

2019 ITRC Project Proposal Template

**Due by July 13, 2018 to Patty Reyes at preyes@ecos.org
*Proposals longer than 5 pages will not be accepted. Replace descriptions in each category with proposal response & refer to [evaluation criteria](#) prior to completion.***

[2012 ISM GUIDANCE UPDATE]

Proposal Date

July 13, 2019

Proposal Contacts

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Proposal Summary

The 2012 ITRC guidance document on Incremental Sampling Methodology presented a revolution in the way sites with contaminated soil (and sediment) are characterized for risk assessment and remediation purposes. Done properly, the approach significantly improves the reliability of sample data and ultimately the time and cost required to investigate and remediate environmental contamination. Over 4,000 environmental experts within and outside of the US have since joined in ISM webinar training sessions. The ISM document continues to be one of the most downloaded TechReg documents published by ITRC.

Over 1,000 investigations using ISM-type approaches have carried out in Hawaii, which initiated the transition from traditional, “discrete” sampling methods in 2004 and published its first guidance in 2009 (referred to there as “Decision Unit” and “Multi Increment Sampling” methods or “DU-MIS”). Additional state agencies that have begun to incorporate ISM-type investigations into their programs include Alabama, Alaska, California, Colorado, Florida, Idaho, Missouri, Michigan, Ohio and Nebraska. ISM-type approaches have been used in a number of other states. This will be more fully reviewed as part of an updated, state survey. The USACE has used ISM-type methods for over 20 years. The approach is also beginning to be implemented in USEPA regional offices, with Region 3 and Region 10 taking the lead. The use of ISM-type methods has also spread to other countries, including several countries in

Europe as well as China and Japan.

Very few of the original team members that prepared the 2012 document, however, had actual training in “sampling theory” and experience in the field with ISM. Significant time and effort was spent debating comparisons to traditional, “discrete” sampling methods and the statistical underpinnings of the different approaches. As a result, guidance on the implementation of ISM-type investigation methods based on experience in the field is lacking in the 2012 document and in some cases is conflicting, if not erroneous.

Much has been learned and many advances made in ISM-type investigation methods since publication of the original ISM document. Under this proposal the ISM document will be revised to focus on the practical implementation of ISM-type methods in the field and in the laboratory and incorporate experience gained since 2012. The organization of the updated document will reflect the progressive stages of a site investigation in a manner similar to the 2012 document, for example:

- **Site Investigation Procedure** (e.g., development of detailed, conceptual site models, systematic planning process, etc.);
- **Site Investigation Design** (e.g., importance of a thorough CSM and designation of DUs for characterization);
- **ISM Sample Collection Methods** (including surface soil, subsurface soil, sediment, VOCs, etc.);
- **Sample Processing and Analysis;**
- **Assessment of Data Quality;** and
- **Identification of Potential Environmental Risks.**

The 2012 document will be organized to follow this natural flow, with topics not specific to the implementation of ISM in the field and laboratory but still pertinent to the document moved to the appendices.

Specific areas of revision in the 2012 document will include (revised section headings and organization may differ in the update):

Section 2 (Nature of Soil Sampling) and Section 4 (Statistical Sampling Designs):

- While an important, the document spends significant time attempting to discuss the merits of ISM versus discrete sampling methods, rather than focusing on implementation of the former.
- Much of the discussions currently in Sections 2 and 4 will be relegated to the appendices, with only a brief, concise overview of Pierre Gy’s sampling theory for particulate matter included in the main text.
- A discussion of the nature and use of traditional, discrete sample data in terms of Gy’s sampling theory will be provided in the appendix. This will include recent field research on the reliability of discrete versus ISM-type sample data (e.g., HIDOH 2017).

Section 3 (Systematic Planning and Decision Unit Designation), Section 5 (Field

Implementation) and Section 9 (Case Studies):

- Very few case studies of ISM investigations were available for review and inclusion in the 2012 document. Those presented in and expanded on the in the appendices lack adequate detail to serve as guides in the field and are not necessarily pertinent to common site scenarios encountered by users of the document.
- The importance of a **thorough CSM** will be emphasized as a tool for establishing the scale or “resolution” of the data required for decision making and designation of DUs;
- The use of **example CSM scenarios** within the main text for designation of DUs and the collection of ISM samples under different field conditions will be significantly expanded (e.g., surface vs subsurface investigations, collection of samples in soft vs hard-packed soils, collection of samples to be tested for volatile chemicals, etc.).
- More detailed, hypothetical case studies based on experience at actual sites will be provided in an **expanded appendix of Case Studies (see below)**.

Section 6 (Laboratory Sample Processing and Analysis):

- This section is generally adequate but requires additional information regarding sample preparation based on investigation objectives (e.g., disaggregation versus grinding), clarification of minimum masses of subsamples for analysis, etc.
- The use of slabcake methods versus more precise tools such as a sectoral splitter for subsample collection for different particle sizes also needs to be clarified.
- New information on laboratory procedures for metals and other contaminants not available in 2012 will also be incorporated into the update.

