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July 31, 2014

Mr. Dade Rose
Giverny, LLC.
1020 S. Foothill Drive
Salt Lake City, Utah 84108

Subject: Response to Cottonwood Heights City Review Letter
SBI Project No: 2-14-501

Dear Mr. Rose,

This letter presents our response to the following Cottonwood Heights (CH) City review letter:

> GeoStrata Review of SBI Fault Investigation Despain Property – 127 Acres SW Quarter of Section 1, SE Quarter of Section 2, and NW Quarter of Section 12, T3S, R1E Salt Lake County, Utah (SBI Project No. 2-04-232), dated July 29, 2005.

SBI has responded to each narrative in the CH City review letter, rather than respond only to the three items under "recommendations and conclusions".

All field work for the study was performed in 2004 by Mr. David B. Simon and Mr. Edward W. Fall, two highly experienced and competent geologists, licensed as professional geologists in Utah; their professional qualifications, circa 2004, are attached. All trench exposures were interpreted and documented by Mr. Simon and Mr. Fall.

Each trench exposure was also reviewed by the former Salt Lake County geologist, Ms. Darlene Batatian. During the "trench reviews," Ms. Batatian verified stratigraphic interpretations, age and type of sediments, and presence/absence of faulting, etc. Ms. Batatian also assisted in resolving questionable features and discussed appropriate setback distances.

Periodic visits, at their own discretion, were made by several geologists from the Utah Geologic Survey (UGS), to observe trench excavations for their own edification, particularly in regards to contemporaneous UGS projects, either in planning, or being performed along the Wasatch Fault Zone (WFZ). During the field visits, UGS geologists were helpful with stratigraphy, age and type of sediments, presence/absence of faulting, and resolving questionable features.

Our responses to the CH City review letter follow.

1.0 GeoStrata comments in regards to Fault F-1

1. "The faults labeled F-1 are considered by SBI to be inactive due to observations made in SBI Trenches T-17, T-18 and T-23. F-1 was reported to be a single west dipping fault in Trench T-17 transitioning into two west dipping faults in Trench T-18."

   SBI Response: Agree.

2. "These faults [F-1], are reported to be overlain by pre-Holocene Bonneville Lake Cycle sediments that are not offset by surface fault rupture along F-1."

   SBI Response: Do not agree. SBI logs show the following:

   a. In Trench T-17, at Station 2+25 the fault is overlain by undisplaced Holocene to latest Pleistocene colluvium.

   b. In Trench T-18, at Stations 0+30 and 0+35, faults are overlain by undisplaced Pleistocene-age glacial deposits.

3. "A single colluvial wedge on F-1 was observed in both Trenches T-17 and T-18 but no carbon dating was performed."

   SBI Response:

   a. Do not agree. A single colluvial wedge of F-1 was not observed in both trenches. In T-17, at station 2+25, two colluvial wedges were documented.

   b. Agree. No carbon dating was performed on the colluvial wedges observed in T-17 and T-18. Carbon dating was not necessary since the late Pleistocene age of the glacial deposits is well established in the literature (Richmond, G.M., 1964, Madsen, D.B. and Currey, D.R., 1979; Personius and Scott, 1992; Lips, E.W., and others, 2005; Laabs, B.J.C., and others, 2011).

4. "Conclusions about the age of F-1 were made from visual identification of the geologic units."

   SBI Response: Agree. Visual identification of geologic units is, and always has been, a well-accepted geologic method, particularly for mapping and fault studies. The glacial deposits documented in T-17, T-18, and T-26 are consistent with geologic

mapping published by Scott and Shroba, 1985, Personius and Scott, 1992, and; Lipps and others, 2005.

5. "It should be noted that F-2, F-3 and F-4 are reported on Drawing 1 of the SBI report to merge into a single fault splay as they trend south."

   SBI Response: Agree. F-2, F-3 and F-4 are shown on Drawing 1 of the SBI report to merge into a single fault as they trend south.

6. "It appears that F-1 does also [e.g. merge into a single fault to the south] but is not clear from the map."

   SBI Response: Agree. Trench T-17 was excavated adjacent to the south property line. Since the study terminates at the south property line, whether or not F-1 merges with a single fault to the south could not be determined (i.e., off-site). In our opinion, whether or not F-1 merges with a single fault to the south is not relevant to the conclusions presented in the SBI report.

7. "With F-2, F-3 and F-4 being reported as active by SBI, it is not clear if F-1 has been active during the Holocene or not and no carbon dating was attempted on the observed colluvial wedges."

   SBI Response: Do not agree. It is very clear that F-1 has not been active during the Holocene. In T-18, the F-1 faults are overlain by 6± feet of demonstrably undisplaced late Pleistocene-age glacial deposits.

