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Forensic Engineer Expert Communications: Lessons Learned from the March 2014 Oso Landslide Litigation

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Abstract

This paper presents lessons learned following an examination of expert discovery protocols related to the March 2014 Oso Landslide litigation in Washington State. An overview of the March 2014 landslide, its devastating effects, and the formulation of an expert team to evaluate allegations brought forth in the litigation are discussed. Challenges associated with developing the expert opinions in this case are reviewed, a chronology of expert disclosure protocols are discussed, and the court's interpretation/response is outlined. Finally, specific lessons are presented to inform future forensic evaluations requiring communication between expert team members. The controversy associated with disclosure protocols resulted, in part, with the State of Washington settling the case and not going to trial with the accumulated evidence addressing the plaintiff's allegations.

Keywords

Discovery, disclosure, expert teams, landslide, forensic engineering

March 2014 Landslide

In the morning of March 22, 2014, a deadly landslide emanated from the slopes above the north side of the North Fork of the Stillaguamish River, crossed the river, and ripped through the village of Steelhead Haven, Washington, which is located on the south side of the river. Tragically, this resulted in 43 fatalities. Steelhead Haven is located in Northern Washington State, approximately 60 miles north of Seattle in Snohomish County (**Figure 1**). This area has known landslide activity from the slopes above the river on both the north and south sides, which can be seen as physical expressions of the ground contours in aerial LiDAR-based digital elevation models available before the March 2014 landslide (**Figure 2**).

Based upon a review of available aerial photographs, previous landslides near Steelhead Haven occurred in 1951, 1967, 1988, 1996, and 2006. The 1967 and 2006 events were large enough to cross the North Fork of the Stillaguamish River and intrude into the Steelhead Haven neighborhood. Until the March 2014 landslide event, it was largely believed, based on available analyses and reports[1,2,3,4], that the most "probable worst-case" future event would be one equivalent in runout extent to the 1967 landslide event. In 1967, only a few uninhabited vacation cabins were destroyed, and these parcels were never redeveloped ("undeveloped" lots shown in **Figure 3**). The 2006 event was similar in magnitude to the 1967 event, which furthered the belief that the 1967 event was a "probable worst-case" future event.

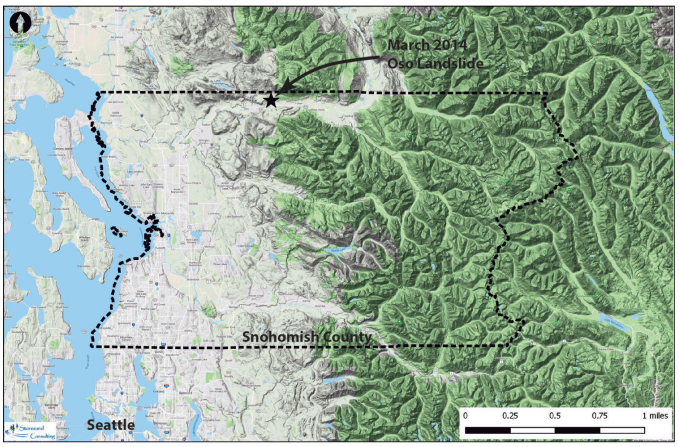

Figure 1
Oso landslide located approximately 60 miles northeast of Seattle.

