Toxicology Centre Response
to the December 2012 Report from a Peer Review of the Centre

("Review of the University of Saskatchewan Toxicology Centre – 20 December 2012")
Submitted by Karsten Liber, Director, on behalf of the Toxicology Centre
November 13, 2013

This document provides a response on behalf of the Toxicology Centre to the report identified above. It has been endorsed by Toxicology Centre faculty and the Toxicology Group Executive, and presented to the Vice-President Research. Our comments are organized by section titles, as those titles were used in the Review Team`s report.

Key Messages

We are in agreement with the six key messages presented on page 1 of the Panel report. Specifically, we are very pleased with the very positive messages presented by the Review Team, who have acknowledged our uniqueness, excellence and national/international leadership in toxicology research, scholarship and education. We also appreciate the recognition of our interdisciplinary efforts and successes, and the acknowledgement of our associated challenges. With respect to the areas identified for careful consideration, we assure the Review Team and University of Saskatchewan (U of S) Administration that these issues will receive careful attention during the current integrated planning cycle; some have already been addressed.

Mandate and Performance

We greatly appreciate the Review Team's conclusion that we have been effective in fulfilling our mandate and goals, and that the Toxicology Centre is the heart and soul of Toxicology activities on campus. We acknowledge the need to develop metrics and benchmarks to quantifiably track our progress towards becoming one of the top interdisciplinary toxicology research groups globally, a goal we firmly believe is attainable. Steps have already been implemented to track quantifiable metrics on an annual basis; results will be presented as part of the Toxicology Centre's annual Achievement Record.

We agree that there are significant growth and collaboration opportunities for the Toxicology Centre and Toxicology Programs, especially related to new institutional priorities, institutes and Signature Areas, and see noteworthy growth potential, especially if key Toxicology Centre governance issues can be successfully addressed within this planning cycle. We are already exploring partnerships and opportunities through some of the new institutional initiatives, and will continue to explore additional partnerships as some of the more recent institutes and initiatives develop further. It should be noted that while our most recognized strengths lie in the area of environmental toxicology, enhancing the interdisciplinary balance between environmental and biomedical toxicology within our program is a top priority. There is strong student interest and growth potential in biomedical/health toxicology, so our future focus will include expanded partnerships and activities related to contaminants and human health, including human health risk assessment.

With respect to expanded activities around sustainable development of natural resources in northern regions, we agree that there is a greater role for the U of S to play on a national scale, and that the Toxicology Centre should be a key participant in such an effort. We are actively pursuing new research and training initiatives in this area (including development of an NSERC Strategic Network grant and a new non-thesis Masters' program), and hope to see the results of those efforts within one to two years. While the Review Team's report states that our outreach activities appear to be minimal, we should acknowledge that our level of outreach and community engagement may not have been well addressed

in our self-study document and during the Review Team's site visit. Many activities have in fact taken place over recent years and several added this past year. Some of the more recent activities include: (i) a partnership with Oskayak High School (a mostly Aboriginal school) in Saskatoon to assist with delivery of components of their new Environmental Science 20 course scheduled for implementation in the fall of 2013; (ii) participation in the Citizen Science: Go Green Youth initiative (with the Saskatoon Public School Board) where Toxicology graduate students assist grade 8 students from several Saskatoon high schools with the development of multimedia presentations around the theme of water use and water quality; (iii) engagement with community groups around the South Saskatchewan River basin and the Slave River delta related to water quality and contaminants in fish (the South Saskatchewan River project in partnership with the U of S Global Institute for Water Security); and (iv) providing expert clinical toxicology consultation services to western Canadian veterinarians, animal owners, and livestock producers in the diagnosis and management of animal poisonings.

The Review Team's recognition of our strong international partnerships and reputation, and our national partnerships with both industry and government, are appreciated. These types of partnerships are a key priority for the Toxicology Centre and areas we will continue to pursue even further (e.g., a new partnership with two universities in South America has recently been implemented). It should also be stressed that several Toxicology faculty members (in addition to Dr. Giesy) hold adjunct professor-type appointments at Chinese and European universities which allow them better access to research funding and top graduate students from those regions. The Centre also routinely hosts foreign scholars and utilizes that mechanism to establish meaningful international research and academic exchange partnerships. The pursuit of strategic international partnerships will continue.

Training

We are pleased to hear that external stakeholders expressed a high level of satisfaction with students graduating from the Toxicology academic programs. While we knew that our students were highly sought-after by employers, it is gratifying to receive this type of feedback. Preparing our students well for employment across all sectors of the job market is a key priority within our academic programs, both graduate and undergraduate.