   Agree: We agree that no carbon dating was attempted on the observed colluvial wedges. There was no reason to do so since the Pleistocene age of the glacial deposits are well established (Richmond, G.M., 1964, Madsen, D.B. and Currey, D.R., 1979; Personius and Scott, 1992; Lips, E.W., and others, 2005; Laabs, B.J.C., and others, 2011).

8. "It should be noted that the northern terminus of F-1 has not been adequately demonstrated by the data in the SBI fault investigation report."

   SBI Response: Do not agree. The northern terminus of F-1 is very clearly and adequately demonstrated by the data in the SBI report; the fault was not documented in Trench T-23.

2.0 GeoStrata comments in regards to Fault F-2:

1. "The fault labeled by SBI as F-2 is considered by SBI to be an active fault."
   SBI Response: Agree.

2. "This fault [F-2] was observed in trenches T-21 and T-26. In T-21, F-2 was reported to consist of four individual faults (3 east dipping and one west dipping) in an approximately 28 feet wide fault zone."

   SBI Response: Agree.

3. "In Trench T-26, F-2 was reported to be a single east dipping fault."

   SBI Response: Agree.

4. "SBI reports that F-2 offsets Holocen-age geologic units in Trench T-21 and is therefore considered by SBI to be active."

   SBI Response: Agree.

5. "SBI reports that in Trench T-26 'the fault terminates wholly within the late Pleistocene-age Bonneville Lake Cycle sediments and is therefore judged to be pre-Holocene age and not active at this location. The negligible displacement (0.2-inches), indicates that F-2 terminates near the location of T-26'."

   SBI Response: Agree.

6. "It is not the standard of care to consider one portion of a fault splay active and other portions of that same fault splay non-active."

   SBI Response: Standard of Care or Standard of Practice is not determined by consultants or by one consultant's claim of what the Standard of Practice may, or may not, be in regards to a particular issue. Standard of Practice is determined by regulation (i.e., geologic ordinances, etc.), litigation, and dissemination of written information. SBI respectfully requests CH City provide citations and specific references, exclusive of "verbal communications," supporting the allegation of "standard of care" as used herein.

   Do not agree: SBI *did not* consider one portion of a fault active and other portions of that same fault non-active. As shown on Drawing 37, Recommended Building Setback Map, a building setback was defined for the entire length of F-2 exhibiting

evidence of greater than four inches of displacement along one or more of its traces during Holocene time[1].

7. "It is not unusual for only a portion of a fault splay to activate during a surface fault rupture event and not activate the entire length of the splay during that event."

   SBI Response: Agree.

8. "The entire length of F-2 should be considered active if portions of that fault splay have been observed to be active."

   SBI Response: Agree. That is exactly what SBI has done and depicted in the SBI report (see response number 6, above). The entire length of F-2 exhibiting evidence of greater than four inches of displacement along one or more of its traces during Holocene time was considered active. As shown on Drawing 37, Recommended Building Setback Map, a building setback was defined for the entire length of F-2 exhibiting evidence of greater than four inches of displacement along one or more of its traces during Holocene time.

9. "Additionally the northern terminus of F-2 has not been adequately demonstrated by the data in the SBI fault investigation report."

   SBI Response: Do not agree: The northern terminus of F-2 has been "adequately demonstrated" by the data in the SBI report. T-26 was located to evaluate the northern terminus of F-2. In T-26, a fault with 0.2-inches of displacement was documented. The fault was overlain by about 7 feet of demonstrably unbroken, stratigraphically continuous late Pleistocene-age Bonneville lake cycle sediments; consistent with a fault "dying-out" to the north. Owing to that data, the fault was terminated at T-26.

10. "In the preliminary development plat provided to us for review there are residential building lots planned just north of and on trend with F-2 where it was observed in Trench T-26."

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[1] An "active fault" is defined in Section 19.75.020 of the Salt Lake County, Utah, Natural Hazards Ordinance (Salt Lake County, 2002), as a fault displaying evidence of greater than four inches of displacement along one or more of its traces during Holocene time (about 10,000 years ago to the present).

An "active fault" is defined in Section 19.75.020 of the Cottonwood Heights City Code of Ordinances as a fault displaying evidence of greater than four inches of displacement along one or more of its traces during Holocene time (about 11,000 years ago to the present). (Rev 2-2011; p. 19-123).

SBI Response: Agree.

11. "To further define this northern terminus, we recommend that an additional trench or multiple trenches be excavated and logged. This trench or these trenches should generally trend east and west and should be located between trenches T-26 and T-28."

