Animal Welfare & Biocontainment Concerns Raised at WFRC

The Western Fisheries Research Center is a facility compromised of two large BSL-2 (biosafety level 2) laboratories (labs); a dry lab located in the main building is made up of multiple labs containing equipment and infrastructures (lab benches, sinks, hoods, etc.) to support activities like cell culture, pathogen propagation, tissue sample analysis, and genetic typing in order to study aquatic pathogens. The BSL-2 wet lab building supports the rearing of fish and aquatic amphibians and experimental challenges involving "endemic" pathogens from the Pacific Northwest region. There is laboratory bench space also available within the wet lab building for handling aquatic animals for procedures such as inoculations, dissections, and tissue preparations.

Ms. Emmenegger is the manager of the BSL-3 (biosafety level 3) laboratory located within the main BSL-2 laboratory, it is the highest containment lab at the facility, and as such entry is restricted to only a few authorized personnel. At the outset, it is important to note that the gravity of the BSL-3 laboratory work as is emphasized in the introduction paragraph of the BSL-3 laboratory operation manual:

> "The Aquatic Biosafety Level 3 (BSL-3) laboratory at the Western Fisheries Research Center in Seattle, Washington is designed to the standards issued by the Centers for Disease Control, the National Institutes of Health and the US Department of Agriculture for microbiological and biomedical containment laboratories. The BSL-3 laboratory provides a high-level quarantine facility in which researchers can safely conduct in vivo experiments using highly virulent fish pathogens or pathogens that may be exotic to western North America... Each person involved in the operation of the BSL-3 laboratory must realize that, by their nature, the infectious agents used in these experiments may have extraordinary levels of biological, political, or economic significance. Should an accidental release occur, the fish stocks of the United States and the reputation of this laboratory might be seriously damaged. For these reasons, IT IS IMPERATIVE that procedures outlined in this manual be followed WITHOUT EXCEPTION. Only persons with adequate training are allowed in the aquatic BSL-3 laboratory and all work is conducted as described in an approved IACUC protocol." (Emphasis in original)

Ms. Emmenegger made repeated reports to her own chain-of-command as well as outside authorities about WFRC animal welfare incidents and biosafety violations and infractions. Those reports include –

> **April 2016** – Ms. Emmenegger sends an email to Ms. Maureen Purcell, serving as the Institutional Animal Care and Use Committee (IACUC) chairperson, Wet Lab Coordinator, Biosafety Officer, and Institutional Biosafety Committee (IBC) chairperson, asking if the electronic post-treatment check for the BSL-2 wastewater treatment system was ever installed as proposed earlier and if the input chlorine levels are at the correct concentration. Ms. Purcell doesn't answer the questions.
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> **May 2016** – Ms. Purcell and former Chief Scientist Jim Winton (now retired) do not want scientists monitoring the BSL-2 effluent system to check if proper decontamination

has occurred. Emmenegger tells them that a USDA Animal Plant Health Inspection Service (APHIS) inspection for laboratory certification that she oversees is coming up, and we need to address this issue because it was brought up previously. Ms. Emmenegger tells them in an email that post-treatment "manual testing needs to be done on a regularly basis since we don't currently have an electronic monitoring system."

July 2016 – Ms. Emmenegger warns Center Director (Jill Rolland) with Mr. Winton present that the lack of BSL-2 effluent treatment monitoring is our biggest biosafety risk at the center.

May 2017 – Ms. Emmenegger reports to her supervisor (Ms. Purcell) that poor air quality in BSL-3 laboratory is likely responsible for Ms. Emmenegger falling unconscious after working long hours on a Saturday in April.

June 2017 – Ms. Emmenegger informed the Center Director (Ms. Jill Rolland) about potential BSL-3 laboratory air quality issues and animal care concerns during a meeting, which included Ms. Purcell. Since it was already agreed that the animal care issues would be submitted as agenda items by Ms. Emmenegger for the next semi-annual IACUC meeting that the discussion on those animal welfare incidents would be delayed until then. Thereupon, Ms. Purcell started to take measures to prevent Ms. Emmenegger from disclosing these issues, as detailed below.

July 2017 – After Ms. Emmenegger submitted three agenda items for the semi-annual animal care (IACUC) meeting to be held in late July 2017, the meeting was scheduled on a day that Emmenegger was on approved leave (family visiting from out-of-state). Ms. Emmenegger asked if it could be held another day, but Ms. Purcell informed her that she could just wait to present the agenda items at the next semi-annual meeting in another six months.