We acknowledge that while students in the Toxicology undergraduate program are very satisfied with the quality of the program, we do need to strengthen awareness of the Toxicology program among 1st and 2nd year undergraduate students at the U of S, and among high school students across Western Canada for that matter. There is significant growth potential in student enrolment if we placed more effort on program awareness and recruitment. One reason for not having pursued that aggressively in recent years is the difficulty we would have with accommodating significant enrolment growth. For example, we currently do not have the faculty resources to teach new courses or second sessions of existing courses, and pedagogically we are concerned with having too large class sizes in our 3rd and 4th year Toxicology courses. This is something we will continue to explore. Delivery of a 200-level introductory toxicology course with very basic prerequisites is something else we are seriously pursuing for the 2014-15 academic year. Such a course could dramatically increase our undergraduate program's visibility on campus and possibly attract more students to the program. With respect to student advising, we could not agree more with the Review Team's comment that greater efficiencies could possibly occur if the Toxicology Centre had more control over running the Toxicology undergraduate program. We hope to explore options related to that concept in the not too distant future.

The Review Panel's suggestion that greater efforts should be directed at engaging undergraduate students and integrating them more into the Centre and its activities will be taken to heart. We agree that having informal meetings between undergraduate students and faculty scheduled regularly

throughout the academic year is a good idea (this has been discussed within our program before, but never implemented). We will therefore implement faculty "meet and greet" events each semester, as well as a casual "meet the director" event each year where undergraduate students can ask questions, bring up concerns, and/or discuss any topic of interest. These events will take place in a new Undergraduate Student Lounge that is currently under renovation within the Toxicology Centre – it should be ready for September 2013. The undergraduate student's request for more direct training on presentation and writing skills (at least the presentation skills component) will partly be addressed through a revised format of the TOX 490 Seminar course. Special training on writing skills is already available through other units on campus so we do not see a need to duplicate those efforts. We will, however, make sure Toxicology students are better aware of them.

The comment that the Centre needs to consider the availability and balance of course offerings each year within the graduate program is acknowledged. This can, however, be challenging with our limited number of faculty, most of whom hold joint appointments in other units (where they also have teaching responsibilities), and with some faculty being on leave (administrative or sabbatical) each year. We will continue to strive for improvements related to graduate course offerings, but this must also be balanced against needs within the undergraduate program.

The possibility of incorporating enhanced communication and writing skills into the Toxicology Graduate Program is already being discussed. At present, we plan on pursuing some professional skills training courses through a new non-thesis Masters' program in Risk Assessment (MRA) that we hope to launch in 2014-15 (the courses would also be available to Toxicology students enrolled in thesis-based programs). A significant number of the courses that will comprise this new program will be delivered in short-course or compressed-course format. Until this new MRA program is launched, most CREATE-HERA (Human and Ecological Risk Assessment) courses have been opened up to non-CREATE students so that the larger Toxicology graduate student population can benefit from those courses. In addition, some of the needs for a new course designed to explore study design and statistics directly related to toxicology should be met by a new TOX 400/800 course in Quantitative Toxicology that will be offered for the first time in 2013-14. The need for a special course on statistics has partly been alleviated by the recent offerings (in the 2012-13 academic year) of new graduate-level statistics courses through Veterinary Biomedical Sciences and the School of Environment and Sustainability. The need for courses with more direct hands-on (experiential) learning opportunities within our undergraduate program has been recognized for some time. Unfortunately, we have not had the faculty resources or laboratory space to offer a true lab or even field course, but we will continue to explore options. Knowing that students would be willing to pay additional fees for such opportunities does open the door for alternative modes of delivery; so does the implementation of the University's new resource allocation model, TABBS (Transparent Activity-Based Budgeting System). In the meanwhile, the Toxicology Centre has recently launched the Toxicology Undergraduate Research Experience Program (TUREP). This program will offer paid, part-time research experience opportunities to six top undergraduate students each year starting in the fall of 2013; students will be able to choose from a list of available research programs under the supervision of participating Toxicology program faculty.

Governance

We share the concern of the Review Team that the current governance structure for the Toxicology Centre may prevent the Centre and the Toxicology academic programs from reaching their full potential. As a result, we are currently working on a concept that would alleviate that concern. With respect to the implementation of TABBS, we do not have a serious concern, as long as the Toxicology Centre receives proper and respectful credit for the activities of core Toxicology faculty and for the enrollment in and successes of the Toxicology academic programs. If TABBS is not implemented in a way that ensures

appropriate resource allocation to the Centre, then TABBS does become a major concern for the future sustainability of the Centre and the Toxicology programs. We will keep a close eye on this as the TABBS model develops and becomes implemented.

