40-8989

ENVIROCARE OF UTAH, INC.
THE SAFE ALTERNATIVE

April 7, 1993

John J. Surmeier, Chief
Uranium Recovery Branch
Division of Low-Level Waste Management
and Decommissioning
Office of Nuclear Material Safety
and Safeguards
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Submittal of Responses to Open Issues, Draft Safety Evaluation Report

Dear Mr. Surmeier:

Please find enclosed fifteen (15) copies of pages 2-16 through 2-19a and Z-12 which were left out of the initial submittal.

Should you have any questions regarding the revised application, with its appendices, or the responses to the Open Issues, please contact me at 801-532-1330 at you earliest convenience.

Sincerely,

George W. Hellstrom
Envirocare of Utah

Enclosures

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3) Wastes will be maintained for no more than 180 days in the Storage Area without prior written approval from the Executive Secretary of the Utah Water Quality Board.

4) In the embankment construction areas, during the process of placing and moving waste, Envirocare will minimize the dust created by these operations through the use of water or other dust suppressing materials in accordance with Envirocare's Air Quality permit. Water or other dust suppressing materials are placed on roads and in areas which work is being performed. Envirocare will keep a record of the application of water to roads for dust suppression. Envirocare will use form EC-1650. See Exhibit 1. The water or dust suppressing materials are employed on an as-need basis as required by the air permit. The use of water moistens the waste materials causing the waste to bond together. This prevents the waste from becoming airborne.

5) During periods of elevated dust-generation conditions, Envirocare will cease loading, hauling, and dumping of bulk wastes. This prevents the creation of dust from loading, hauling, and dumping the waste from being dispersed outside Envirocare's facilities by the high winds. Loading, hauling, and dumping of bulk wastes will cease at winds in excess of 40 miles per hour. Operations may be restricted by Envirocare at wind speeds less than 40 miles per hour.

6) Envirocare will performs a daily inspection of the Clive facility. As part of this inspection the inspector is required to look for any materials that may easily become airborne. Any of these types of materials must be covered on a daily basis. Additionally, the Storage Area will be inspected for any disturbance of a waste pile that may contribute to wind dispersal of the waste.

intensely studied areas of Utah and provide a high-level of seismic information. Because these studies were progressively over time, with the DOE study conducted before the more detailed and scientifically intensive ensuring investigations, these studies also developed some apparent conflicting information. In particular, some of the information on possibly active faults collected for the DOE investigation was speculative in nature and was not confirmed by later investigations. Much of the following information is summarized from these three reports.

The South Clive site is located within the Great Basin in the Basin-and-Range Province (BAR) in Western Utah. The site is also located a few tens of kilometers west of the imprecise western boundary of the Intermountain Seismic Zone, an extensive zone of intraplate deformation that lies along the eastern margin of the BAR. The site is in a transition zone between exposed BAR horsts and grabens (mountain range and valleys) to the east and buried BAR horsts and grabens to the west. The site area does not have recorded historical seismicity but nearby seismogenic areas and geologic structures could pose a hazard to the site. Seismogenic sources (active faults) which could pose a hazard to the site include fault zones along the east flank of the Cedar Mountains, the east flank of the Newfoundland Mountains, the west flank of the Stansbury Mountains, and the Puddle Valley. Other fault zones in the site region do not show evidence of being active.

Reports by Arabasz and others (Arabasz, et al, 2989 (reproduced in Appendix K)) and Barnhard and Dodge (Barnhard and Dodge, 1988) thoroughly assessed and mapped evidence of surface faulting in late Quaternary time (past 500,000 years). Barnhard and Dodge mapped all faults scarps on unconsolidated sediments in the Tooele 1 degree by 2 degree Quadrangle, which includes all of the area within 45 miles of the south Clive site. Because unconsolidated sediments (primarily Lake Bonneville lacustrine deposits) cover about 80 percent of the area, the inventory is rather complete. The latest stage of Lake Bonneville occurred about 10,000 years ago; thus all sediment surfaces offset by recognizable faulting in the past 10,000 years are noted on their map. Those faults are listed in Table 4.1 of Appendix K and the faults within 45 miles are listed in Appendix J. Arabasz and others (Arabasz, et al, 1989) further evaluated the faults in the region and noted all faults that have moved or are suspected of movement in the late Quaternary time (last 500,000 years). Those faults are listed in Table 4.1 of Appendix K. Thus by Criterion (1) of the Nuclear Regulatory Guide, there is no evidence of a capable fault within 10 miles (15 km) of the site.