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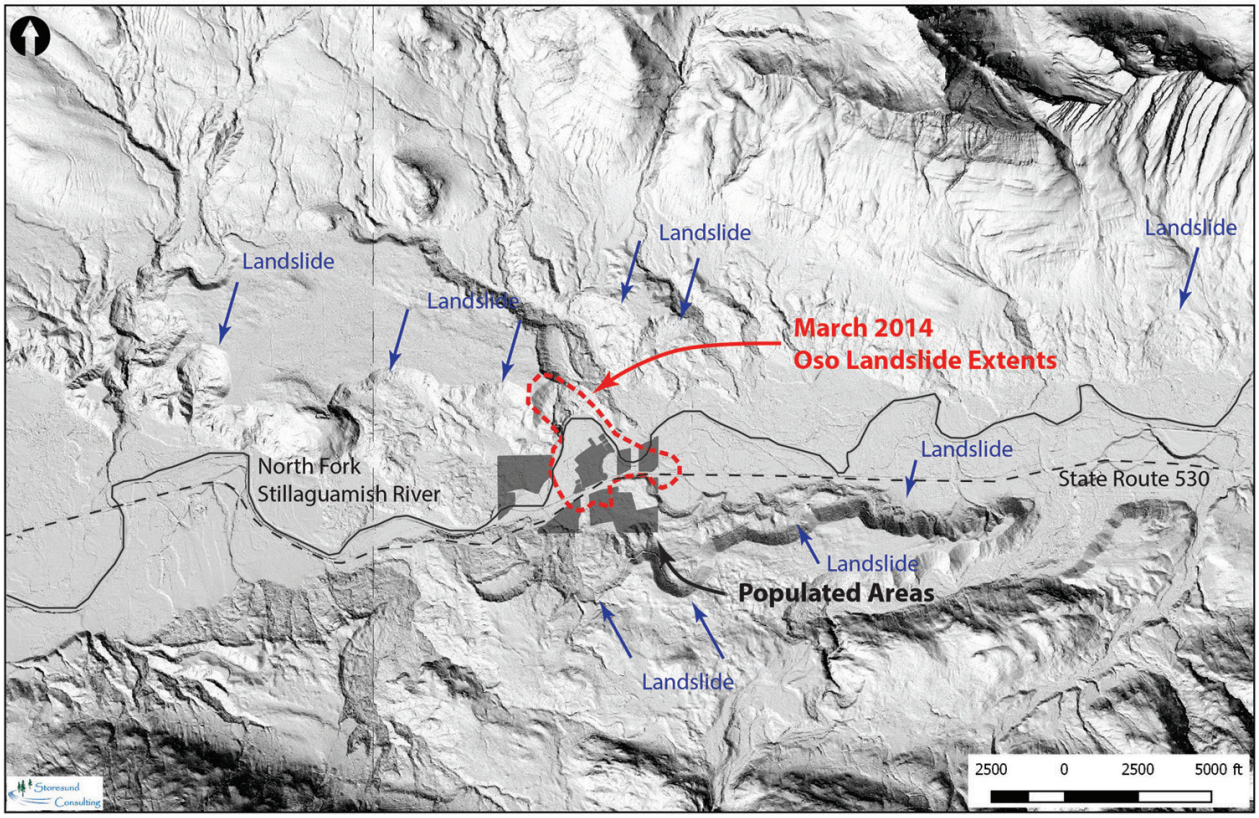

Figure 2
March 2014 Oso Landslide on aerial LiDAR DEM hillshade basemap.

