D1018

PDR-1
LPDR-Wm-10(2)
Wm-11(2)
Wm-16(2)

426.1 CA/87/05/12

MAY 13 1987

MEMORANDUM FOR: Randy Read
Division of Minerals Availability
U.S. Bureau of Mines
2401 E. Street, NW
Washington, DC 20241

FROM: Charlotte Abrams
Geology/Geophysics Section
Technical Review Branch
Division of High-Level Waste Management
Office of Nuclear Material Safety
and Safeguards

SUBJECT: WORK DIRECTIVE O/O UNDER TASK ORDER 002 OF INTERAGENCY AGREEMENT NRC-02-85-004

As part of Task Order 002 of Interagency Agreement NRC-02-85-004, this Work Directive is for appropriate Bureau of Mines staff, in support of NRC, to examine well and mine data for western U.S. mines to determine any effect of regional earthquakes on groundwater or underground workings. Hydrologic effects should include documented well level fluctions, flooding in mines or tunnels, or spring modifications. Mine data should be examined for any documentation of damage to openings or underground workings as a result of earthquakes. In addition, if there are any mining areas within the region where persistent induced seismicity has been observed or numerous rock bursts have been reported, these locations should be included in the mine damage summary.

Attached is a listing of earthquakes which should be considered and represent the larger events that have occurred in the intermontane region between the Rocky Mountains on the east and the Sierra Nevada-Cascades on the west. Most of the earthquakes on this list were taken from the U.S. Department of Commerce Publication Number 41-1, "Earthquake History of the United States," and its supplement. These data were updated by information in the Earthquake Engineering Research Institute monograph by S. T. Algermissen, "An Introduction to the Seismicity of the United States." The geographical limits of the region are clockwise from 49°N, 121°W, to 49°N, 113°W, to 42°N, 106°W, to 31°N, 106°W, to 31°N, 113°W, to 39°N, 121°W, and back to 49°N, 121°W. This region is illustrated on the attached seismicity map prepared from figures in the Algermissen monograph. The events listed are of Modified Mercalli Intensity VIII or greater with the exception of the Milton-Freewater earthquake which is within 125 kilometers of the potential HLW disposal site on the Hanford Reservation.

Wm-RES
WM Record File
D1018
BOM

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

87176467
WM Project: WM-10,11,16
PDR w/encl
(Return to WM, 623-SS)

WM Record File: D1018
LPDR w/encl

3911

The level of effort for this work is twenty (20) staff weeks. Receipt of the completed report described above with an accompanying transmittal memorandum by October 15, 1987, will constitute the deliverable associated with the Work Directive.

/s/

Charlotte Abrams, Project Manager
Geology/ Geophysics Section
Technical Review Branch
Division of Waste Management

