



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 01, 1998

Dr. Stephan J. Brocoum
Assistant Manager for Licensing
U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Yucca Mountain Site Characterization Office
P. O. Box 30307
North Las Vegas, Nevada 89036-0307

SUBJECT: REVIEW OF THE U.S. DEPARTMENT OF ENERGY'S 3-DIMENSIONAL
GEOLOGIC FRAMEWORK MODEL OF YUCCA MOUNTAIN, VERSION 3.0 - A
STEP IN THE REVIEW OF THE U.S. DEPARTMENT OF ENERGY'S INTEGRATED
SITE MODEL

Dear Dr. Brocoum:

This letter responds to your request for the U.S. Nuclear Regulatory Commission (NRC) staff to comment on the adequacy and sufficiency of the U.S. Department of Energy's (DOE's) Integrated Site Model Version 2.0 (ISM2.0) for its various uses (letter from S.J. Brocoum to J.T. Greeves, dated November 21, 1997). For reasons stated below, the NRC staff will review ISM3.0 and subsequent revisions, instead of ISM2.0. The staff has completed a review of DOE's Geologic Framework Model 3.0 (GFM3.0), the framework for the soon-to-be-released ISM3.0. The principal conclusion and result of the GFM3.0 review is that GFM3.0 is an adequate tool for various site-scale analyses of stratigraphy and faults at Yucca Mountain.

NRC, through the Center for Nuclear Waste Regulatory Analyses (CNWRA), initiated work on a 3-Dimensional (3D) geologic framework model of the Yucca Mountain site, using EarthVision software from DGI for the purpose of developing an independent capability to review DOE's 3D models (Stirewalt, et al., CNWRA 94-023, 1994). DOE was developing its ISM on EarthVision. The staff became cognizant of ISM2.0 by observing Quality Assurance audits of ISM2.0 and through an Appendix 7 meeting, July 16-17, 1997 (letter dated December 15, 1997, from N.K. Stablein to S.J. Brocoum). In November 1997, you requested that the staff specifically comment on the adequacy and sufficiency of ISM2.0 for site characterization and design, and as an approach to modeling geologic and static rock properties' (letter from S. Brocoum to J. Greeves, *ibid.*, p.2). DOE's Management and Operations (M&O) contractor assisted CNWRA staff in getting ISM2.0 up and running in September 1997 (letter from N.K. Stablein to S. Brocoum, enclosure, part III, *ibid.*). The staff began a limited review of ISM2.0.

Early in January 1998, as NRC Headquarters (HQ) staff was upgrading its EarthVision computer capability to run ISM2.0, the staff was notified that ISM3.0 would soon replace ISM2.0 (subsequently, ISM3.0 was delayed to FY99). The CNWRA and HQ staffs were provided copies of GFM3.0, the geologic framework of ISM3.0. Because ISM2.0 was to become obsolete, NRC focused its review on ISM3.0 and started by testing GFM3.0. Once again, a technology transfer was held with the invaluable assistance of R. Clayton of the M&O, this time at NRC HQ, for CNWRA and HQ staffs (letter from N.K. Stablein to S. Rousso dated June 22, 1998, Minutes of the May 28-29, 1998, Technical Exchange on DOE's GFM3.0).

9810070104 981001
PDR WASTE
WM-11 PDR

98-147

402

WH-11

1/6
NH16

S. Brocoun

2

The results of the staff's review of GFM3.0 are as follows: GFM is adequate for the purposes of (1) depicting: (a) faults - 42 are included in the model; (b) fault blocks - 43 are included; (c) stratigraphic horizons - 50 surfaces are included; (d) the topographic surface at the scale of the repository site; and (2) providing a geologic framework for displaying and assessing parameter distributions of site characteristics, such as hydrologic and rock properties (for details, see Appendix F of the Structural Deformation and Seismicity Key Technical Issue "Issue Resolution Status Report, Revision 1," that will be sent to you under separate cover.

As a result of the staff's favorable review of GFM3.0, for having developed the capability to fully utilize the model and with consideration of the costs of resources needed to develop a tool similar to GFM3.0, the staff will use an adapted version of GFM3.0 for the purposes of reviewing and conducting its own analyses of the Yucca Mountain site.