In reply, Ms. Emmenegger informs Ms. Purcell that she will attend the meeting while she is on leave. Ms. Purcell then suggests and sends an email to IACUC coordinator rearranging the agenda order (typically new items are discussed at the end of the committee meeting), so that Emmenegger could present first and then depart the meeting to resume annual leave.

At the start of the meeting, Ms. Emmenegger presented three animal care issues and proposed cost-effective solutions or standard operating procedures (SOPs) to address long-standing maintenance issues/practices that subjected animals to undue stress and harm, and compromised experiments, with associated pictures of how animals have been impacted (fish suffering after facilities forgot to turn airflow back on, etc.) and the unsanitary water in the headboxes. Ms. Emmenegger then departed the meeting. Subsequently Ms. Purcell presents a deviation of SOP report, that she authored, involving the "Chlorination of main wetlab effluent", which in the meeting minutes was described as having "discovered that the automatic chlorination system was not working properly"

and there was no further discussion of this deviation. At the end of the meeting, under a new agenda item (Committee Constitution), Ms. Purcell proposes reducing the number of committee members from 12 to 7, thereby only needing 4 members for a quorum, in order to improve committee efficiency. The motion passes. Unbeknownst to Ms. Emmenegger, she was one of the alternate members slated by Ms. Purcell to be removed from the committee.

One day following the meeting, a "gag-order" forbidding her from communicating with the facilities staff unless it is for emergencies is placed only on Ms. Emmenegger by Ms. Purcell.

August 2017 – Ms. Emmenegger learns that an environmental release, of untreated pathogen-contaminated biosafety level 2 (BSL-2) wastewater into the neighboring wetland park that drains into the second largest lake in Washington State, had occurred from ~January to June 2017. It was discovered over two months earlier and "reported" at the previous animal care meeting. These releases of pathogens for months into waters adjoining Lake Washington pose a substantial environmental risk. Ms. Emmenegger asks her supervisor, now Ms. Purcell, why regulatory agencies, scientists rearing animals, and those involved with biosafety procedures at the facility had not been immediately informed. Ms. Purcell's states Ms. Emmenegger is behaving inappropriately in questioning her and attempts to dissuade Ms. Emmenegger from making any further inquiries.

August 2017 – The BSL-3 laboratory, the highest containment laboratory at the facility, that tests high-risk pathogens, had a shutdown resulting in no water flows for four hours during an experiment, resulting in possible danger to the test animals as well as possibly compromising the validity of the experimental results. Ms. Emmenegger reports to supervisor Purcell that the shutdown was preventable if facilities staff had adhered to standard operating procedures.

September 2017 – Ms. Emmenegger reports the environmental releases from the BSL-2 laboratory to regulatory agencies (Washington Department of Fish & Wildlife and USDA APHIS), because they amounted to non-compliance incidents in violation of the permits Ms. Emmenegger is issued on behalf of the research center.

September 2017 – Ms. Emmenegger submits a scientific integrity complaint with USGS Office of Science, Quality and Integrity (OSQI) citing three incidents involving animal welfare, environmental release of contaminated wastewater, and BSL-3 laboratory deficiencies, and asks for corrective measures to be implemented to prevent future mishaps. This complaint charges Ms. Purcell and other managers with scientific misconduct in violation of the Department of Interior's Scientific Integrity Policy. Ms. Purcell is interviewed as part of the investigation of this complaint. The ultimate dismissal of this complaint is announced at an all-hands meeting in July 2019.

November 2017 – For her FY2018 performance plan all of Ms. Emmenegger's work assignments, with the exception of employee supervisory duties, were altered and

elevated to match the GS-14 (PhD level) scientists in her research group instead of her GS-12 (Masters level) position. Also all the BSL-3 laboratory management and biocontainment duties were no longer listed as primary work tasks. After Ms. Emmenegger's protests, her job duties were reverted back, only to be changed again for FY2019 (see below).

December 2017 – Air quality issues (respiratory ailments, headaches, and fatigue) are reported to Ms. Emmenegger by two researchers currently working in the BSL-3 lab and also by another technician who started in September 2017. Ms. Emmenegger reports this to her management.