    SBI Response: Do not agree. As explained in SBI response number 9 above, the northern terminus of F-2 has been "adequately demonstrated" by the data in the SBI report. T-26 was located to evaluate the northern terminus of F-2. In T-26, a fault with 0.2-inches of displacement was documented. The fault was overlain by about 7 feet of demonstrably unbroken, stratigraphically continuous late Pleistocene-age Bonneville lake cycle sediments; consistent with a fault "dying-out" to the north. Owing to that data, the fault was terminated at T-26. Additional trenching to "…further define this northern terminus…" is not deemed necessary.

12. "It should also be noted that a displacement of 1.8 feet was used by SBI to calculate the setback for F-2. In the last paragraph on page 11 of the SBI fault investigation report it states '*Fault F-2, initially documented in Trench T-21 (Drawing 23), consists of four individual faults comprising a zone about 28 feet wide... The normal slip (east side down) F-2 faults trend 15° to N22° E and dip from 71° to 78° SE. Maximum displacement of 1.8 feet was observed on the fault at station 0+84.5*.' In our review of Drawing 23 we observed approximately 4 feet of offset documented across the 28 feet wide fault zone. If the entire 28 feet wide fault zone is being considered a single fault zone, as reported by SBI, then the total net vertical displacement across the entire fault zone should be considered the offset on F-2."

    SBI Response: Do not agree. There is *clearly not* 4 feet of offset across the 28 foot wide zone in T-21 (from about Stations 0+55 to 0+85). There is 2.4 feet.

    It appears CH City has added the individual displacement of each of the four faults (which is 4 feet) and is calling the summation "net vertical" displacement,[2] *which it is not*. The difference between total antithetic displacement and total synthetic displacement must be accounted for when calculating net vertical displacement, which CH City failed to do.

[2] Net vertical displacement or throw: The vertical component of displacement on a dip-slip fault (AGI, 2011), or across a dip-slip fault zone.

SBI is not sure what the four feet is, but it is not net vertical displacement and not germane to establishing a fault setback area. The net vertical displacement across the 28 foot wide zone in T-21 is 2.4± feet.

The measured displacement utilized by SBI to calculate the setback is completely consistent with the Standard of Practice in Utah as defined by the State of Utah (see Christenson and other, 2003). *SBI will not calculate setbacks for F-2 in T-21 using an incorrect displacement* of 4 feet.

However, CH City may find it of interest that the net vertical displacement of 2.4 feet, the maximum measured displacement of 1.8 feet, and the incorrect net vertical displacement of 4 feet, all yield setback distances less than the recommended minimum setback of 15 feet (Christenson, 2003).

13. "In the first paragraph on page 17 in the SBI fault investigation report it states '*A net vertical displacement of 8 feet was used for cases when the net vertical displacement could not be determined from trench exposures. Typical vertical displacement for large earthquake events (magnitude M=7) have been estimated to range from 6 to 8 feet (Black and others, 1996)*.'

"It is the standard of care to assume that the maximum potential offset along a fault splay may not be observed in every trench exposure along a fault splay. It is therefore the recommended practice to use the maximum expected single event offset for the entire fault splay when calculating setback areas along that fault splay."

"F-2 has an observed offset of approximately 4 feet as reported on Drawing 23 of the SBI report. As discussed above, F-2, F-3 and F-4 all merge into a single fault splay to the south as shown on SBI Drawing 1. The SBI trench logs show a net vertical displacement along F-4 of 8 feet or greater. In the case of F-2, the displacement used to calculate the setback for F-2 should be clearly justified by SBI if a displacement of less than 8 feet is used."

SBI Response: Do not agree. We respectfully insist that CH City provide citation and specific references, exclusive of "verbal communications," supporting every reference to their opinion on what the standard of care is as used herein by CH City.

We also respectfully request CH City provide further clarification regarding the CH City statement: "The SBI trench logs show a net vertical displacement along F-4 of 8 feet or greater." In particular, how CH City calculated the referenced net vertical displacement.

It is SBI's professional opinion that the methodology and displacements utilized by SBI to calculate the setback are *completely consistent* with the Standard of Practice in Utah as defined by the State of Utah (see Christenson and other, 2003. Also see Salt lake County, 2002; Draper City, 2007; Morgan County, 2010, and; Iron County, 2010).

As noted above (response 12), F-2 in Trench T-21 (Drawing 23) does not have an net vertical displacement of 4 feet. The net vertical displacement in T-21 from stations 0+55 to 0+85 is about 2.4 feet.

The CH City request that "…the displacement used to calculate the setback for F-2 should be clearly justified by SBI if a displacement of less than 8 feet is used" is incorrect and unreasonable. F-2 is not the same fault as F-4. The maximum displacement along F-4 is not in any way relevant to F-2. The displacement used to calculate the setback for F-2 has been clearly justified by SBI in the subject report and in this response letter (see SBI response 12, above).

It is a well-established standard of practice (see Christenson, 2003) to use the maximum vertical displacement measured in the field, at the particular site being investigated. The use of 1.8 feet displacement to calculate the setback for F-2 is, or, at least should be, obvious and considered clearly justified.

