



Standards Oversight Council (SOC)

Developing effective technical standards that protect Wisconsin's natural resources

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01 Verification of Land Features in Silurian Bedrock/Karst Areas Standard Team

MEETING NOTES

Thursday, July 18, 2019 ▲ 9:30am – 3:00pm ▲

UW Division of Extension - 625 E. County Road Y, Meeting Room A, Oshkosh, WI

9:30 Welcome, Introduction, Notes Approval (Kate, Team)

Goal: Welcome, review objective for meeting today, and review and approve 6/27/19 draft meeting notes. Review what is included in standard and what is not.

Present: Kate Brunner, Rachel Rushmann, Matt Woodrow, Joe Baeten, Travis Engels, Amy Haak, David Hart, Maureen Muldoon, Nathen Nysse, Francisco Arriaga, Matt Komiskey, Jason Nemecek, and Jamie Patton.

Absent: Tony Reali

Invited Guests: None

Public Guests: None

Notes from 6/27 meeting were emailed last week---any comments? Kate will post final online in a week so please email her any lingering comments this week.

Action Items from last meeting were completed, and some will be reported on today. Some of the action items from July meeting were not yet completed, as follows:

- a. **Joe** sent the team the DNR definition of bedrock, which will be discussed by the team at another date.
- b. **Travis, Nate and Francisco** – They are working together to compare in-field depth to bedrock data for a single field using hand probe, Veris and EM (EM-38 and/or other avail?). This is expected to be completed next week and reported on at our August meeting.
- c. **Tony** contacted Bruce Riesterer from Manitowoc Co. LCD, who will be discussing county usage of Lidar for closed depressions and depth to bedrock. **Kate** will finalize logistics with Bruce.

Note: this has been postponed to next meeting, when we have more time, and Tony can be present. A new action item today: **Maureen** knows of a software/app for Lidar to automate closed depressions based on some work in Kentucky karst. She'll review for the next meeting and be prepared to discuss more.

Team reviews a handout summarizing what would be included in this standard vs ATCP 50. Standard will follow the SOC format and include both criteria and considerations. It will contain protocols for each verification method type, qualifications for persons who conduct

verification, certifying/training program if appropriate, data that needs to be collected and documentation needed, and we expect to include examples of implementing this standard. ATCP 50 would include cost sharing, the entity(ies) to receive, approve, manage the data. The ATCP 50 content is not for this team to establish and would be prepared at DATCP staff level. Outside expert input may be pursued.

Summary of Intrusive Methods (Rachel, Team)

Goal: Review tables with summary and details in intrusive methods for field verification. Discuss criteria and considerations for the standard.

The team had a chance to review and comment on the summary tables between meetings. We received some comments from the team between meetings—some were incorporated and some are shown in blue on the screen for additional team discussion.

These tables are still tools to organize our work and would not necessarily go into the standard in their current style, though we started to reformat with the information for the standard listed first. Intrusive information was condensed into one table. Some key points of the discussion:

- Hand probe and Geoprobe will have same sample density. Excavation will be less dense sampling.
- Is 2' vs. 3' boundary able to be discerned? With a 6" margin of error, these two depths blend together. The depth intervals are set up in NR 151 rule, though ATCP 50 will specify how the 151.075 performance standards would be implemented.
- Existing maps have varying intervals and none match the NR 151 intervals:
 - NRCS soil maps use 0-12", 12-20" and 20-40"
 - Snap plus maps use 0-20" for shallow
 - Sherell's map shows contours at 2', 5', and 20'
- Sample density – how to make adjustments for combining direct measurements (intrusive) with indirect measurements (geophysics)
 - Team discusses having less dense grid than an average of a random selection of sub-probes like variable rate technology application for P (say, 1 per acre plus 5 additional probes). This would be a legal problem as we couldn't average or composite our samples but would need to draw contours.
 - Team discusses how to specify a sampling density reduction to the intrusive sampling plan if geophysics are used. Research (for P) shows 57 to 78% intensity reduction used.
 - Veris reports back 4 zones—the intervals vary field-to-field depending on the results. If we confirm each of the reported zones twice, this would be at least 8 probes on a 40-acre field, which is a 90% reduction.
 - Team discusses further the use of 90% reduction in intrusive samples when combined with geophysics. At a future meeting, we'll look at what this would look like on a specific field with some real data, based on field work being done

