENT REVIEWS  
(h) DIRECT COSTS

(1) Direct Labor		Hours			
Labor Category	Name	Billed	Rate		Total
Prog. Manager	R. Hart	3.0	\$22.12		\$66.36
Admin. Manager	L. Gaarder	2.0	\$8.25		\$16.50
	J. Markham	5.0	\$24.04		\$120.20
Sr. Engineer	M. Board	40.0	\$22.02		\$880.80
	L. Lorig	6.0	\$19.95		\$119.70
	R. Hart	4.0	\$22.12		\$88.48
Secretarial	K. Sikora	25.0	\$9.38		\$234.50
	L. Gaarder	2.0	\$8.25		\$16.50
QA	K. Sikora	0.5	\$9.38		\$4.69
Total Direct Labor					\$1,547.73

(5) Subcontract		
Nuclear Waste Consultants, Inc.		\$803.38 *

(6) Other Costs		
	Copies	\$36.90 *
	Telephone	\$22.26 *
	Postage	\$35.30 *
		\$94.46

TOTAL DIRECT COSTS	\$2,445.57
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(i) INDIRECT COSTS	
G & A Expense (1.06 x Direct Labor)	\$1,640.59

TOTAL DIRECT AND INDIRECT COSTS	\$4,086.16
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(j) FIXED FEE EARNED	\$326.89
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(m) TOTAL AMOUNT CLAIMED	\$4,413.05
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\* Invoice Attached



# SUPPORTING INFORMATION

TASK ORDER-001  
TASK 4 TECHNICAL MEETINGS  
(h) DIRECT COSTS

(1) Direct Labor		Hours			
Labor Category	Name	Billed	Rate	Total	
Admin. Manager	L. Gaarder	2.0	\$8.25	\$16.50	
Sr. Engineer	R. Hart	34.0	\$22.12	\$752.08	
Secretarial	K. Sikora	4.0	\$9.38	\$37.52	
	L. Gaarder	2.0	\$8.25	\$16.50	
QA	K. Sikora	0.5	\$9.38	\$4.69	
Total Direct Labor				\$827.29	

## (4) Travel

From	To	Traveller	Costs	
8/18/86	8/22/86	M. Board	1) Airfare	(\$129.00)#
	Destination		2) Hotel	
			3) Meals	
From	To	Purpose	4) Transportation	
			5) Parking	
Mpls,MN	Richland,WA	BWIP Appendix VII		
		Site Visit		
				(\$129.00)

Total Itasca Travel

(\$129.00)

## (6) Other Costs

Copies	\$36.50 *
Telephone	\$7.22 *
Postage	\$32.36 *

\$76.08

TOTAL DIRECT COSTS

\$774.37

## (i) INDIRECT COSTS

G & A Expense (1.06 x Direct Labor)

\$876.93

TOTAL DIRECT AND INDIRECT COSTS

\$1,651.30

## (j) FIXED FEE EARNED

\$132.10

## (m) TOTAL AMOUNT CLAIMED

\$1,783.40

# SUPPORTING INFORMATION

TASK ORDER-002

TASK 1 SITE SPECIFIC IN SITU TESTING POINT PAPERS

## (h) DIRECT COSTS

(1) Direct Labor			Hours		
Labor Category	Name	Billed	Rate	Total	
Admin. Manager	L. Gaarder	1.0	\$8.25	\$8.25	
Sr. Engineer	L. Lorig	68.0	\$19.95	\$1,356.60	
Secretarial	K. Sikora	13.0	\$9.38	\$121.94	
	L. Gaarder	1.0	\$8.25	\$8.25	
QA	K. Sikora	0.5	\$9.38	\$4.69	
Total Direct Labor				\$1,499.73	

## (6) Other Costs

Copies	\$35.10 *
Telephone	\$33.95 *
Postage	\$4.49 *

\$73.54

## TOTAL DIRECT COSTS

\$1,573.27

## (i) INDIRECT COSTS

G & A Expense (1.06 x Direct Labor)