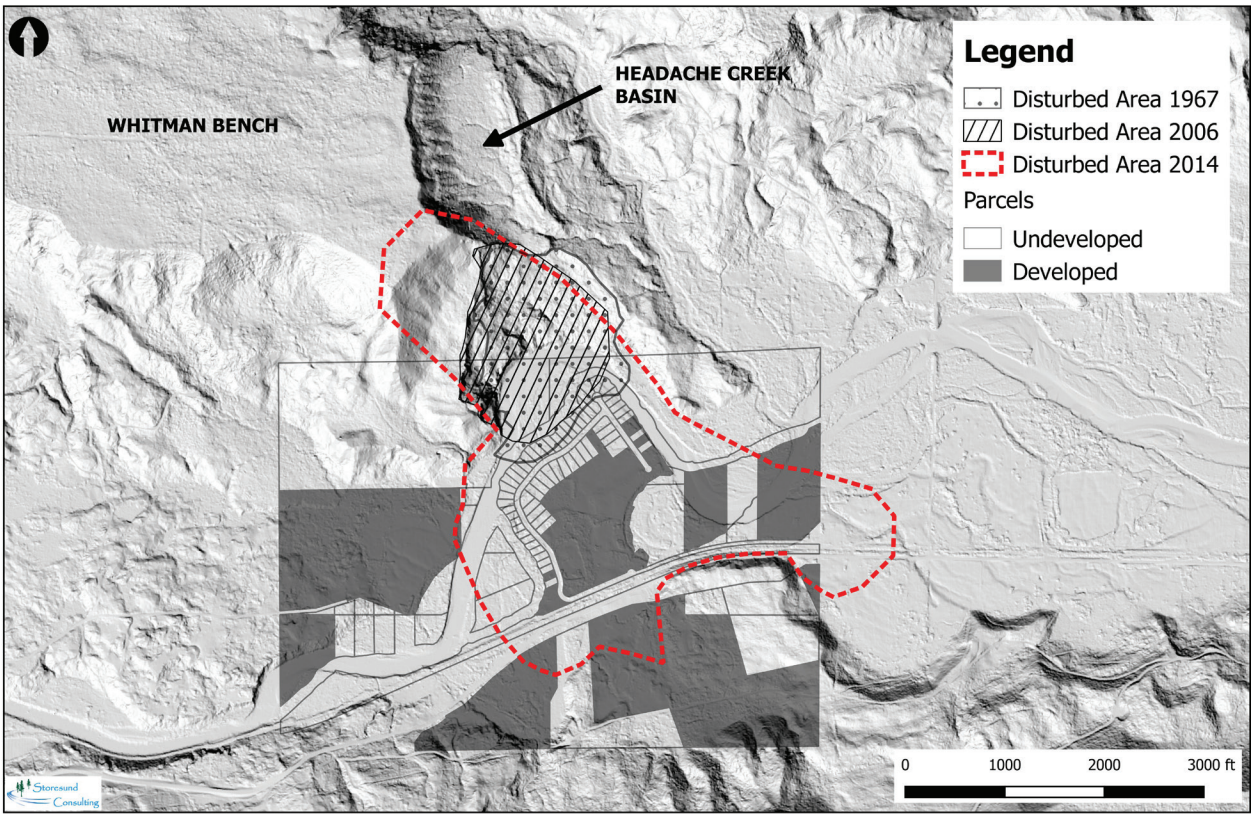

Figure 3
Overlay of runout extents from landslide events in 1967, 2006, and 2014.

The March 2014 Oso Landslide, however, was (regionally) unprecedented with respect to the volume of material displaced during the event, the speed at which the landslide debris traveled through the community of Steelhead Haven, and the distance traveled by the debris (runout). In a matter of 3 to 5 minutes, more than 10,000,000 cubic yards of material displaced, with landslide debris traveling up to a mile at the distal end. **Figure 3** shows a comparison between the 1967, 2006, and 2014 landslide extents. There was a sharp contrast in runout between an anticipated event (1967-type movement) and the largely unexpected event of 2014. A comparison of debris volume of known landslide events prior to the 2014 Oso Landslide, based on comparisons of aerial photos taken before/after each landslide occurrence, is shown in **Figure 4**. A view of the Oso Landslide body prior to the March 2014 event is shown in **Figure 5**, and a similar view following the March 2014 event is shown in **Figure 6**.

By all accounts, the perception that a landslide of this magnitude would affect residents within the Steelhead Haven community did not exist. This was an unusual event that would require a more thorough forensic investigation than recent past events (1951, 1967, 1988, 1996, and 2006).

The unexpected and severe nature of the March 2014 Oso Landslide raised a series of questions:

1. What was the underlying cause of such a severe failure?

2. What role did forest management practices have, coupled with precipitation events, on landslide triggering?

3. Was sufficient information available to characterize the hazard and enable the State of Washington/Snohomish County to provide actionable warnings?

State Expert Team

The State of Washington, along with Grandy Lakes Forestry and Snohomish County, were named as defendants by survivors of lost family members in the Oso Landslide in a consolidated litigation brought forth in July 2014. Then in the fall of 2014, a group of experts was retained by the State of Washington's Attorney General's Office (AGO) to evaluate the Oso Landslide and eventually offer expert opinions with respect to causation (state experts).

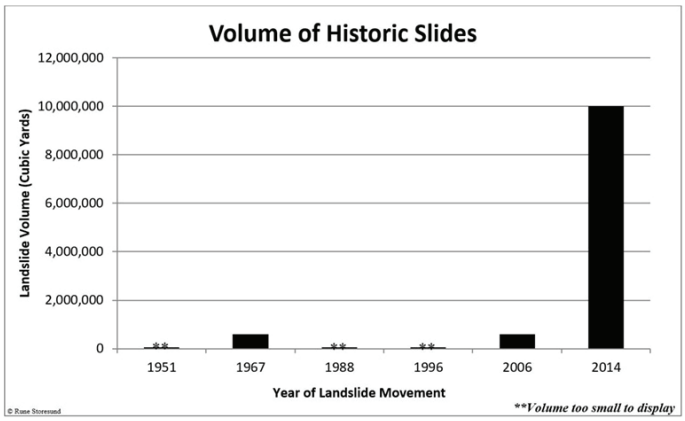

Figure 4
Comparison of landslide volumes
and movements between 1951 and 2014.