- by Nathen and Travis (action item from last meeting), and research by Matt K (see bullet below).
- **Matt K** will create some test sampling plans using real data to see how verification and boundary lines would change with different densities (for example if 1 per 1/4 acre vs 1 per 1/2 acre vs 1 per 2 acres). **Maureen** will look to see if she had bedrock data handy in her project files and **Joe** will check DNR landfill data and provide to Matt.
 - Square grid doesn't work for all shapes of fields. We'll reference sampling density per acre rather than grid spacing. We should specify that probes should be evenly distributed.
 - For determining a boundary, team agrees to interpolate between sample points. The sample point will not distinguish a grid square. We could include sample map or two of how to interpolate in the standard.
 - Farmers are qualified to implement some of these methods, but would be in collaboration with county or other expert (agronomist, geologist, etc.) to interpret the data. We could require a training, like DATCP training for NMPs, or via technical schools or UW Extension.
 - This verification data could be submitted along with the NMPs, though that would not be in this standard. DATCP will determine where to submit (via ATCP 50).
 - Farmer would only need to sample where they are disputing the map and so they may only verify a portion of their field. If they don't want to spread manure there anyway, they wouldn't need to verify. We could state this as starting point in the standard text (like Condition Where Practice Applies).
 - If a farm is mapped at >20' to rock, then this wouldn't apply. If a farmer knows the maps isn't correct and he has shallower bedrock, there could be an enforcement issue and the farmer may be obligated to verify bedrock depth in a field. This isn't the purpose of the standard, but the standard methods could be applied as a result of enforcement.
 - Team discusses decreasing sample density as depth increases. The density changes should change comparable to the depth interval and associated risk. Some team members assert that even the shallow end of the 5-20' range is quite vulnerable to contamination. For example, one sample per quarter acre jumped to one sample per 2 acres is a big jump if we are talking about a 2' change in depth. The density will be discussed further at next meeting, based on evaluation of real data sets [field work being done by Nathen and Travis (action item from last meeting), and research by Matt K (see bullet above)].

Summary of Geophysical Survey Methods (Rachel/Dave, Team)

Goal: Review tables with summary of geophysical methods for field verification. Discuss criteria and considerations for the standard.

The team had a chance to review and comment on the geophysical summary tables between meetings. We received some comments from the team between meetings—some were

incorporated to the handout and some are mentioned in meeting for team discussion. There were few comments to the geophysical table; key points of that discussion are below:

1. Spacing of geophysical method will be based on sample density for intrusive methods. It will be adjusted as decisions are made on intrusive methods. Geophysical methods are linear with more frequent data points and that will be taken into consideration.
2. For geophysical protocols, it's good practice to run some data perpendicular but this isn't possible on all fields. WE could specify things like instrument speed and/or data density. Generally, we'd want instruments to be operated per manufacturer specifications and at judgement of qualified/trained operator.
3. Geophysical equipment is readily available. There are few WI companies but rental equipment commonly shipped from elsewhere in the US so compiling a lists of companies isn't necessary.
4. Electrical conductivity variation can be from soil variations like moisture and texture and not necessarily from bedrock. Field truthing is important to correlate the geophysical data to direct observations in intrusive methods.
5. Some brand names (e.g. Veris, Ohmmapper) are unique technologies and may need to be named in the standard.
6. Width of the information reported in geophysics varies with depth.
7. **Dave** will add preferred ground-truthing methods to geophysics table (may vary by depth?).

Borehole/Pit Abandonment (Joe, Team)

Goal: Review DNR rules on borehole and pit abandonment. Discuss and identify additional procedures appropriate to this standard.

Joe emailed the team a summary of NR codes that apply to hole or pit abandonment. He reviewed that summary with team discussion:

1. DNR requires specific procedures (in-field and documentation submittal) with boreholes greater than 10 feet deep or where water table encountered.
2. We discuss relevance of reporting water table depth in the intrusive sampling. This will be added to documentation list.
3. Due to the sensitive nature of this landscape, Team agrees to add abandonment criteria for boreholes shallower than 10 feet deep.
 - a. Boreholes <5' deep can be abandoned with soil cuttings.
 - b. All boreholes >1" wide but less than 2" wide, and between 5' and 10' deep will be abandoned by filling hole with bentonite granules to grade.
 - c. Boreholes >2" wide should be abandoned with **hole plug**.
4. NR rule requires excavation holes to be abandoned by backfilling with a less coarse material.

Next Meeting Topics and Plan of Action (Kate, Team)

Goal: Identify the topics, concerns, and goals for next meeting. Review Action Items and agenda items for next meeting.

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1. What remains to be discussed at the next couple meetings?
 - a. We are set up to hear about Lidar and closed depressions at the next meeting on Aug 22.
 - b. We'll hear back from Nathen and Travis about their in-field verification test with hand probing and Veris and possibly some EMs.
 - c. Matt will have table/maps of some data sets and what different sample densities look like.
 - d. Review documentation that will be required. Matt W started list of submittal requirements based on CPS 313 and DNR boring log. **Amy** will review the initial submittal list and amend/adjust.
2. Keep in mind ideas for homework to make progress between meetings, either solo or as small group.

ASSIGNMENTS:

1. **Nathen, Travis, Jason** (with his colleague) and possibly **Francisco** - perform in-field depth to bedrock testing next week on field in Kewaunee using Veris, hand probe, and EM(s). Prepare data to present at next meeting, including review of possible options for sample percent reduction when using combination of methods.
2. **Maureen** - review software/app for Lidar to automate closed depressions; look for depth to bedrock data for Matt K to use
3. **Dave** – Add preferred ground-truthing methods to geophysics table (by depth?).
4. **Joe** - look for depth to bedrock data for Matt K to use (DNR landfill project?)
5. **Matt K** - test out sampling plans using real data (either Maureen's project files or Joe's DNR landfill data to be provided to Matt) to see how verification and boundary lines would change with different densities (for example if 1 per 1/4 acre vs 1 per 1/2 acre vs 1 per 2 acres)
6. **Amy** - review initial submittal list and amend/adjust.

3:00 End