



10 December 1987

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. 28 for the period 1-30 November 1987 on Task Orders No. 002, 005, and 006, Contract NRC-02-85-002. Also enclosed is the summary sheet for the November voucher. Please call me if you have any questions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Roger D. Hart".

Roger D. Hart
Program Manager

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

Encl.
rdh/ks

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PDR WMRES EECITAS
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WM Project: WM-10, 11, 16

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WM Record Files D-1016

LPDR w/encl

ITASCA MONTHLY PROGRESS REPORT

Progress Report No. 28
NRC Technical Assistance
for Design Reviews

10 December 1987
Contract No. NRC-02-85-002

Reporting Period: 1 - 30 November 1987

1.0 INTRODUCTION

This progress report summarizes the work performed during November 1987 on NRC Contract No. NRC-02-85-002. During November, work progressed on Task Orders No. 002, 005, and 006.

2.0 ACTIVITIES DURING THE REPORTING PERIOD

- A. On 2 November, written authorization was received for the following activities:
1. attendance at the Appendix 7 meeting for NNWSI in Las Vegas during September 1987 (Task Order No. 001)
 2. participation in a visit to Falconbridge Mines in Sudbury, Ontario, 21-23 October 1987 (Task Order No. 001)
 3. review of the following documents (Task Order No. 006):
 - a. conceptual design documents from September 1987 Appendix 7 visit in Houston
 - b. "Exploratory Shaft Facility Water Inflow Design Calculations," RHO CB-00617, February 1987
 - c. "Further Analysis of Joint Stiffness From Jointed Triaxial Testing," RHO CB-0622, February 1987

- d. "Character and Distribution of Borehole Breakouts and Their Relationship to In Situ Stresses in Deep Columbia River Basalts," J. Geophys. Res., 92, 6223-6234 (1987)
 - e. "LAR Review of BWIP SCP," May 1987
 - f. "ESF Design Basis Study," RHO SD-BWI-ER-018, June 1987
 - g. "SCP CDR for BWIP," RHO SD-BWI-CDR-005, June 1986
 - h. "Exploratory Shaft Test Portholes Configuration, RHO SD-BWI-TI-119
 - i. "Performance Sensitivity Analysis of the Repository Seals Subsystem - Boreholes Drilled From Repository Excavations," RHO SD-BWI-TI-342
 - j. "Primary Fracture Frequency, RQD and Core Break Frequency Calculated From Cohasset Drill Core Data," RHO DER-CB-0023, June 1987
- B. Progress Report No. 27 and Invoice No. 27-87-159 were transmitted on 12 November 1987.
- C. On 16 November, the paper "Numerical Parametric Sensitivity Study of Thermal and Mechanical Properties for a High-Level Nuclear Waste Repository" was received for review (Task Order No. 006).
- D. On 20 November, DSI versions of MUDECT and FLACT were transmitted (Task Order No. 005).

- E. Itasca Document Review 006-01-39, "Summary Review of NNWSI Thermomechanical Analysis Documents" was transmitted (Task Order No. 006). The review was compiled from the following documents:
1. "Thermal Analysis of Spent Fuel Disposal in Vertical Emplacement Boreholes in a Welded Tuff Repository" by C. M. St. John (SAND84-7207, November 1985)
 2. "Analysis of Horizontal Waste Emplacement Boreholes of a Nuclear Waste Repository in Tuff" by K. Arulmoli and C. M. St. John (SAND86-7133, March 1987)
 3. "Sensitivity Analyses of Underground Drift Temperature, Stresses, and Safety Factors to Variation in the Rock Mass Properties of Tuff for a Nuclear Waste Repository Located at Yucca Mountain, Nevada" by B. L. Ehgartner (SAND86-1250, May 1987)
 4. "Reference Thermal and Thermal/Mechanical Analyses of Drifts for Vertical and Horizontal Emplacement of Nuclear Waste in a Repository in Tuff" by C. M. St. John [SAND86-7005, May 1987(a)]
 5. "Investigation of Excavation Stability in a Finite Repository" by C. M. St. John and S. J. Mitchell (SAND86-7011, May 1987)
 6. "Near Field Mechanical Calculations Using a Continuum Jointed Rock Model in the JAC Code" by R. K. Thomas (SAND83-0070, May 1987)
 7. "Thermomechanical Analysis of Underground Excavations in the Vicinity of a Nuclear Waste Isolation Panel" by C. M. St. John [SAND84-7208, June 1987(b)].

3.0 RESULTS

A. Documents Submitted in November

Itasca Document Review 006-01-39, "Summary Review of NNWSI Thermomechanical Analysis Documents" (Task Order No. 006)

Professional Labor	J. Daemen	14	hours
	L. Lorig	16.5	hours

B. Works in Progress

1. SRP in-situ testing point paper (Task Order No. 002)

Professional Labor	B. Brady	88	hours
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2. analysis of continuum vs discontinuum modeling for BWIP (Task Order No. 005)

Professional Labor	M. Board	23	hours
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3. thermomechanical analysis for BWIP (Task Order No. 005)

Professional Labor	M. Board	48	hours
	K. Nelson	8	hours
	D. Russell	10	hours

4. sensitivity analyses for key joint parameters at BWIP (Task Order No. 005)

Professional Labor	M. Christianson	70.5	hours
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5. analyses of DOE's proposed conceptual design for SRP (Task Order No. 005)

Professional Labor	M. Mack	23	hours
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6. analyses of key parameters in support of in-situ testing at SRP (Task Order No. 005)

Professional Labor	M. Mack	26.5	hours
	K. Nelson	0.5	hours

7. Itasca Document Review 006-01-40, "Review of HEFF Manual (Task Order No. 006)

Professional Labor	B. Brady	5	hours
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8. Itasca Document Review NO. 006-01-42, "STRES3D and Link to Thermal Output of FLAC" (Task Order No. 006)