Figure 5
View of the Oso Landslide area in August 2012,
looking northeast (photo by R. Tart).

Figure 6
View of the March 2014 Oso Landslide in April 2014,
looking northeast (photo by King County Sheriff's Department).

An overview meeting (for state experts) was organized by the AGO in March of 2015 to present initial understandings and data on topics in hydrology, forest management, natural resources, geology, and geotechnical engineering. The outcome of this initial meeting was a consensus that the body of knowledge relative to landslide triggering was deficient, and there was a dire need for site-specific data to responsibly evaluate landslide triggering and failure mechanism(s). What was recognized, based on the limited facts that were available (e.g., precipitation, previous forest management practices, previous slope movements, completed site reconnaissance, river discharge quantities), was an understanding by the meeting participants that there was no obvious trigger or trigger mechanism.

As early as the 1990s, it was understood that the landslide site was situated in an area with glacially deposited materials. Glacially deposited materials can be extremely heterogeneous and have even been described as "chaotic" with regard to depositional character. Glacial deposits warrant more investigation than traditional colluvial and alluvial depositional environments. However, minimal geotechnical evidence was available following the Oso Landslide other than surficial observations. Available information at the site included:

- A geotechnical assessment[1] after the 1951 landslide by an engineering consultant included some very limited subsurface information at four soil boring locations situated on the mid-portion of the slide.

- A geologic reconnaissance by a state geologist[2] after the 1967 event provided some additional insight as to the plausible/ location of the surface of rupture for the 1967 event.

- A surficial geotechnical reconnaissance[5] effort in May 2014.

- A set of geotechnical soil borings had been completed by the Washington Department of Transportation (WSDOT) in 2014[6], following the March 2014 landslide.

- Aerial LiDAR surveys from 2003, 2006 (following the landslide 2006 event), 2012, and 2014 (following the landslide 2014 event).

- A geologic map of the region prepared by Washington State Department of Natural Resources[7].

In aggregate, insufficient geotechnical site-specific evidence was available as of 2014 to complete forensic analyses without significant conjecture and speculation with regard to actual failure mechanism and triggering factors. Essential minimum data required for responsible forensic analyses (not available as part of the existing information in 2014) included:

- Surface of rupture location and geometry.

- Soil stratigraphy and material properties across the entire failure zone.

- Groundwater levels and hydrostatic pressures across the surface of rupture zone.

- Mapping of displaced soil units.

Compounding the challenge for the state expert team was a court schedule that envisioned trial proceedings would start in June 2016, only 16 months after the initial expert meeting in March 2015. In this time frame, the experts would need to outline, permit, mobilize a drilling contractor, drill, and collect geotechnical samples to unconventional depths of up to 300+ feet, install instrumentation (and collect data), perform geotechnical laboratory testing/forensic analyses, and complete expert reports detailing the analyses and resulting forensic opinions.

A general timeline of the state expert's activities is presented in **Figure 7**. State experts were initially retained in the fall of 2014. A general meeting occurred in March 2015. In May 2015, it was recognized that it would be necessary to collect minimum essential data (i.e., soil stratigraphy, soil engineering properties, location of the surface of rupture, pore pressure profiles) to perform meaningful analyses to address plaintiff's allegations and evaluate potential failure mechanisms. It is the author's contention that any forensic analyses performed without this minimum essential data would have been, at best, conjecture and speculation.

Planning of the field exploration program to collect this minimum essential data began immediately following the May 2015 geotechnical expert meeting. A preliminary report was issued by the state experts in May of 2015 that expressed the need for data collection before responsible expert opinions could be rendered. This report outlined the proposed field exploration and geotechnical laboratory testing. Before actual subsurface exploration could begin,

site access agreements had to be obtained from private property owners, and permits for temporary roads, drilling, and environmental constraints had to be obtained from state agencies. In addition, extreme fire-hazard weather conditions limited work days. The plaintiffs were provided an opportunity to provide input on the field exploration program. Actual drilling began in July 2015 and lasted through December 2015. An interim report was released in January of 2016 that provided an update on data collection and reiterated the need for collection of this essential data prior to performing meaningful analyses representative of the actual failure mechanisms. Geotechnical laboratory testing to gain an understanding of engineering properties of the soil units occurred in early 2016. All collected data during the field exploration and laboratory testing was made available to all litigation parties (plaintiffs and defendants).