\$1,589.71

## TOTAL DIRECT AND INDIRECT COSTS

\$3,162.98

## (j) FIXED FEE EARNED

\$253.04

## (m) TOTAL AMOUNT CLAIMED

\$3,416.02

\* Invoice Attached

# SUPPORTING INFORMATION

TASK ORDER-002

TASK 2 THERMOMECHANICAL ANALYSIS

## (h) DIRECT COSTS

(1) Direct Labor		Hours		
Labor Category	Name	Billed	Rate	Total
Prog. Manager	R. Hart	7.0	\$22.12	\$154.84
Admin. Manager	L. Gaarder	2.0	\$8.25	\$16.50
	J. Markham	6.0	\$24.04	\$144.24
Sr. Engineer	L. Lorig	1.0	\$19.95	\$19.95
Asst. Engineer	M. Mack	77.0	\$12.00	\$924.00
Secretarial	K. Sikora	8.5	\$9.38	\$79.73
	L. Gaarder	1.0	\$8.25	\$8.25
QA	K. Sikora	0.5	\$9.38	\$4.69
Total Direct Labor				\$1,352.20

## (6) Other Costs

Copies	\$24.80 *	
Telephone	\$8.85 *	
Postage	\$54.91 *	
	-----	\$88.56

## TOTAL DIRECT COSTS

\$1,440.76

## (i) INDIRECT COSTS

G & A Expense (1.06 x Direct Labor)	\$1,433.33
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## TOTAL DIRECT AND INDIRECT COSTS

\$2,874.09

## (j) FIXED FEE EARNED

\$229.93

## (m) TOTAL AMOUNT CLAIMED

\$3,104.02

\* Invoice Attached

# SUPPORTING INFORMATION

TASK ORDER-003

TASK 1 POINT PAPER ON ROCKBURST POTENTIAL

## (h) DIRECT COSTS

(1) Direct Labor		Hours			
Labor Category	Name	Billed	Rate		Total
-----	----	-----	----		-----
Admin. Manager	L. Gaarder	1.0	\$8.25		\$8.25
	J. Markham	2.0	\$24.04		\$48.08
Sr. Engineer	M. Board	61.0	\$22.02		\$1,343.22
Secretarial	K. Sikora	2.0	\$9.38		\$18.76
	L. Gaarder	1.0	\$8.25		\$8.25
QA					\$0.00
					-----
Total Direct Labor					\$1,426.56
					-----
TOTAL DIRECT COSTS					\$1,426.56

## (i) INDIRECT COSTS

G & A Expense (1.06 x Direct Labor)	\$1,512.15
	-----

TOTAL DIRECT AND INDIRECT COSTS	\$2,938.71
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## (j) FIXED FEE EARNED

\$235.10
-----

## (m) TOTAL AMOUNT CLAIMED

\$3,173.81
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# SUPPORTING INFORMATION

TASK ORDER-003

TASK 2 IDENTIFICATION OF UNDERGROUND SYSTEM DESIGN COMPONENTS

## (h) DIRECT COSTS

(1) Direct Labor			Hours		
Labor Category	Name		Billed	Rate	Total
-----	----		-----	-----	-----
Secretarial	K. Sikora		6.0	\$9.28	\$55.68

Total Direct Labor	\$55.68
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TOTAL DIRECT COSTS	\$55.68
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## (i) INDIRECT COSTS

G & A Expense (1.06 x Direct Labor)	\$59.02
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TOTAL DIRECT AND INDIRECT COSTS	\$114.70
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(j) FIXED FEE EARNED	\$9.18
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(m) TOTAL AMOUNT CLAIMED	\$123.88
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Nov-86  
TASK ORDER 001  
TASK 2

TASK LABOR SUMMARY

REVIEW OF DOCUMENTS

LABOR CATEGORY	BUDGETED HRS	TOTAL HRS BILLED	HRS REMAINING
PROGRAM MGR	96	36	60
ADMIN MGR	120	92	28
SR. ENGINEER	980	600.5	379.5
ASST. ENGINEER	300	0	300
SR. REVIEWER	48	0	48
QA	48	17	31
SECRETARIAL	200	258.5	-58.5
	-----	-----	-----
TOTAL ITASCA	1792	1004	788
CONSULTANT			
	-----		
J. DAEMEN	168	172	-4
I. FARMER	88	80	8
ASST. ENGINEER	208	0	208
R. BARNES	0	20	-20
K. WAHI	0	74	-74
R. RAJARAM	0	50	-50
	-----	-----	-----
TOTAL CONSULT	464	396	68
SUBCONTRACTOR-NWC			
	-----		
PRIN. INVEST.	256	69	187
SR ENGINEER	144	0	144
ENGINEER/GEOL	208	31	177
DRAFTING	0	2	-2
CLERICAL	100	38	62
	-----	-----	-----
TOTAL SUBCONT	708	140	568
	=====	=====	=====
TOTAL TASK	2964	1540	1424