It is also a well-established standard of practice (see Christenson, 2003), when displacement cannot be determined, to estimate displacement based on paleoseismic data, generally using the maximum estimated single-event displacement for the particular fault; which is clearly not the case for F-2.

3.0 GeoStrata comments in regards to Fault F-3

1. "The fault labeled by SBI as F-3 is considered by SBI to be an active fault. This fault was observed in trenches T-22, T-24, T-25, T-31 and T-32. In T-22, F-3 was reported to consist of a single east dipping fault. SBI reports that F-3 offsets Holocene age geologic units in Trench T-22 and is therefore considered by SBI to be active."

   SBI Response: Do not agree. SBI did not report "…that F-3 offsets Holocene age geologic units in Trench T-22 and is therefore considered by SBI to be active."

   SBI stated the following in the subject report: "In T-22, fault F-3 was documented at station 0+75. F-3 trends N05°W and dips 74°NE. Relative displacement is normal slip (east side down). Maximum displacement of 2.7 feet was observed. The fault displaces Bonneville Lake cycle sediments, a weak to moderately developed Bw

horizon, and the lower part of the modern A-horizon. Owing to the displaced soil horizons, the fault is judged to be Holocene-age, and therefore, active." (p. 12).

2. "In Trench T-24, F-3 was reported to consist of two east dipping faults. SBI reports that F-3 offsets Holocene age geologic units in Trench T-24 and is therefore considered by SBI to be active."

   SBI Response: Do not agree. SBI did not report "…that F-3 offsets Holocene age geologic units in Trench T-24 and is therefore considered by SBI to be active."

   SBI stated the following in the subject report: "In T-24 (Drawing 26) and T-25 (Drawing 27), F-3 was observed at stations 0+81.5 and 0+31 to 0+35.5, respectively; relative movement was normal slip (east side down) and maximum displacements of 0.6 and 2.0 feet, respectively, were observed. F-3 displaces Bonneville Lake cycle sediments, a weak to moderately developed Bw horizon and the lower part of the modern A-horizon. Based on the displaced soil horizons, the fault is determined to be Holocene-age, and by definition, active." (p. 12).

3. "In Trench T-25, F-3 was reported to consist of seven east dipping faults. SBI reports that F-3 offsets Holocene age geologic units in Trench T-25 and is therefore considered by SBI to be active."

   SBI Response: Do not agree. See SBI response 2, above.

4. "In Trench T-31, F-3 was reported to consist of two east dipping faults. SBI reports that in Trench T-31 '*Of importance is that F-3 terminates wholly within the late Pleistocene-age Bonneville Lake Cycle sediments and is overlain by undisplaced Bonneville Lake Cycle sediments and is therefore judged to be Pre-Holocene age and not active north of T-24. The negligible displacement documented in T-31 and T-32 (0.1 to 1.0-inch), the dispersed nature of faulting, and the absence of displaced sediments in T-28, indicates that F-3 is close to its northern termination in T-31 and T-32*.' As stated above, it is not the standard of care to consider one portion of a fault splay active and other portions of that same fault splay non-active."

   SBI Response: Do not agree. SBI respectfully requests CH City provide citations and specific references, exclusive of "verbal communications," supporting the allegation of "standard of care" as specifically used herein.

   SBI *did not* consider one portion of a fault active and other portions of that same fault non-active. As shown on Drawing 37, Recommended Building Setback Map, a building setback was defined for the entire length of F-3 exhibiting evidence of

greater than four inches of displacement along one or more of its traces during Holocene time

5. "It is not unusual for only a portion of a fault splay to activate during a surface fault rupture event and not activate the entire length of the splay during that event."

   SBI Response: Agree.

6. "The entire length of F-3 should be considered active if portions of that fault splay have been observed to be active."

   SBI Response: Agree. That is exactly what SBI has done and depicted in the SBI report. The entire length of F-3 exhibiting evidence of greater than four inches of displacement along one or more of its traces during Holocene time was considered active. As shown on Drawing 37, Recommended Building Setback Map, a building setback was defined for entire length of F-3, exhibiting evidence of greater than four inches of displacement along one or more of its traces during Holocene time.

7. "Additionally the northern terminus of F-3 has not been adequately demonstrated by the data in the SBI fault investigation report.

   SBI Response: Do not agree. The northern terminus of F-3 has clearly been "adequately demonstrated" by the data in the SBI fault investigation report. T-31 and T-32 were located to evaluate the terminus of F-3. In T-31, a fault with 0.2-inches of displacement and overlain by about 7 feet of demonstrably unbroken, stratigraphically continuous late Pleistocene-age Bonneville lake cycle sediments.