The state experts did not produce expert opinions until submission of the expert report on June 30, 2016 along with all reliance materials upon which the opinions were based. The lack of initial data, complexity of the site due to the glacial setting, and compressed timeline necessitated the experts working as an integrated group and rapidly exchanging logistical and coordination correspondence to respond to and give direction with regard to field data collection. This group had to frame the questions to be answered with respect to causation, assess the adequacy of available information to inform the questions being asked, and devise/implement a field exploration and laboratory testing program to develop the minimum data for analysis. It would not have been possible to collect the necessary site-specific data and perform the required forensic analyses without close coordination and continuous interaction between the state experts.

Expert Discovery & Communications

As the litigation progressed, there was a conflict over expert disclosure rules. In May 2015, no formal disclosure policy was presented by the AGO to the state experts. However, a review presented in "State of Washington's Response to Certain Plaintiffs' Motion for Sanctions Against Defendant State of Washington[8]," revealed:

- July 2014 - When the case was filed in July 2014, State of Washington Superior Court Rule (CR) 26 applied with respect to discovery protocols because the case was filed in state court[9]. CR 26 describes State of Washington general provisions governing discovery. It requires the identification of experts, discovery of facts, and opinions held by experts. The AGO had not identified its testifying and/or non-testifying experts. No AGO expert opinions existed.

- November 2014 – AGO served a request to plaintiffs' counsel requesting identifying information regarding any experts that plaintiffs' counsel intended to call as a witness and any documents provided to any expert. Plaintiffs noted their understanding that all expert-related discovery would be subject to a "yet-to-be-agreed-upon" expert disclosure protocol.

- March 2015 – Plaintiff and defense attorneys agreed to use of the federal disclosure rules (FRCP 26). FRCP 26[10] requires expert witnesses to produce a written report that presents a complete statement of all opinions to be expressed as well as the basis/reason for them, the facts

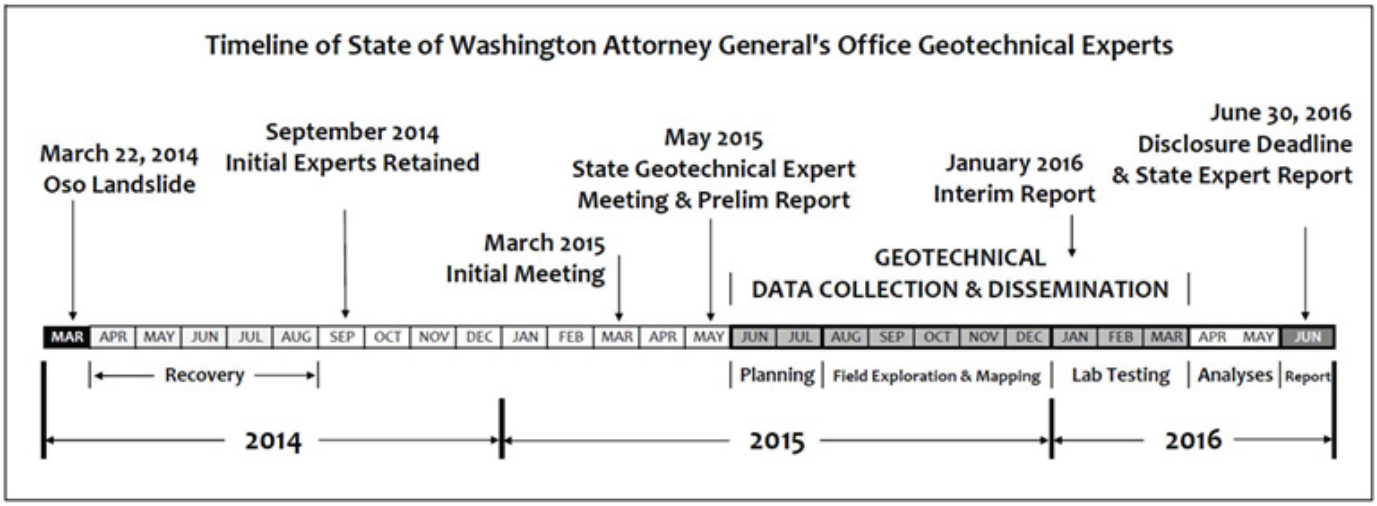

Figure 7
Timeline of geotechnical experts for the attorney general's office.

or data considered by the expert in forming opinions, any exhibits to be used, and qualifications and publications authored in the last 10 years.