January 2018 – Ms. Emmenegger reports BSL-3 laboratory airflow failure during a power surge. In response, supervisor Purcell inaccurately claims that Ms. Emmenegger had caused an air containment breach and broadcasts this in a later BSL-3 laboratory report to multiple agencies/stakeholders.

January 2018 – At the semi-annual IACUC meeting, Ms. Emmenegger reports that there are significant water temperature fluctuations in BSL-2 main wet lab tanks and alarm notifications appear to be absent in many cases. Such temperature variations can affect animal welfare and the quality of experimental results. Other principal investigators would not be aware of this because she is the only one with water temperature data recorders in her animal stock tanks. Emmenegger requests that water stoppages, regardless of short duration, need to be reported to animal caregivers, because they can cause air blocks in incoming water lines for some tank systems.

February 2018 – Ms. Emmenegger submits via the Center Director the annual 2017 BSL-3 Laboratory Inspection & Incident Report to USGS headquarters. It reported on a biosecurity breach (unauthorized personnel entry) in the effluent treatment room, daily checks of the effluent treatment system not being performed by maintenance staff, and poor air quality inside the BSL-3 laboratory impacting worker health. Center Director initially suggests removing text regarding incidents from the report.

March 2018 – Ms. Emmenegger informs supervisor Purcell of potential leak from one of the BSL-3 wastewater treatment tanks. Emmenegger then learns that another leak from a wastewater transfer pipe had been ongoing since November 2017. Facilities staff was aware of the pipe leak in January 2018 but did not convey that information to the BSL-3 Lab Manager (Ms. Emmenegger).

March 2018 – Ms. Emmenegger reports BSL-3 noncompliance of permits/laboratory certification because of effluent containment breach to WA Department of Fish Wildlife and USDA APHIS. BSL-3 laboratory work suspended until assessment and repairs of the effluent treatment system and air ventilation (HVAC) system can be performed.

March 2018 – Ms. Purcell authors a formal report that Director Rolland sends to federal and state regulatory groups regarding the BSL-3 laboratory closure, which erroneously states that there was an air breach in the BSL-3 laboratory caused my Ms. Emmenegger

and describes the wastewater biocontainment breach as a "small drip in the pipe carrying untreated effluent" to the treatment tanks. There is no mention of the second biocontainment breach involving the larger leak that is coming from the bottom of the BSL-3 wastewater treatment tank that they were informed of earlier in March. Emmenegger was unaware of the report until after it had been distributed.

April 2018 – Ms. Emmenegger reports that BSL-3 door key card access no longer working after a power surge event and the back-up manual key also failing. Supervisor Purcell and facilities staff didn't want to fix lock/key until Ms. Emmenegger pointed out that it was a safety issue.

April 2018 – A clarification report authored by Ms. Emmenegger is sent via Center Director Rolland again to state and federal agencies/groups describing the two BSL-3 laboratory biocontainment breaches and the incidents leading up to the failures.

July 2018 – Ms. Emmenegger discloses to the national USGS Biosafety Specialist concerns regarding the effluent tank treatment leak assessment and indicates her desire to discuss and seek input. Ms. Purcell then requests the list of tasks to justify Ms. Emmenegger's entry into the BSL-3 effluent room and Interim Director (Jonathan Sleeman) ordered Ms. Emmenegger to no longer directly contact the specialist.

August 2018 – Ms. Emmenegger notifies supervisor Purcell and others that BSL-2 alarm notifications (water flow stoppage, temperature fluctuations, etc.) by facilities staff are still not occurring or excessively delayed.

September 2018 – Ms. Emmenegger asks Ms. Purcell, during the summer semi-annual IACUC meeting, the whereabouts of the report regarding BSL-2 wastewater treatment deviations that occurred earlier in the year. BSL-2 effluent treatment system is now monitored manually, with Ms. Purcell participating and in charge of ensuring compliance. In response, Ms. Purcell stated she was unaware of any deviations. Emmenegger explained that the monitoring logbook indicated that were three events between January and March 2018 when the effluent treatment (chlorine levels) were significantly low and insufficiently treated wastewater was released.