We acknowledge that succession planning is important, but it is not easy to accomplish with our current resources and governance structure. At present, Professor David Janz serves in a part-time (25%) capacity as Associate Director – Academic, which does provide some level of succession planning for the director's position should Dr. Liber no longer be available to serve in that capacity. Beyond that, succession planning for key senior faculty members is entirely contingent upon Toxicology receiving authorization to replace faculty recruited to support the Toxicology program, should those faculty retire or leave the university for other reasons. An equally important concern is the reliance of the Toxicology academic programs on key faculty that are hired and paid through other academic units. Should those units choose to pursue recruitment in different directions (in the case of a retirement or resignation), implications for the Toxicology program could be very significant. We will consequently continue to work with our academic partners to maintain mutually beneficial relationships. A new governance structure for Toxicology as a whole could partly alleviate that problem, as well as allow for development of a more strategic leadership succession plan.

We believe that a supportive environment for young faculty is already in place, which includes a mentorship program, phased-in teaching responsibilities, competitive start-up funding, and internal peer-review and support. We are more concerned with the sustainability of the research staff position for the aquatic facility (Manager of the Aquatic Toxicology Research Facility, ATRF) and appreciate the recognition by the Review Team of how critical that position is to ensure compliance with institutional and national animal care and use regulations, proper maintenance of facility infrastructure, and with the overall success of research conducted in the ATRF. We are concerned with our ability to fund this position over the long term without dedicated institutional support and resources for the position (it has largely been funded from external resources to date). The future of the ATRF relies heavily on our ability to maintain this position.

We acknowledge that the Toxicology Centre Advisory Board has not been used in the most effective manner in recent years. This shortfall partly resulted when Dr. Liber left the Centre for three years to take over leadership of the School of Environment and Sustainability without ensuring that appropriate engagement of the Advisory Board was maintained, a trend that had been slipping over time. This will be remedied and the overall role of the Board revisited and ideally enhanced. In addition, the creation of a Stakeholder Engagement Committee is being contemplated. This committee would be comprised entirely of key external stakeholders from government, industry and consulting firms (potential research partners and employers of both undergraduate and graduate students), and would serve as a vehicle for direct input from key stakeholders into the research and training programs of the Toxicology Centre.

We acknowledge that the sustainability of the Toxicology Centre will be a challenge in the changing environment at the U of S. Addressing this challenge is the centre's biggest priority for 2013 and beyond. We agree that in order to ensure the long-term sustainability and success of Toxicology at the U of S, the Centre needs to have greater direct authority over decisions that affect its activities and programs. We are therefore working on a proposal for how that could be accomplished, for example by becoming an academic unit (i.e., dissolving the Centre in favour of creating a new entity with greater decision-making and programmatic authority). In short, we fully accept the Review Team's suggestion in this regard.

<u>Infrastructure and Resources</u>

We acknowledge that the Toxicology Centre's leading-edge infrastructure, along with the laboratories and equipment of key Toxicology faculty based in other units, is critical to our continued success. However, having adequate technical staff to oversee such infrastructure is a challenge for most units, not just Toxicology. Overall, we feel reasonably confident that we can continue to secure the resources to maintain well trained analytical instrumentation staff (largely through research grants, contracts, and user fees), but as mentioned above we are concerned about our ability to sustain the ATRF Manager position over the long term. We had set aside contingency funds to buy us a few years to develop a sustainable solution, but unfortunately we lost some of those funds in a recent institutional contingency fund claw-back exercise. Remaining contingency funds are 100% allocated to existing commitments.
We have always ensured that Toxicology Centre research staff have adequate training and professional development opportunities. This will continue. Concerns about future infrastructure maintenance and renewal costs are valid, but again not unique to Toxicology. Most units who rely on technology to conduct their research face this challenge and we will continue to employ a user fee (cost recovery) model where appropriate (e.g., analytical services). Beyond that, the best we can do is work collaboratively to secure funding for new equipment and facility maintenance when the time comes that instruments need to be replaced and facilities renovated or renewed. Our success to date suggests that we should have a fair chance of similar success in the future, although the high cost of maintaining the ATRF in full research-ready state has been substantially greater than predicted and beyond what can be recovered in user fees. While a formal plan to support replacement of analytical equipment and renewal of the ATRF has not been prepared, the issues have been, and will continue to be, discussed at meetings of the faculty. Promoting and securing a larger, paying, external user base may be part of the answer. Specific plans will be developed on a case-by-case basis; one model will not fit all possible situations.