• February 2016 – Plaintiff counsel proposed via email on February 2, 2016 that identified a list of expert materials to be provided to the other parties a minimum of 14 days before an expert's deposition. This list of materials would be "in lieu of individual document subpoenas." This list included:

- Materials relied upon by the expert in forming their opinions, including any papers or notes (Bates numbers for materials produced in the litigation also acceptable);

- Documents provided to, considered by, or created by the expert that contains facts or underlying assumptions that the expert considered in forming his/her opinion;

- Articles, paper, or reports authored or co-authored by the expert in the last 10 years relating to the area of expertise in their opinions;

- Communications between the expert and any other expert in the case;

- The expert's updated or most current CV; and

- The expert's invoices or time records for services provided relating to this case.

It was reported that all three defendant counsels agreed to this protocol proposed by the plaintiff counsel.

The terms of this February 2016 disclosure protocol were not shared with the state experts until June 2016. In the spring of 2016, state experts were encouraged by AGO attorneys to copy them on email communications with the understanding that (due to privilege rules) this would preclude the need to produce these email communications at a later date.

During depositions in August 2016, the plaintiff's counsel claimed they learned that email communications between state experts were not retained and produced as outlined in the February 2016 standard discovery protocols. A motion[11] for sanctions against the AGO was submitted by the plaintiffs on August 23, 2016. The motion alleged the following:

• Email communication among the state's expert team should have been preserved and produced.

• The state could not withhold discoverable expert emails by instructing its experts to "cc" the lawyers when the expert team communicated with each other to create a fake "privilege."

• The state conducted systematic deletion and withholding of expert email communication, which constituted systematic spoliation of important documents, and this was conducted in bad faith.

• The state's bad faith destruction of critical evidence had severely prejudiced plaintiffs and required the most severe judicial sanctions.

A rebuttal response was submitted to the court by the AGO on September 2, 2016. The AGO concurred that an error in discovery occurred, per the February 2016 standard protocol. However, the AGO argued that[8]:

• *The federal rules leave significant uncertainty as to aspects of required expert discovery.*

• *Any spoliation was minimal, not ill-intentioned, and will have no impact on plaintiffs' case.*

• *No sanction affecting the merits is appropriate; financial sanctions are sufficient.*

The judge appointed a Special Master to evaluate the merit of the plaintiff's allegations of discovery breach for the court. A Special Master is a designated agent of the court appointed by the judge to carry out some sort of action on its behalf[11]. The AGO was able to reconstitute the full email correspondence between the state experts in September 2016 for the period March 2015 to September 2016. Portions of the reconstituted email were made available to the court's Special Master. The full set of emails were not made available to the Special Master because the AGO was still in the process of reviewing and redacting email correspondence as the case settled just prior to the start of trial in early October 2016.

Court Interpretation

The allegations of evidence destruction were reviewed by the presiding judge and the Special Master. The court concluded[12]:

In summary, the State's discovery violations, as they occurred between March 2015 and September 2016, constitute more than an innocent, bumbling mistake. On the other hand, they constitute less than the conspiratorial cabal described by Plaintiffs. The Court finds that these violations occurred because: (1) the State's lawyers did not, apparently, understand their discovery obligations under the rules by which they agreed to abide; (2) the State displayed a degree of institutional arrogance; (3) the State made bad decisions not to immediately come clean when it became clear discovery violations were occurring; and (4) the State provided incomplete and inaccurate information to the Court about the timing and extent of their actions throughout the summer.

... Court finds the State destroyed potentially relevant evidence, thus requiring an analysis under the spoliation doctrine. The Court also finds the State violated discovery rules arising from its decision to delete emails, thus requiring a slightly different analysis under CR 26.

Lessons

This litigation was challenging from many aspects. First, a basic characterization of the geologic and geotechnical setting upon which to formulate responsible expert opinions did not exist. The lack of minimum required data necessitated rapid development and deployment of an exploration program to collect a basic suite of facts to evaluate purported causation allegations. Second, the multi-faceted nature of the slope failure necessitated a diverse team of geologists, engineers, forestry professionals, and hydrologists working in close coordination to rapidly formulate, execute, collect, and interpret fundamental data. Finally, this work needed to be accomplished within a highly compressed court-specified time frame.