Section 7 (Making Decisions Using ISM Data):

- The current section is overly complicated and again mixes and confuses the use of ISM versus discrete sample data for decision making.
- The section will be revised to focus on the interpretation of ISM sample data in accordance with Gy’s sampling theory and will incorporate related guidance published since the 2012 document.

Section 8 (Regulatory Acceptance):

- The current document reflects a period of time prior to publication of the ITRC ISM document and subsequent training webinars. This section is out-of-date and will be revised based on a new survey of state regulators and private environmental experts.
- The survey will be used to capture a more current overview of state understanding of ISM-type investigation methods and identify additional information that should be included in the revision.

ISM for Risk Assessment (new):

- Training risk assessors in the nature and advantages of ISM-type data is critical for

gaining acceptance of this approach over past, traditional data collection methods.

- **A new, separate section specific** to the collection and use of ISM investigation methods to support human health and ecological risk assessments will be added to the document.

Appendices

A series of brief but succinct appendices will be provided for additional details on specific subjects, for example: A) Sampling theory for particulate matter, B) Example site investigation designs (see below), C) Nature and use (and misuse) of discrete sample data, D) Common problems and mistakes, E) Overview of key references.

A detailed review of each of these topics would of course be beyond the space limitations and even the intent of the ITRC document. An **expanded appendix of case studies**, particularly with respect to example DU designations under different site scenarios, will form an important part of the overall document. The case studies will be hypothetical in nature but based on collective experience at actual sites, and include common site scenarios such as:

- Small and large industrial complexes;
- Commercial properties;
- Residential properties;
- Agricultural fields;
- Illegal dump sites;
- Former munitions ranges;
- Very small areas (small spills, sumps, identification of “hot spots” to support RCRA-type administrative actions, etc.);
- Canals, draining ditches and other aquatic habitats (sediment);
- Subsurface contamination; and
- Investigations for volatile compounds).

The use of figures, photos, flow charts, tables, etc., will be optimized to provide as much information into the document as possible and assist the reader in understanding how ISM-type investigation approaches are designed and implemented in the field and in the laboratory.

Key parts of the **2012 document** will be re-incorporated into either the main text of the updated document or included in the appendices. This revision will replace and take precedence over the 2012 document. The 2012 document will be retracted and removed from the ISM web page following publication of the revised document in order to avoid confusion over discrepancies in updated concepts and guidance provided the latter. The updated document will become the primary ITRC reference for ISM-type investigation methods.

Summary and Schedule of Deliverables (primary project product(s))

Indicate the ITRC product(s) to be produced and a general timeline of project schedule.

- State survey of current training, use of ISM-type investigation methods and recommendations for updated document;
- Web-based update to 2012 ITRC ISM document;
- Downloadable pdf version of updated document;

- Training (Online, video, classroom).

Completion of the update is anticipated to take 12-18 months. In order to expedite the process, initial update ideas, including draft text to the extent possible, will be provided to and discussed with core team members at the first project meeting. The state survey will need to be completed soon after initiation of the project, preferably within the first three months. It is anticipated that a full, first draft of the update will be ready within six to nine months of the project initiation. A second, near-final draft will be provided for review and comment within nine to twelve months. Training webinars will be organized in coordination with ITRC during the last three months of the project.

Proposed Team Composition

A core group of people with significant training and field experience in Gy's sampling theory and ISM-type investigation methods will oversee preparation of update and provide drafts to additional parties for review and comment. Initial interest in joining the ISM update team has been expressed by several state and federal regulators as well as private consultants, including (members of 2012 team noted by an "*"):

- Alabama (contact Brian Espy);
- California (contacts *Mark Malinowski, Craig Sanchez and Karen DiBiasio);
- Colorado (contact Michael Cosby);
- Hawaii (contacts *Roger Brewer)
- Michigan (contact William Harmon);
- Missouri (contact *Michael Stroh);
- Nebraska (contact Sue Dempsey);
- USEPA (contacts Harry Craig (Reg 10), Gerald Dodo (Reg 10), Josh Barber (Reg 3));
- USACE (contacts Brian Jordan, Michael Walsh, *Jan Dunker, *Hugh Rieck)
- University of California – Berkeley (contact Karl Hans);
- Chuck Ramsey (Envirostat; former USEPA);
- *Diane Anderson (APPL Laboratory);
- *Marvin Heskett (Element Environmental);
- *Robin Boyd (AECOM);
- Jason Brodersen (TetraTech EMI).

Experienced regulators from Idaho and Ohio are also being contacted. William Harmon with the Michigan DEQ has expressed interest in being a co-state lead. Mr Harmon has extensive training in sampling theory as well as field experience with ISM-type investigations. He also has experience working with ITRC.

Chuck Ramsey, formerly with the USEPA and an internationally known expert in Gy's sampling theory and ISM-type investigations, has agreed to be a senior, technical advisor for the group.

Soil experts from the Chinese Academy of Sciences have also expressed interest in joining the team. Experts from Europe have also expressed interest.

Identification of Potential Funding Sources

Funding for the preparation of ISM-type guidance and field research has in the past been provided by the USEPA, USACE and USDOD.