

EBPI Bioassay Technique and Training Project, High Level Alberta, Sept 13th-16th 2016

Project Summary

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EBPI

In the spring of 2016, EBPI and Keepers of the Water wrote a grant for the North American Charity Pot program sponsored by Lush cosmetics to fund a project that would bring together traditional knowledge holders, interested community members in northern Alberta and western science. The goals of the project focused on combining First Nations Traditional Knowledge of environmental health with industry standardized tests to provide an accessible means of detecting and monitoring suspected environmental contamination sites independently, using these techniques to provide tangible evidence of contamination time sensitively, help improve pipeline cleanup in remote areas, bring awareness to pipeline spills in the north, and empower communities to assess their own territories independently. This pilot project also aimed to determine challenges with the implementation of bioassays for remote environmental monitoring and the feasibility of sampling and testing according to international standards.

Partners in this project included the Dene Tha First Nation, Beaver First Nation, North Peace Tribal Council, Treaty 8 Organization and Keepers of the Water Council. Partners contributed direct support to the project and sent participants from several territories to receive training and relay environmental concerns from other geographical areas. The project took place between September 13th-16th in High Level Alberta and surrounding First Nations communities. Theoretical information on proper environmental sampling techniques for biological assays was presented and practical training was conducted using standardized industrial tests to evaluate environmental water samples taken from selected sites in the Hay River Basin. EBPI was invited to furnish kits for the project and to lead training on testing methodology and sampling technique for the assembled group.

The theoretical training session was presented on September 14th, 2016 at Executive House in High Level Alberta, and focused on background knowledge regarding toxicology, environmental assessment, bioassays, sampling technique and storage. A round table discussion was also conducted to gather input from participants regarding individual and community environmental contamination concerns, ways in which bioassays might be incorporated with traditional methods to help alleviate or substantiate these concerns and priority areas to address with regards to environmental issues in the north.

Upon conclusion of the theory, participants were transported into the field to employ the techniques learned and collect samples from individual areas. Traditional Knowledge holders from the community of Chateh were asked to provide project guidance and select sites of concern for contamination in their territory. The sites were chosen based on historical spills and one site on the Hay river was chosen as a simulated spill site to help with sampling method training. Group participants travelled to the sites and plotted out a sampling strategy based on controls, water flow and spill epicenter. Replicate samples were taken and sealed, chains of custody were established, and proper sample transport and storage were addressed.

After the water samples had been collected, bioassays including the Toxi-ChromoTest™ and the DaphTox™ kit were run to evaluate acute toxicity in these samples. These tests were run at the band office in Chateh. Although group participants conducted the assays as part of their training, EBPI agreed to run the samples in the controlled environment of their Ontario lab to support the results observed in

the field. All site and testing information was plotted using an environmental software program called EMMA Pro which stores and tabulates sampling dates, photographs and data to track the results. Participants received recognition for their participation and ability to run EBPI's bioassays. A final report was produced by EBPI analytics and distributed to participants for review.

Several positive conclusions from the project:

- Community members were able to conduct the assays independently and interpret results without a true laboratory setup
- The bioassays used were sensitive to oil and gas contamination and did not produce false negative results which supported the results obtained
- Participants engaged in the project were excited about the ability to produce conclusive evidence of suspected toxicity.
- Results from these assays are significant as they are collected using international standards.
- Although limits of detection require calibration, ease of use and immediate result acquisition appear to offset this disadvantage.
- Strong support for the potential of this technology to be a tool helping remote environmental assessments, conducted by local community members
- Practical training using industry tools and sampling method
- Bioassay method provides a natural complement to traditional ways of assessing environments. Data is accumulated quickly, results show clear indications of toxicity, format is recognized by the western scientists conducting current assessments

Future improvements for similar programs:

- Further training and practice is necessary to promote true independence for these techniques
- Start up costs for these methods might be too high (\$800-\$2000 initial investment for equipment) may require outside or third party funding.
- Limits of detection are not into the ppm or ppb range. Sample collection time and location are very important to show toxicity.
- Assistance will be required for incorporation into communities already struggling with other socioeconomic issues.
- Need to establish community liaisons with additional training to coordinate sampling schedules, ensure consistent testing methodology, report results and manage projects in selected areas.
- Work with community elders to increase access and awareness of this technological option for members who are spending a significant amount of time on the land (first response).
- Better organization of criteria for success is required

Overall, it was felt that the project was an excellent pilot for the possible incorporation of bioassay testing methods within remote communities. The tests performed well and the participation was excellent. Although some challenges with methodology and data production to an international standard remain, this initiative demonstrates a lot of promise. It is hoped that these assays will help to support traditional ways of assessing toxicity in the environment and not replace them. The ease of use, long shelf-life and rapid acquisition time provides concerned communities with additional tools to discover/ investigate contamination events on their territory and help with mitigation/ remediation strategies.