   However, to verify this interpretation, SBI proposes to excavate one to three supplemental trenches north of T-24. Prior to commencement of field work, we suggest submittal of a work plan to CH City for their review. The work plan would include locations of proposed exploratory trenches. The investigation approach would allow for flexibility due to unexpected site conditions; field findings may require modifications to the work plan.

8. In the preliminary development plat provided to us for review there are residential building lots planned just north of and on trend with F-3 where it was observed in Trench T-24."

   SBI Response: Agree.

9. "It should also be noted that a displacement of 2.7 feet was used by SBI to calculate the setback for F-3.

"In the third paragraph on page 12 of the SBI fault investigation report it states '*Fault F-3 was initially documented in T-22 (Drawing 24), excavated to evaluate the eastern part of the SFR Special Study area on Parcel 1. No surface expression of F-3 was observed during the site reconnaissance or on the aerial photographs reviewed for the investigation… In Trench T-22, fault F-3 was documented at station 0+75. F-3 trends N05°W and dips 74°NE. Relative displacement is normal slip (east side down). Maximum displacement of 2.7 feet was observed'*."

"F-3 has an observed offset of approximately 2.7 feet as reported on Drawing 24 of the SBI report. As discussed above, F-2, F-3 and F-4 all merge into a single fault splay to the south as shown on SBI Drawing 1. The SBI trench logs show a net vertical displacement along F-4 of 8 feet or greater. In the case of F-3, the displacement used to calculate the setback for F-3 should be clearly justified by SBI if a displacement of less than 8 feet is used."

SBI Response: The CH City request that "…the displacement used to calculate the setback for F-3 should be clearly justified by SBI if a displacement of less than 8 feet is used" is incorrect and unreasonable. F-3 is not the same fault as F-4. The fault located to the south bifurcates into four separate faults. The maximum displacement along F-4 is not in any way relevant to F-3. The displacement used to calculate the setback for F-3 has been clearly justified by SBI in the subject report.

In regards to additional justification for using a displacement of 2.7 feet, F-3 was observed in the following five trenches, along with the indicated displacements:

Trench	Maximum Displacement
T-22	2.7 feet
T-24	0.6 feet
T-25	2.0 feet
T-31	0.2 inches
T-32	0.6 inches

It is a well-established standard of practice (see Christenson, 2003) to use the maximum vertical displacement measured in the field. The use of 2.7 feet displacement to calculate the setback for F-3 is, or, at least should be, obvious and considered clearly justified.

It is also a well-established standard of practice (see Christenson, 2003), when displacement cannot be determined, to estimate displacement based on

paleoseismic data, generally using the maximum estimated single-event displacement for the particular fault; which is clearly not the case for F-3.

4.0 GeoStrata - SBI Closure

"In the last paragraph on page 21 SBI states "This report was written for the exclusive use of L.C. Canyons Partners, L.L.C. and only for the proposed project described herein."

SBI Response: L.C. Canyons Partners has issued Giverny, L.L.C. a reliance letter authorizing Giverny, L.LC. and its affiliates to rely on the July 29, 2005, SBI Fault Investigation Report for the 127 acre property referred to as the "Despain Property," in its evaluation of the property to the same extent as if Giverny, LLC. and its affiliates, were original addressees thereof.

5.0 GeoStrata Recommendations and Conclusions

1. "SBI should review the current proposed development plan and assess whether their report properly applies to the current development plan. SBI should assess whether all of the pertinent recommendations presented in their report have been adequately incorporated into the current proposed development plan."

   SBI Response: If requested by the applicant, SBI will be pleased to review final development plans to substantiate the findings contained in the July 29, 2005, SBI fault investigation report have been properly implemented.

2. "The SBI fault investigation report should specifically state that the fault investigation report data when recorded with the development plat with Cottonwood Heights City can be relied upon by the city for future public use purposes."

   SBI Response: Please provide the part of the Cottonwood Heights City Code of Ordinances where such a statement is specifically required.

3. "SBI should address the issues of activity, location of termination and size of setback for F-1, F-2 and F-3 that have been presented in this letter."

   SBI Response: Issues of activity, location of termination and size of setback for F-1, F-2 and F-3 have been addressed in the items above.

4. "When the current proposed development plan has been reviewed by SBI and the issues of activity, location of termination and size of setback for F-1, F-2 and F-3 that have been presented in this letter have been addressed, a licensed Professional

Geologist from SBI should sign and stamp the development plan to show that they affirm that their recommendations have been appropriately incorporated into the development plan."

SBI Response: If requested by the applicant, SBI will be pleased to sign and stamp final development plans to substantiate the findings contained in the July 29, 2005, SBI fault investigation report have been properly implemented.

6.0 SBI Closure

SBI would like to thank Cottonwood Heights City for the thorough review of our report; it is sincerely appreciated.