When the staff receives the final version of ISM3.0, I will provide you with a timetable to accomplish our review of the adequacy and sufficiency of ISM3.0 for various uses at Yucca Mountain. If you have any questions, please contact Dr. Philip S. Justus of my staff. He can be reached at (301) 415-6745 or at psj@nrc.gov.

Sincerely,

Original Signed By

Michael J. Bell, Chief
Engineering and Geosciences Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

cc: See attached list

DISTRIBUTION:	Central File	MWeber	SWastler	NMSS r/f	RWeller
ENGB r/f	LSS	ACNW	Albrahim	OSR	KTI leads
JGreeves	LMcKague, CNWRA		JStamatakis, CNWRA		PUBLIC

DOCUMENT NAME: S:\DWM\ENGB\AKI\GFM30REV.LTR

OFC	ENGB	ENGB	ENGB	ENGB
NAME	PSJustus:cc/ p/r	DBrooks	NKStablein	MJBell
DATE	09/30/98	09/30/98	10/01/98	09/01/98

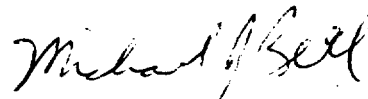
OFFICIAL RECORD COPY

The results of the staff's review of GFM3.0 are as follows: GFM is adequate for the purposes of (1) depicting: (a) faults - 42 are included in the model; (b) fault blocks - 43 are included; (c) stratigraphic horizons - 50 surfaces are included; (d) the topographic surface at the scale of the repository site; and (2) providing a geologic framework for displaying and assessing parameter distributions of site characteristics, such as hydrologic and rock properties (for details, see Appendix F of the Structural Deformation and Seismicity Key Technical Issue "Issue Resolution Status Report, Revision 1," that will be sent to you under separate cover.

As a result of the staff's favorable review of GFM3.0, for having developed the capability to fully utilize the model and with consideration of the costs of resources needed to develop a tool similar to GFM3.0, the staff will use an adapted version of GFM3.0 for the purposes of reviewing and conducting its own analyses of the Yucca Mountain site.

When the staff receives the final version of ISM3.0, I will provide you with a timetable to accomplish our review of the adequacy and sufficiency of ISM3.0 for various uses at Yucca Mountain. If you have any questions, please contact Dr. Philip S. Justus of my staff. He can be reached at (301) 415-6745 or at psj@nrc.gov.

Sincerely,



Michael J. Bell, Chief
Engineering and Geosciences Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

cc: See attached list

Distribution List for Letter to Stephan Brocoun dated: September 30, 1998

cc: S. Rousso, DOE/Wash, DC
R. Loux, State of Nevada
B. Price, Nevada Legislative Committee
J. Meder, Nevada Legislative Counsel Bureau
R. Dyer, YMPO
C. Einberg, DOE/Wash, DC
N. Slater, DOE/Wash, DC
A. Brownstein, DOE/Wash, DC
J. Hoffman, State of Nevada
M. Murphy, Nye County, NV
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
D. Weigel, GAO
B. Mettam, Inyo County, CA
V. Poe, Mineral County, NV
W. Cameron, White Pine County, NV
T. Manzeni, Lander County, NV
L. Fiorenzi, Eureka County, NV
E. von Tiesenhausen, Clark County, NV
J. Regan, Churchill County, NV
L. Bradshaw, Nye County, NV
W. Barnard, NWTRB
R. Holden, NCAI
A. Collins, NIEC
R. Arnold, Pahrump County, NV
N. Stellavato, Nye County, NV
J. Lyznicky, AMA
R. Clark, EPA
F. Marcinowski, EPA/Wash, DC
A. Gil, YMPO
R. Anderson, NEI
S. Kraft, NEI
S. Frishman, Agency for Nuclear Projects
S. Hanauer, DOE/Wash, DC
D. Horton, YMPO
J. Kessler, EPRI
M. Michewicz, DOE
L. Barrett, DOE/Wash, DC
S. Dudley, Esmeralda County, NV
E. Culverwell, Lincoln County, NV
J. Wallis, Mineral County, NV
A. Mitre, NIEC