Professional Labor	M. Mack	25	hours
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9. Itasca Document Review No. 006-01-52, "Numerical Parametric Sensitivity Study of Thermal and Mechanical Properties for a High-Level Nuclear Waste Repository" (Task Order No. 006)

Professional Labor	L. Lorig	12	hours
	K. Wahi	19	hours

10. Itasca Document Review 006-01-53, "ESF 60% Design Drawings Review" (Task Order No. 006)

Professional Labor	B. Brady	1	hour
	R. Hart	64	hours

11. Itasca Document Review No. 006-01-54, "Response to Information Requests From April 14-15, 1987 Meeting Between U.S. DOE and U.S. NRC" (Task Order No. 006)

Professional Labor	J. Daemen	9	hours
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4.0 QUALITY ASSURANCE

Correspondence logs were monitored and BWIP, NNWSI and SRP documents were received and catalogued.

5.0 DIFFICULTIES

No specific difficulties were encountered during this reporting period. Written authorization is requested for three articles which Itasca has received to review:

- A. "Response to Information Requests From April 14-15, 1987 Meeting Between U.S. DOE and U.S. NRC"
- B. "Technical Basis for Performance Goals, Design Requirements, and Material Recommendations for the NNWSI Repository Sealing Program" (SAND84-1895, September 1987)
- C. "Numerical Parametric Sensitivity Study of Thermal and Mechanical Properties for a High-Level Nuclear Waste Repository"

6.0 ACTIVITIES PLANNED FOR THE NEXT REPORTING PERIOD

- A. Work will continue on preparation of the following tasks.
 - 1. sensitivity analyses for key joint parameters at BWIP (Task Order No. 005)
 - 2. analyses of DOE's proposed conceptual design for SRP (Task Order No. 005)
 - 3. thermomechanical analysis for BWIP (Task Order No. 005)
 - 4. analysis of key parameters in support of in situ testing at SRP (Task Order No. 005)
 - 5. SRP in-situ testing point paper (Task Order No. 002)
 - 6. Document Review 006-01-40, "Review of HEFF Manual (Task Order No. 006)

7. Document Review 006-01-41, "Thermal Rockbolt Logic in MUDEC" (Task Order No. 006)
8. Document Review No. 006-01-42, "STRES3D and Link to Thermal Output of FLAC" (Task Order No. 006)
9. Document Review No. 006-01-45, "Character and Distribution of Borehole Breakouts and Their Relationship to In Situ Stresses in Deep Columbia River Basalts"
10. Document Review No. 006-01-54, "Response to Information Requests From April 14-15, 1987 Meeting Between U.S. DOE and U.S. NRC"

B. Activities to be completed in December:

1. continuum versus discontinuum modeling for BWIP (Task Order No. 005)
2. "Site Technical Position on In-Situ Testing at NNWSI" (Task Order No. 002)
3. Document Review 006-01-52, "Numerical Parametric Sensitivity Study of Thermal and Mechanical Properties for a High-Level Nuclear Waste Repository"
4. Document Review 006-01-53, "ESF 60% Design Drawings Review" (Task Order No. 006)

7.0 MEETINGS/TRIPS DURING THE REPORTING PERIOD

There were no meetings attended or trips taken in November.

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8.0 SCHEDULE AND COST PROJECTION

The billing summary for the November invoice is attached.
All task orders remain within the allotted budgets.

Respectfully submitted,



Roger D. Hart
Program Manager

10 December 1987

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

(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: 28-87-171
(d) Date of Voucher: December 11, 1987
(e) Contract Amount: \$1,312,270.80
(f) Fixed Fee: \$ 104,981.66

Payee's Name and Address

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

Individual to contact:

John J. Markham (612-623-9599)

(g) This voucher represents reimburseable costs from November 1 thru November 30, 1987

	<u>AMOUNT BILLED</u>	
	(k) <u>Current Period</u>	(l) <u>Inception to Date</u>
(h) <u>DIRECT COSTS</u>		
(1) Direct Labor	<u>\$ 9,901.01</u>	<u>\$150,373.30</u>
(2) Materials, Supplies and Noncapitalized Equipment	<u>-0-</u>	<u>-0-</u>
(3) Consultants	<u>2,606.95</u>	<u>106,000.15</u>
(4) Travel - Domestic	<u>-0-</u>	<u>27,139.59</u>
(5) Subcontract	<u>-0-</u>	<u>31,682.82</u>
(6) Other Costs	<u>2,358.51</u>	<u>14,365.67</u>
TOTAL DIRECT COSTS	<u>14,874.47</u>	<u>329,561.53</u>
(i) <u>INDIRECT COSTS</u>		
G & A Expense 102% of Cost Element (1)	<u>10,107.18</u>	<u>156,765.51</u>
TOTAL DIRECT AND INDIRECT COSTS	<u>24,981.65</u>	<u>486,327.04</u>
(j) <u>FIXED-FEE EARNED</u>	<u>1,998.53</u>	<u>39,286.38</u>
(m) <u>TOTAL AMOUNTS CLAIMED</u>	<u>26,980.18</u>	<u>525,613.42</u>
(n) <u>ADJUSTMENTS</u>	<u>-0-</u>	<u>-0-</u>
(o) <u>GRAND TOTALS</u>	<u>\$26,980.18</u>	<u>525,613.42</u>

PDR
LPDR - WM-10 (2)
11 (2)
16 (2)

WM Record File
D1016
Itasca

WM Project 10, 11, 16
Docket No. _____
PDR ✓
LPDR ✓ (B, N, S)

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