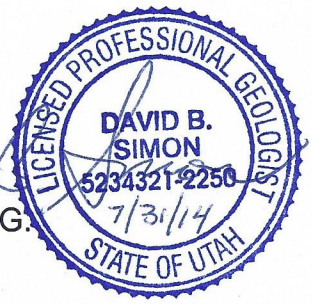
The findings and recommendations of this letter were prepared in accordance with generally accepted professional geologic principles and practices in this area of Utah, at this time. There is no other warranty, either express or implied.

This letter was written for the exclusive use of Giverny, LLC and only for the proposed project described herein. SBI is not responsible for technical interpretations by others of the information described or documented in this letter.

Specific questions or interpretations concerning the findings and conclusions presented herein may require written clarification to avoid any possible misunderstandings. The opportunity to be of service on this project is appreciated.

Very truly yours,

SBI



David B. Simon, P.G.
Principal Geologist

Dist: 1/addressee
Encl: Resume – David B. Simon
Resume – Edward W. Fall

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SBI
Simon • Bymaster Inc.

David B. Simon, P.G.
Principal Geologist

RESUME

SUMMARY

Mr. Simon has over 25 years of experience as an engineering and environmental geologist, is a principal at Simon • Bymaster Inc. (SBI), located in Bountiful, Utah. SBI provides comprehensive engineering geology, environmental, and geotechnical consulting services throughout the western United States. Mr. Simon is responsible for planning, coordination, supervision, project review and project management of SBI's engineering geology programs and geotechnical consulting services. In 2003-2004, Mr. Simon was President of the Association of Environmental & Engineering Geologists.

Representative engineering geology experience includes surface-fault-rupture, landslide, debris-flow, rock fall, geologic hazard, geologic feasibility, seismic hazard, and site feasibility investigations, liquefaction and rippibility evaluations, slope stability analysis, construction management, and groundwater resource exploration and development.

Representative environmental experience includes preliminary site assessments for real property transactions, site characterization and remediation, removal and upgrading of underground storage tank systems, preparation of environmental impact reports, groundwater resource exploration and development, soil and groundwater contamination and remediation studies, groundwater flow and transport modeling, landfill siting, NEPA, RCRA, and CERCLA investigations, environmental audits and assessments, and permitting/regulatory compliance.

Mr. Simon's project experience includes public, commercial and industrial developments, large mass grading/earthwork projects, highways, water resources, dams, reservoirs, pipelines, airports, landfills, bridges, and other civil works.

PROFESSIONAL LICENSES AND CERTIFICATIONS

- Licensed Professional Geologist - California, Idaho, Utah, and Wyoming
- Certified Engineering Geologist - California
- 40-Hour Hazardous Waste Operations and Emergency Response

PROFESSIONAL ORGANIZATIONS

- Association of Environmental & Engineering Geologists (AEG)
- Geological Society of America (GSA)
- Utah Geological Association (UGA)
- Dixie Geological Society (DGS)

EDUCATION

- Post Graduate Studies, University of Nevada, Reno, Engineering Geology, 1977-79
- Bachelor's Degree - Geology, University of California at Santa Barbara, 1976

PROFESSIONAL SERVICE ACTIVITIES

2004

- *National President* - AEG.
- *Member* - Utah Liquefaction Advisory Group for the Wasatch Front, Utah.
- *Panelist* - U.S.G.S. National Earthquake Hazards Reduction External Research Program.
- *Ex Officio Director* - Board of Directors, AEG Foundation.
- *Member* - Utah Geological Survey, State Mapping Advisory Committee.
- *Guest Speaker* - AEG Allegheny-Ohio Section.
- *Guest Speaker* - AEG Carolinas Section.
- *Guest Speaker* - AEG Great Basin Section.
- *Guest Speaker* - AEG New England Section.
- *Guest Speaker* - AEG Rocky Mountain Section.
- *Guest Speaker* - AEG Sacramento.
- *Guest Speaker* - AEG Southern California.
- *Guest Speaker* - AEG St. Louis Section.
- *Guest Speaker* - AEG Washington Section.
- *Guest Speaker* - AEG Detroit Chapter.
- *Guest Speaker* - AEG Baltimore-Washington-Harrisburg Section.
- *AEG National Representative* - American Geological Institute National Leadership Forum.
- *Continuing Education Liaison*, AEG Intermountain Section.

2003

- *National Vice President and President Elect* – AEG.
- *Ex Officio Director* - Board of Directors, AEG Foundation.
- *AEG National Representative* - GSA Associated and Allied Societies Meeting.
- *Member* - Utah Geological Survey, State Mapping Advisory Committee.
- *Member* - Utah Liquefaction Advisory Group for the Wasatch Front, Utah.