The known and suspected active or capable faults in the area are tabulated in Table 4.1 (Appendix K). Only five active or possibly active faults were detected within a 45 mile (72 km) radius of the site. Those faults, their distance from the South Clive site, the expected maximum magnitude of earthquake they could produce, and the expected peak acceleration (calculated using the equations published by Joyner and Boore (1988) are tabulated below. The faults, the proposed locations for the SSC rings, and the location of the South Clive are also shown on the attached map (Figure 2.2). Also listed in the table is the assumed maximum earthquake that would affect the site without producing surface fault rupture. That assumed earthquake is a magnitude 6.5 event centered 10 miles (15 km) from the site.

Fault No.	Name	Nearest Distance mi (km)	Maximum Magnitude M_s	Maximum Acceleration Fraction of gravity Mean	Mean + 1 σ
1	E. flank Cedar Mts	12(19)	6.6	0.18	0.34
2	W. flank Lakeside Mts	18(29)	6.5	0.11	0.21
3	NW Puddle Valley	11(19)	6.6	0.19	0.36
4	E. flank Newfoundland Mts.	26(42)	6.8	0.09	0.17
5	W. flank Stansbury Mts.	34(54)	7.3	0.09	0.17
Local earthquake without surface rupture		10(15)	6.5	0.22	0.42

The fault along the western flank of the Stansbury Mountains, noted above, lies near the western margin of the Intermountain Seismic Belt ("ISB"). Several larger faults, such as the East Great Salt Lake Fault and the Wasatch Fault (Faults 7 and 8c, respectively, in Table 4.1, Appendix K) lie farther to the east in the ISB. Those faults are capable of producing maximum earthquakes with magnitudes as great as 7.5. However, because of their greater distances from the South Clive site (greater than 100 km) peak accelerations from such large but distant earthquakes would be greatly attenuated by the time they reached the South Clive area. Based on the attenuation curves published by Joyner and Boore (1988), peak ground accelerations at the South Clive site for magnitude 7.5 earthquakes on those faults would likely be about 0.05 g (mean value). Other faults in the nearby part of the ISB are smaller than East Great Salt Lake and Wasatch features, and would generate even smaller ground shaking hazard. Thus, the shaking hazard to the South Clive site from earthquakes in the ISB is much smaller than for nearby sources, as tabulated above, and is not considered further in the analyses herein.

No other faults were identified by Arabasz et al (1989) or Barnhard and Dodge (1988) that could move in sympathy or be triggered by movement on a nearby capable fault. Thus, by Criterion (3) there is no evidence of a capable fault at the site.

The above tabulation shows that the local earthquake magnitude and peak acceleration ($M = 6.5$ and $a_{max} = 0.37$ g) selected as seismic design values for the South Clive site are consistent with earthquake magnitudes on nearby capable faults (Faults 1, 2, and 3) and with peak accelerations at the mean plus one standard deviation level. By comparison with Figure 4.10 in Appendix K (reproduced here as Figure 2.3), the expected return period for an acceleration of 0.37 g at a point within the SSC ring, which would include the

South Clive site, is much greater than 10,000 years, and by extrapolation would appear to have a return period of about 50,000 years. The latter recurrence interval yields an estimated 90 percent probability that an 0.37 g design acceleration will not be exceeded in 5,000 years at the South Clive site. Even though the hypothesized random local earthquake placed 10 km from the site yields a slightly higher acceleration of 0.42 g at the mean plus one standard deviation level, the probability of such an event and acceleration is sufficiently small (less than one occurrence in each 50,000 years) that this extreme value was disregarded and the adequately conservative value of 0.37 g was used for design. Even so, the analyses are not very sensitive to peak acceleration. For example, during the investigation, liquefaction susceptibility was tested at the 0.5 g acceleration level which revealed no significant increase of liquefaction or ground failure hazard compared to the 0.37 design value.

The magnitude 6.5 earthquake with a peak acceleration of 0.37 g, is assumed as the maximum nearby event for design, as noted above and specified in Appendix J. This acceleration appears to be a reasonably conservative estimate for the South Clive area. Because there are no known capable faults in the ear vicinity (within 10 mi), the largest earthquake likely to occur without producing surface fault rupture was conservatively chosen as the design earthquake. According to Arabasz and others, earthquakes up to magnitude 6.5 have occurred in the basin and range province without rupturing the ground surface.