A committee discussion ensues regarding whether this was an adverse event/SOP deviation with no resolution. After the meeting, Ms. Purcell transfers the compliance responsibilities and reporting duties for BSL-2 effluent monitoring incidents from herself to the new biosafety officer. Subsequently after lengthy exchanges, a SOP deviation report was generated a month later by the biosafety officer and regulatory agencies/groups (WDFW, EPA, USDA, Fisheries Co-Managers of Washington State, and University of Washington) were informed of the second set of environmental release events from the WFRC.

October 2018 - USGS Headquarters industrial hygienist who was conducting the BSL-3 laboratory air quality investigation asks Ms. Emmenegger about performing a wet run (mock) experiment, to test for chlorine gas and other noxious fumes in order to confirm

that the ventilation system is now functioning properly, and she recommends the test run should be done after repairs to the leaking wastewater tank and pipe are completed. Supervisor Purcell and Facilities Manager Kyle Sato intercede, stating the test run could be done while the effluent tank was still leaking. Many email exchanges are sent after Ms. Emmenegger raised concerns about exposing the BSL-3 lab staff unnecessarily to bleach fumes from a leaking effluent tank and why perform redundant wet runs. The industrial hygienist decides to delay the ventilation test until all BSL-3 lab repairs are completed.

December 2018 – Ms. Purcell altered Ms. Emmenegger's FY2019 performance plan once again, three out of Ms. Emmenegger's four critical elements/job duties are substantially changed. This plan is similar to the performance plan Ms. Purcell initially proposed at the beginning of FY18 and then retracted. Research grade scientists' jobs at USGS centers are not cookie-cutter occupations. Ms. Emmenegger's listed job duties in her performance plan, the same since 2009, most accurately reflect the work she performs (e.g. BSL-3 lab manager, biocontainment duties, special pathogen research). Ms. Purcell ignores Ms. Emmenegger's response and the major alterations to her FY2019 performance plan proceed.

March 2019 – At the spring semi-annual IACUC meeting, under a new chairperson, Ms. Emmenegger reports that alarm notifications by facilities staff have started to wane and these incidents are summarized in the two WFRC Environmental Quality Monitoring reports involving animals being subjected to extreme rapid temperature fluctuations (~10˚C). No fish died, but two frog deaths may have been associated with the temperature extremes. Ms. Emmenegger noted that the previous December 2018 deadline issued by the IACUC for headboxes to be cleaned had passed and incoming water from headboxes was really filthy (most not cleaned since 2011).

May 2019 – Ms. Emmenegger attends semi-annual WRFC IBC meeting under another new chairperson and learns that a third incident of low chlorine treatment levels occurred in November 2018, that was likely associated with heavy rainfall, and was reported to regulatory agencies/groups. Ms. Emmenegger presents a statement in response to an IBC review involving one of her experimental protocols, in which she tells IBC members that:

> "Subsequent discovery of pathogens in fish stocks with clean health histories and shipments of sick fish have occurred in the wet lab. The WFRC wet lab is a designated quarantine facility. All aquatic species that we transfer to our facility bring along their own unique circulating microbiome that is entirely unknown. Therefore, the overarching premise is that the WFRC BSL-2 effluent treatment system is capable of destroying the majority of microbes/pathogens (known or unknown)."

September 2019 – During semi-annual fall IACUC meeting, Ms. Emmenegger presents information to IACUC that alarm notifications by facilities are not happening again (no phone calls for 11 alarms) and a presentation of data refuting the report by facilities manager stating that scientists who performed prototype cleaning of the headboxes had

damaged some components (floats). Pictures documenting continued poor water quality in headboxes are also shown.

October 2019 – Ms. Emmenegger reports BSL-3 laboratory air flow cessation and alarms malfunctioning to supervisor Purcell and requests a work order to fix alarms. Ms. Purcell chastises Ms. Emmenegger for entering the lab briefly to take a picture confirming alarm malfunctions. This malfunction and absence of notification by facilities staff means that researchers will not know when or if it is safe to re/enter the laboratory. Ms. Emmenegger also reports this to the Safety and Biosafety Committees.

Within days, Ms. Purcell issues Ms. Emmenegger an unacceptable job performance rating.

January 2020 – Ms. Emmenegger reports a BSL-2 Wastewater Treatment System bleach leak to the Safety Committee.

Later in January, Ms. Emmenegger is served with a notice of proposed Separation, placed on administrative leave, and forbidden to enter the WFRC premises without prior permission from Ms. Purcell.

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