2002

- *Member* - Utah Geological Survey, State Mapping Advisory Committee.
- *Invited Speaker*, Dixie Geological Society.
- *National Treasurer* – AEG.
- *Continuing Education Liaison*, AEG Intermountain Section.
- *Distinguished Mentor*, Roy J. Shlemon Applied Mentor Program, 54th Annual Meeting of GSA Rocky Mountain Section.

2001

- *Co-Chairman,* AEG/UGS/ASCE - Geologic Hazards in Utah Conference.
- *Invited Speaker*, University of Utah Geology Department - Ethics Course.
- *Member* - Utah Geological Survey, State Mapping Advisory Committee.
- *Continuing Education Liaison*, AEG Intermountain Section.

2000

- *Chairperson* - Geologic Hazards Conference, Salt Lake City, Utah.
- *Workshop Leader*, FEMA Project Impact 2000 Summit, Washington D.C.
- *Invited participant*, Earthquake Hazards Committee, Salt Lake City FEMA Project Impact.

Professional Service Activities - continued

- *Chairperson*, Natural Hazards Committee, Salt Lake City FEMA Project Impact.
- *Invited Speaker*, University of Utah Department of Geography, Geomorphology Course.
- *Member* - Utah Geological Survey, State Mapping Advisory Committee.
- *Continuing Education Liaison*, AEG Intermountain Section.
- *Invited Speaker*, BYU Department of Geology, Distinguished Lecturer Series.

1999
- *Board of Directors* - AEG Intermountain Section.
- *Co-Chairman*, AEG 42nd National Meeting.
- *Field Trip Leader*, AEG 42nd National Meeting.
- *Continuing Education Liaison*, AEG Intermountain Section.
- *Member* - Utah Geological Survey, State Mapping Advisory Committee.
- *Invited Speaker*, University of Utah Department of Civil Engineering.
- *Invited Speaker*, University of Utah Geography Department.

1998
Board of Directors - AEG Intermountain Section.

1997
Board of Directors - AEG Intermountain Section.

1996
Chairperson, AEG Intermountain Section.

1995
Chairperson, AEG Intermountain Section.

1994
Program Chair, AEG Intermountain Section.

1993
Program Chair, AEG Intermountain Section.

PUBLICATIONS

- *Engineering Geology - Highlights in Solid Earth* (Simon, D.B. and Hatheway, A. W.), Geotimes, vol. 49. no. 7, p. 26, American Geological Institute, July 2004.

- *Engineering Geologists Play a Crucial Role in Providing Geologic Information to the Public* (Simon, D.B., Hatheway, A.W., and Proctor, R.J.), Article For Students, Geotimes, vol. 48, no. 12, p. 12, American Geological Institute, December 2003.

Publications - continued

- *Holocene Faulting Near Piute Dam, Piute County, Utah* (Simon, D.B. Shlemon, R.J., and Fall, E.W.), AEG News, Program with Abstracts - 2002 Annual Meeting, July 2002, Volume 45, p.85. Presented to an Engineering Geology Technical Session at the 45th Annual Meeting of the Association of Engineering Geologists, September 2002, Reno, Nevada.

- *Landslide Complexes in Eastern Utah County, Utah - Implications for Hillside Development*, 2002 (Simon, D,B, and Fall, E.W.); Geological Society of America, Rocky Mountain Section, Abstracts with Programs, v. 33, no. 4, April 2002. Presented to the Hillslope and Mountain Slope Hazards in the Rocky Mountains Symposium, 54th Annual Meeting of G.S.A. Rocky Mountain Section, 2002, Cedar City, Utah.

- *Episodic Deposition in Closed Depressions: Proxy Evidence of Holocene Paleoseismic Events, Provo Segment of The Wasatch Fault Zone, Utah*, 2001 (Simon, D.B. and Shlemon, R.J.); Geological Society of America, Cordilleran Section, Abstracts with Programs, v. 33, no. 7, p. A-95. Presented to the Engineering Geology Technical Section, 97th Annual Meeting of G.S.A. Cordilleran Section, 2001, Universal City, California.

- *The Holocene "Downtown Fault" in Salt Lake City, Utah: Technical Controversies and Geopolitics*, 1999 (Simon, D.B. and Shlemon, R.J.); Association of Engineering Geologists, San Francisco Section of the Association of Engineering Geologists, Abstract in January 2000 Newsletter.

- *The Holocene "Downtown Fault" in Salt Lake City, Utah: Technical Controversies and Geopolitics*, 1999 (Simon, D.B. and Shlemon, R.J.); Association of Engineering Geologists, Southern California Section of the Association of Engineering Geologists, Abstract in June 1999 Newsletter.