Nov-86  
TASK ORDER 001

TASK LABOR SUMMARY

TASK 4 TECHNICAL MEETINGS

LABOR CATEGORY	BUDGETED HRS	TOTAL HRS BILLED	HRS REMAINING
PROGRAM MGR	62	37	25
ADMIN MGR	76	76.5	-0.5
PRIN. INVEST.	588	33	555
SR. ENGINEER	1108	372	736
SR REVIEW	0	24	-24
QA	32	13	19
SECRETARIAL	148	95.5	52.5
TOTAL ITASCA	2014	651	1363

CONSULTANT

J. DAEMEN	588	152	436
I. FARMER	104	61	43
K. WAHI	0	109	-109
R. RAJARAM	0	30	-30
Y. KIM	0	80	-80
TOTAL CONSULT	692	432	260

SUBCONTRACTOR-NWC

PRIN. INVEST.	588	147	441
CLERICAL	44	28	16
TOTAL SUBCONT	632	175	457

TASK TOTAL	3338	1258	2080
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TASK ORDER TOT	6545	2822.5	3722.5
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Nov-86  
TASK ORDER 002  
TASK 1

TASK LABOR SUMMARY

SITE SPECIFIC IN-SITU TESTING POINT PAPERS

LABOR CATEGORY	BUDGETED HRS	TOTAL HRS BILLED	HRS REMAINING
PROGRAM MGR	72	11	61
ADMIN MGR	96	31.5	64.5
SR. ENGINEER	872	490	382
SR REVIEW	12	12	0
QA	48	5.5	42.5
SECRETARIAL	126	71	55
	-----	-----	-----
TOTAL ITASCA	1226	621	605
CONSULTANT			
	-----		
J. DAEMEN	72	16	56
I. FARMER	40	0	40
K. WAHI	72	0	72
	-----	-----	-----
TOTAL CONSULT	184	16	168
SUBCONTRACTOR-NWC			
	-----		
PRIN. INVEST.	72	37	35
ASST. PROF.	0	4	-4
CLERICAL	8	18	-10
	-----	-----	-----
TOTAL SUBCONT	80	59	21
	=====	=====	=====
TASK TOTAL	1306	680	626



Nov-86  
TASK ORDER 002  
TASK 2

TASK LABOR SUMMARY

THERMOMECHANICAL ANALYSES

LABOR CATEGORY	BUDGETED HRS	TOTAL HRS BILLED	HRS REMAINING
PROGRAM MGR	54	19	35
ADMIN MGR	72	37.5	34.5
SR. ENGINEER	592	348	244
ASST. ENGINEER	320	430	-110
SR REVIEW	88	0	88
QA	16	7	9
SECRETARIAL	112	175	-63
TOTAL ITASCA	1254	1016.5	237.5
CONSULTANT			
J. DAEMEN	0	24	-24
K. WAHI	80	85	-5
TOTAL CONSULT	80	85	-5
TASK TOTAL	1334	1101.5	232.5
TASK ORDER TOT	2640	1781.5	858.5

Nov-86  
TASK ORDER 003  
TASK 1 ROCKBURST POTENTIAL AT BWIP

TASK LABOR SUMMARY

LABOR CATEGORY	BUDGETED HRS	TOTAL HRS BILLED	HRS REMAINING
PROGRAM MGR	8	0	8
ADMIN MGR	16	3	13
SR. ENGINEER	160	61	99
SR REVIEW	16	0	16
QA	6	0	6
SECRETARIAL	36	3	33
	-----	-----	-----
TOTAL ITASCA	242	67	175
SUBCONTRACTOR-NWC			
-----			
PRIN. INVEST.	40	0	40
SR ENGINEER	24	0	24
CLERICAL	8	0	8
	-----	-----	-----
TOTAL SUBCONT	72	0	72
	=====	=====	=====
TASK TOTAL	314	67	247

Nov-86  
TASK ORDER 003

TASK LABOR SUMMARY

TASK 2 IDENTIFICATION AND PRIORITIZATION OF MAJOR  
UNDERGROUND SYSTEM DESIGN COMPONENTS FOR NNWSI

LABOR CATEGORY	BUDGETED HRS	TOTAL HRS BILLED	HRS REMAINING
PROGRAM MGR	6	0	6
ADMIN MGR	12	2	10
SR. ENGINEER	80	1	79
QA	4	0	4
SECRETARIAL	20	6	14
	-----	-----	-----
TOTAL ITASCA	122	9	113
CONSULTANT			
J. DAEMEN	80	0	80
	-----	-----	-----
	80	0	80
	=====	=====	=====
TASK TOTAL	202	9	193
	=====	=====	=====
TASK ORDER TOT	516	76	440