Enclosures: as stated

cc: Mary Little, Division of Contracts

LARGER EARTHQUAKES OF THE WESTERN UNITED STATES
INTERMONTANE REGION

DATE	GCT	LOCATION	NLAT	WLON	MAG	MMI	REF
1852-11-09		Near Fort Yuma, AZ?	33	114½		VIII?	1,8,10
1872-03-26	1030	Owens Valley, CA	36½	118		X-XI	
1872-12-15	0540	Near Lake Chelan, WA	49.2	121.0	7.0?	IX	
1884-11-10		Utah-Idaho border	41.5	111.2		VIII	
1887-05-03	2113	Sonora, Mexico	31	109		VIII-IX	1,6
1893-03-07		Umatilla, OR	45.9	119.3		VII	
1901-11-14	0430	50km E of Milford, UT	38.7	112.1		VIII	1,3
1902-11-17	1953	Pine Valley, UT	37.4	113.5		VIII	
1906-07-16	1900	Socorro, NM	34.0	107.0		VIII	1,4,7
1910-09-24	0405	Northeast Arizona	36.0	111.1		VIII	
1912-08-18	2112	Near Williams, AZ	36.5	111.5		VIII	
1915-10-03	0553	Pleasant Valley, NV	40½	117½	7.7	X	
1921-09-29	1412	Elsinore, UT	38.8	112.2		VIII	
1921-09-30	0230	Elsinore, UT	38.8	112.2		VIII	1,2
1921-10-01	1532	Elsinore, UT	38.8	112.2		VIII	1,2
1925-06-28	0121	East of Helena, MT	46.0	111.2	6.7	VIII	1,5,12
1932-12-21	0610	Cedar Mountain, NV	38.7	117.8	7.3	X	
1934-01-30	1924	SE of Hawthorne, NV	38.3	118.4		VIII-IX	
1934-01-30	2017	SE of Hawthorne, NV	38.3	118.4		VIII-IX	
1934-03-12	1506	Hansel Valley, UT	41.7	112.8	6.6	VIII	9,12
1934-03-12	1720	Hansel Valley, UT	41.7	112.8	6.0	VIII	9,12
1935-10-19	0448	Near Helena, MT	46.6	112.0	6.2	VIII	9,11,12
1935-11-01	0358	Near Helena, MT	46.6	112.0	6.0	VIII	9
1936-07-16	0708	Milton-Freewater, OR	46.2	118.2	5.7?	VII	9,12
1947-11-23	0946	Southwestern Montana	44.8	112.0		VIII	9
1954-07-06	1113	East of Fallon, NV	39.4	118.5	6.6	IX	
1954-07-06	2208	SE of Fallon, NV	39.3	118.5		VIII	
1954-08-24	0452	East of Fallon, NV	39.6	118.5	6.8	IX	
1954-12-16	1107	Dixie Valley, NV	39.3	118.2	7.3	X	
1959-08-18	0637	Hegben Lake, MT	44.8	111.1	7.1	X	9
1959-08-18		Hegben Lake, MT	44.8	111.1	6.5	VI	
1959-08-18		Hegben Lake, MT	44.8	111.1	6.0	VI	
1959-08-18		Hegben Lake, MT	44.8	111.1	6.0	VI	
1959-08-18		Hegben Lake, MT	44.8	111.1	6.5	VI	
1975-03-28	0231	Pocatello Valley, ID	42.1	112.5	6.1L	VIII	9
1975-06-30	1854	Yellowstone N.P., MT	44.7	110.6	6.4L	VIII	
1980-05-25	1634	Mammoth Lakes, CA	37.6	118.8	6.1L	VII	
1983-10-28	1406	Borah Peak, ID	44.0	113.9	7.3	IX-X	

BIBLIOGRAPHY

1. Bulletin of the Seismological Society of America
   1852-11-09 vol. 29
   1887-05-03 vol. 8,10
   1901-11-14 vol. 43
   1906-07-16 vol. 1
   1921-09-30 vol. 11,43
   1921-10-01 vol. 11,43
   1925-06-28 vol. 16
2. Monthly Weather Review, U.S. Weather Bureau
3. Reid, H.F., Unpublished records, Johns Hopkins University, Baltimore, MD
4. Reid, H.F., 1911. "List of Strong Shocks in the United States and Its Dependencies," British Association for the Advancement of Science, p.41 and Appendix 1, p. 642
5. Quarterly Seismological Report, U.S. Coast and Geodetic Survey
6. Science, vol. 88
7. American Geologist
8. Holden, E.S., 1898. "A Catalogue of Earthquakes on the Pacific Coast, 1769-1897," Smithsonian Miscellaneous Collections, vol.1087
9. United States Earthquakes, U.S. Coast and Geodetic Survey
10. Eppley, R.A., 1966. "Earthquake History of the United States, Part II, Stronger Earthquakes of California and Western Nevada," Environmental Science Services Administration, USDC Special Publication 41-1
11. Scott, H.W., 1936. "The Montana Earthquakes of 1935," Montana School of Mines Memoir No. 16
12. Gutenberg, B. and Richter, C.F., 1954. "Seismicity of the Earth and Associated Phenomena," Princeton University Press

426.1 CA/87/05/12

OFFICIAL CONCURRENCE AND DISTRIBUTION RECORD

MEMORANDUM FOR: Randy Read, USBM

FROM: Charlotte Abrams

SUBJECT: WORK DIRECTIVE 010 UNDER TASK ORDER 002 OF INTERAGENCY AGREEMENT NRC-02-85-004

DATE: 5/12/87 MAY 13 1987

DISTRIBUTION

HLWM/SF	NMSS RF	RBrowning, HLWM	MBell, HLWM
JBunting, HLSE	RBallard, HLTR	PJustus, HLTR	JLinehan, HLOB
PDR	CAbrams & r/f	HLTR r/f	MBlackford,HLTR

CONCURRENCES

ORGANIZATION/CONCUREE	INITIALS	DATE CONCURRED
HLTR/CAbrams	CA	87/05/13

Mailed by the WMDCC
5/18/87 8:15
Date Time