With respect to space, we do not believe it is necessary for the Toxicology Centre to invest in teaching laboratories. Such labs are available on campus and we expect that satisfactory arrangements for accessing those labs could be reached, should we decide to launch a lab-based undergraduate course some time in the future. In some ways proper implementation of TABBS might make such negotiations easier. We are more concerned about the lack of space to accommodate additional graduate students. We are already experiencing that challenge now that new faculty are ramping up their research programs and looking for office space for their new students. We predict this will become a significant issue within the next year. This challenge is confounded by our wish to provide office space for visiting scientists and researchers as expanding our international partnerships and activities are a key priority for the Toxicology Centre. By 2014 we may no longer be able to provide such office space which would leave us in a significant predicament with balancing the need for office space for students, research staff and visiting scientists. All future needs cannot be met within the existing infrastructure. Additional space, including much needed storage space for field gear and equipment, will have to be secured somehow or somewhere to accommodate projected program growth.

Long-Term Vision

While we agree that the Toxicology Centre has succeeded in creating a critical mass of researchers, we want to stress that maintaining and enhancing such critical mass could become difficult under the existing governance structure of the Centre and depending on how the TABBS financial model is implemented. Regardless, enhancing the critical mass of talent to serve the program is a key priority under the Centre's current strategic plan. So is maintaining the interdisciplinary nature and foundation of the Centre and the Toxicology Programs. Thus, we agree with the Review Team that TABBS may represent a challenge for the Toxicology Centre, but one we are hopeful can be appropriately addressed in partnership with University Administration. Clearly we hope the Team's suggestion that the University should take special care to ensure that the TABBS model does not undermine the future potential of the

Centre is heeded. Maintaining the research strength and infrastructure of the Centre is critical to the success of the entire Toxicology Program.

We agree that enhancing experiential learning opportunities, especially within the Toxicology Undergraduate Program, should be a priority. In fact, since this review took place we have implemented two initiatives that will help address this need. First, we have created a new undergraduate course, TOX 400 Quantitative Toxicology, that will be launched in the 2013-14 academic year. This course will give students hands-on experience in calculations and problem solving related to practical toxicology issues, largely via computer-based models and exercises. Second, we have launched the Toxicology Undergraduate Research Experience Program (TUREP) which will be formally implemented in September 2013. Under this program, we will offer paid part-time research experience (as student research assistants) to three top undergraduate students (one each from Years 1, 2 and 3) each semester. As mentioned earlier, successful students will be able to work with any core Toxicology faculty member and will be provided the opportunity to work in active toxicology research groups across campus, learn valuable stills and techniques, and possibly have the opportunity to co-author scientific publications with Toxicology graduate students and faculty. The possibility of offering a field course (in compressed format) within the Toxicology Undergraduate Program will be discussed further once we see how the TABBS model is implemented for Toxicology. There are clearly limits to what we can do under the current governance structure and fiscal situation.

The breadth and focus of the Toxicology academic programs are areas of active discussion and activity. We recognize that our main strength and international reputation largely lie in the area of environmental toxicology. Therefore, this strength and focus must be maintained. However, another strength of the Toxicology Program has been its interdisciplinarity. This interdisciplinary focus was an early strength of the program and one that we need to maintain. In fact, strengthening the biomedical side of our program is a top priority for the Toxicology Program during the current integrated planning cycle. One way we hope to address the need to strengthen biomedical expertise and student opportunities, is through recruitment of new faculty in strategic biomedical and human health fields, in partnership with other units on campus, such as the School of Public Health and the College of Medicine. Discussions are already underway and a concept paper being developed for one such position. In addition, we are working on a proposal for the creation of a new non-thesis Masters' program in Risk Assessment that would help strengthen and focus our biomedical expertise. This program would be build on the success of our current NSERC CREATE HERA program and thus also ensure that the CREATE program leaves a lasting legacy when the seven years of NSERC funding runs out. A large component of this program would focus on human health risk assessment, especially human exposure to chemicals and pollutants found in the environment, in our water and food supplies, and in other aspects of our daily lives.

We agree with the Review Team's comment that the Toxicology Centre has demonstrated that it is a flexible organization that can adapt quickly to exploit opportunities as they arise. However, we wish to stress that this is becoming increasingly difficult with the expanding rules and regulations at the U of S that diminish opportunities for non-academic units to make independent decisions and independently pursue new opportunities. Thus, we have reached the conclusion that the governance structure of the Toxicology Centre must change so that we can stay flexible and have more control of our destiny in an increasingly competitive environment. If we fail to do that, we will not be well positioned – as the Review Team has concluded that we currently are – to have a continuing impact on important environmental risk management and sustainable resource development activities, areas critical to Canadian society and economy.