Lesson #1: Strong consideration should be given by legal counsel to employ consulting experts in cases where significant coordination and logistics for data collection is needed. Unlike testifying expert witnesses, consulting experts are not necessarily subject to discovery. FRCP 26(b)(4)(D) states:

(D) Expert Employed Only for Trial Preparation. Ordinarily, a party may not, by interrogatories or deposition, discover facts known or opinions held by an expert who has been retained or specially employed by another party in anticipation of litigation or to prepare for trial and who is not expected to be called as a witness at trial. But a party may do so only…on showing exceptional circumstances under which it is impracticable for the party to obtain facts or opinions on the same subject by other means.

Communications and information exchange between consulting experts and expert witnesses, however, may be subject to discovery. Had a consulting expert been employed in this case with a separate and distinct task to orchestrate and implement the exploration and testing program, the expert witnesses would not have engaged in this work (unless solely through direction by counsel) and would not have been subject to disclosure rules. The developed field and laboratory data would need to be disclosed.

While the cost of experts is always a consideration factor, complicated and fast-paced litigation is certainly a setting where a fractional investment in a consulting expert can purchase significant "savings" by ensuring the sanctity of the expert witnesses and greatly minimizing the potential discovery vulnerability.

Lesson #2: The ambiguity of disclosure extents can be mitigated by establishing the standard disclosure protocols at the onset of the case and then clearly communicating agreed-upon disclosure protocols in writing to all retained experts. If undefined, all materials for an expert witness should be assumed to be potentially discoverable. Close coordination between attorneys is crucial to avoid mixed messages to opposing counsel.

There is no explicit requirement in CR 26 or FRCP 26 that requires preservation and disclosure of incidental email correspondence that do not contain facts, data, or basis for opinions. While reference is made to disclosure of communications where "facts or data that the party's attorney provided and that the expert considered in forming the opinions to be expressed" and "identify assumptions that the party's attorney provided and that the expert relied on in forming the opinions to be expressed," an expert witness should assume all materials are discoverable. Attorneys should ensure proper time and personnel have been allocated to review these materials within the court-appointed time frame.

Lesson #3: Protections are provided by federal rules for draft work products. FRCP 26(b)(4)(B) states:

Trial Preparation Protection for Draft Reports or Disclosures. Rules 26(b)(3)(A) and (B) protect drafts of

any report or disclosure required under Rule 26(a)(2), regardless of the form in which the draft is recorded.

For a draft work product to qualify, it must bear substantial similarity to the final work product.

Conclusion

The March 2014 Oso landslide was catastrophic with respect to the volume of material displaced during the event, the speed at which the landslide debris traveled through the community of Steelhead Haven, and the distance traveled by the debris. The perception that a landslide of this magnitude would occur within the lifetimes of the residents within the Steelhead Haven community did not exist. This was an unusual event that required a more thorough forensic investigation than the previous landslide events of 1951, 1967, 1988, 1996, and 2006.

The lack of existing data, complexity of the site due to the glacial setting, and compressed timeline necessitated an integrated working group of experts to frame the questions to be answered with respect to causation; assess the adequacy of available information to inform the questions being asked; and devise/implement a field exploration and laboratory testing program to develop the minimum data for analysis. An additional challenge was the unconventional depth the soil borings were required to be drilled, necessitating real-time modifications to the drilling and sampling program to collect the required subsurface data.

Strong consideration should be given by legal counsel in future cases to employ consulting experts where significant coordination and logistics for data collection is needed. Consulting experts have more disclosure protection than expert witnesses. To be safe, an expert witness should assume all materials are discoverable. The ambiguity of disclosure extents can be mitigated by establishing the standard disclosure protocols at the onset of the case and then clearly communicating agreed-upon disclosure protocols in writing to all retained experts. Expert witness disclosures in this case resulted in significant conflict, sanctioning of the AGO's office, and the controversy associated with disclosure protocols resulted (in part) with the State of Washington settling the case.

The full forensic engineering analyses of the incident and robust determination of whether there were any pre-incident deficiencies (on the part of the authorities having jurisdiction) were never completed, due to the timing of the case settlement.

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