- *The Holocene "Downtown Fault" in Salt Lake City, Utah*, 1999 (Simon, D.B. and Shlemon, R.J.); 42nd Annual Meeting of the Association of Engineering Geologists, Program with Abstracts Volume, 1999, Salt Lake City, Utah, p.85. Presented at the Earthquake Hazards in Extension Regimes Symposium, 42nd Annual Meeting of the Association of Engineering Geologists, September 1999, Salt Lake City, Utah.

- *Holocene Ground Failure in Downtown Salt Lake City, Utah*, 1999 (Simon, D.B., Shlemon, R.J. and Bartlett, S.F.); Geological Society of America, Cordilleran Section, Abstracts with Program, v. 31, no. 6, p. A-95. Presented to the Engineering Geology Technical Section, 95th Annual Meeting of G.S.A. Cordilleran Section, 1999, Berkeley, California.

- *Rejuvenation of Ancient Earth Fissures at Jackpot, Nevada*, 1998 (Shlemon, R.J. and Simon, D.B.), in Borchers, J.W., (ed.), Land Subsidence Case Studies and Current Research, Proceedings of the Dr. Joseph F. Poland Symposium on Land Subsidence (Association of Engineering Geologists Special Publication No. 8), Star Publishing Company, Belmont, California, p. 155-164.

Publications - continued

- *Rejuvenation of Ancient Ground Fissures at Jackpot, Nevada: Engineering Geologic Implications*, 1995 (Shlemon, R.J. and Simon, D.B.); Association of Engineering Geologists, 1995 Annual Meeting, Abstract Volume, Sacramento, California, p.87.

- *Stabilization of Landsliding-Friendly Valley, Canyon Country, Los Angeles County, California*, in Abstracts, 82nd Annual Meeting Cordilleran Section, Geological Society of America, 1986 (Simon, D.B. and Scullin, C.M.), vol. 18, no. 2. p182. Presented at the Landslide Mitigation Symposium, 85th Annual Meeting of G.S.A. Cordilleran Section, 1986, Los Angeles, California.

- H*ot Dry Rock Geothermal Site Evaluation, Western Snake River Plain, Idaho*, in Transactions, Geothermal Resources Council Annual Meeting, September 1980, Salt Lake City, Utah (J.H. Beyer, Weiss, R.B., Simon, D.B., Arney, B.H., and F.B. Tonani).

- *Active Fault Zones and Regional Seismicity in Western Nevada*, in Proceedings of the 17th Annual Symposium on Engineering Geology and Soil Engineering, April 1979, Moscow, Idaho (Rogers, D.K., Simon, D.B., and Stellar, J.R.).

- *Seismicity of a Portion of the Rose North-East Quadrangle, Nevada* (abs) (Simon, D.B.) in Earthquake Notes, Eastern Section, Seismological Society of America, January-March 1978, Vol. 49, No. 1. Presented at the 73rd Annual Meeting, Seismological Society of America, April 6-8, 1978 Sparks, Nevada.

- *Hot Dry Rock Geothermal Site Evaluation, Western Snake River Plain, Idaho*, in Transactions, Geothermal Resources Council Annual Meeting, September 1980, Salt Lake City, Utah (with B.H. Arney, J.H. Beyer, F.B. Tonani and R.B. Weiss).

ED FALL & ASSOCIATES

Edward W. Fall, P.G.
Principal Geologist

RESUME

SUMMARY

Mr. Fall has over 25 years of experience as an engineering and environmental geologist, is principal geologist of Ed Fall & Associates located in Salt Lake City, Utah. Mr. Fall provides comprehensive engineering geology, environmental, and geotechnical consulting services throughout the western United States. Mr. Fall is responsible for planning, coordination, supervision, project review and project management of engineering geology programs and geotechnical consulting services.

Representative engineering geology experience includes surface-fault-rupture, landslide, debris-flow, rock fall, geologic hazard, geologic feasibility, seismic hazard, and site feasibility investigations, slope stability analysis, construction management, and groundwater resource exploration and development.

Representative environmental experience includes preliminary site assessments for real property transactions, site characterization and remediation, removal and upgrading of underground storage tank systems, groundwater resource exploration and development, soil and groundwater contamination and remediation studies, landfill siting, and permitting/regulatory compliance.

Mr. Fall's project experience includes public, commercial and industrial developments, large mass grading/earthwork projects, highways, bridges, water resources, dams, reservoirs, pipelines, airports, landfills, and other civil works.

PROFESSIONAL LICENSES AND CERTIFICATIONS

Licensed Professional Geologist – Arizona, California, Idaho, and Utah
Certified Engineering Geologist - California
40-Hour Hazardous Waste Operations and Emergency Response

EDUCATION

Master's Degree, Geology, California Institute of Technology (Caltech), 1978
Bachelor's Degree - Geology, University of California at Los Angeles (UCLA), 1976