Staff Summary for October 8-9, 2025

6. Application for a Restricted Species Permit Amendment (Consent)

Today's Item **Information ☐** **Action ☒**

Review an application to amend a restricted species permit from Cedars-Sinai Medical Center to import, possess, transport, rear, or conduct research on transgenic western clawed (*Xenopus tropicalis*) and transgenic African clawed frogs (*Xenopus laevis*), and take action consistent with Commission regulations, if warranted.

Summary of Previous/Future Actions (N/A)

Background

Pursuant to Section 671.1, subsection (a)(8)(H), when the Department approves a restricted species permit for transgenic aquatic animals, the Commission must review the Department's determination during a regularly scheduled public meeting. The Commission may deny the issuance of a permit if it determines the applicant cannot meet regulatory requirements for importation, transportation, possession, and confinement.

In its transmittal memo (Exhibit 1), the Department states that transgenic *Xenopus* frogs will be used for biomedical research at Cedars-Sinai Medical Center, to study the genes and developmental mechanisms that lead to birth defects. The *Xenopus* frog is well-suited for this research due to its developmental similarities to human development. Cedars-Sinai has agreed to comply with importation, transportation, containment and security conditions as specified in regulation. When determining whether to approve the permit amendment, the Department's Fisheries Branch coordinated with regional staff responsible for this area, as well as the Fish Health Lab.

Significant Public Comments (N/A)

Recommendation

Commission staff: Allow the issuance of the restricted species permit amendment as recommended by the Department.

Department: Allow the issuance of the restricted species permit amendment.

Exhibits

1. Department memo, received September 16, 2025
2. Application for a permit amendment, received September 16, 2025 (received by the Department April 25, 2025)

Motion (N/A)

State of California
Department of Fish and Wildlife

Signed original on file,
Received September 16, 2025

Memorandum

Date: September 16, 2025

To: Melissa Miller-Henson
Executive Director
Fish and Game Commission

From: Charlton H. Bonham
Director

Subject: **Agenda Item for the October 8-9, 2025 Meeting: Receipt of Cedars-Sinai Medical Center's Restricted Species Permit Amendment Request to Possess Transgenic African Clawed Frogs and Transgenic Western Clawed Frogs**

Cedars-Sinai Medical Center has submitted an Amendment Request to the California Department of Fish and Wildlife (Department) to add transgenic African clawed frogs (*Xenopus laevis*) and transgenic western clawed frogs (*Xenopus tropicalis*) to its Restricted Species Permit (Permit No. RD-10001). In February 2025, the Commission approved Cedar-Sinai's request for a Restricted Species Permit to possess transgenic zebrafish (*Danio rerio*) for biomedical research.

According to Title 14, Section 671.1(a)(8)(H), all approved applications to possess transgenic aquatic animals shall be reviewed by the California Fish and Game Commission (Commission) at a regularly scheduled meeting. The Commission may deny the issuance of a permit if it determines that the applicant is unable to meet the regulatory requirements for the importation, transportation, possession, and confinement of transgenic aquatic animals.

The transgenic *Xenopus* frogs will be used for biomedical research at Cedars-Sinai Medical Center. Cedars-Sinai recently recruited a new faculty member, Dr. Mustafa Khokha, from the Yale University. Dr. Khokha has current funding from the National Institutes of Health to work with these frog species. Upon approval of this Amendment Request, Cedars-Sinai will begin importing Dr. Khokha's frog colony from Yale University to the Cedars-Sinai Davis Research Building on the hospital campus. The Khokha Lab is interested in the genes and developmental mechanisms that lead to birth defects (Congenital malformations). The frog *Xenopus* is particularly well-suited for studying birth defect genes because it has many similarities to human development.

The Department currently permits approximately six university research facilities to possess transgenic *Xenopus* frogs for the purpose of biomedical research. Cedars-Sinai has agreed to comply with containment and security conditions as specified in

Title 14 of the California Code of Regulations. Fisheries Branch has coordinated with the regional staff responsible for this area and the Fish Health Lab. The Department recommends approving Cedars-Sinai's Amendment Request to possess transgenic African clawed frogs and transgenic western clawed frogs.

If you have any questions or need additional information on this matter, please contact Jay Rowan, Chief, Fisheries Branch at (916) 212-3164.

Attachment

ec: Chad Dibble, Deputy Director
Wildlife and Fisheries Division

Jay Rowan, Branch Chief
Fisheries Branch
Wildlife and Fisheries Division

Kevin Kwak, DMV, Ph.D.
Veterinarian Specialist
Fisheries Branch

Christine Richey, DVM
Veterinarian Specialist
Fisheries Branch

Kyle Evans, Env. Program Manager
Central Region (Region 5)

Joseph Stanovich, Sr. Env. Scientist (Supervisor)
Central Region (Region 5)

David Thesell, Deputy Executive Director
Fish and Game Commission

Ari Cornman, Wildlife Advisor
Fish and Game Commission

State of California – Department of Fish and Wildlife

2025 RESTRICTED SPECIES PERMIT AMENDMENT REQUEST

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IMPORTANT! YOU MAY NOT OBTAIN ANIMALS PRIOR TO AMENDMENT APPROVAL

Fees include a nonrefundable three percent (3%) application fee, not to exceed $7.50 per item. *(Section 700.4, Title 14, California Code of Regulations CCR).*

FEE: $78.54 *(Nonrefundable application fee must accompany this amendment request.)*

SEE INSTRUCTIONS ON PAGE 2. TYPE OR PRINT CLEARLY.

FIRST NAME	M.I.	LAST NAME	PERMIT NUMBER
n/a			RD-10001

BUSINESS NAME	DAY TELEPHONE
Cedars-Sinai Medical Center	310-423-9042

LOCATION OF ANIMAL(S) HOUSING: Note: Animals being held at multiple locations require inspection certification by the Department that each of those facilities meet the minimum applicable housing requirements as set forth in subsection 671.1(a)(8)(A-F), Sections 671.3-671.4 and/or 671.7(b), Title 14, of the CCR.

ADDRESS	CITY	STATE	ZIP CODE	COUNTY
110 N George Burns Rd (Davis Building)	Los Angeles	CA	90048	Los Angeles
ADDRESS	CITY	STATE	ZIP CODE	COUNTY

List all restricted animals **TO BE ACQUIRED** in the following order: mammals, birds, fish, or reptiles. Group animals by order, family, and species. Use the following letters to denote sex: M=Male, F=Female, and U=Neutered or Unknown. Mark an "X" in the **TO BE ACQUIRED** column for animals to be acquired within the next year. **Unique Identifiers:** Use the following letters to denote unique identifying methods (See Section 671.1(c)(3)(J), Title 14, of the CCR): M=Microchip, T=Tattoo, and A=Alternative Method. Aquaculture and fish permittees: Identify the actual number in the ID number field and identify either W=Weight, V=Volume or C=Count in the method field. Remember to complete the Importation Only Section below for animals being imported into California. For California Residents Only: **All native species obtained from a licensed California Wildlife Rehabilitation Facility require a Native Species Exhibiting Permit.** Contact the License and Revenue Branch at (916) 928-5846 or SPU@wildlife.ca.gov if you need additional information.

COMMON NAME	SCIENTIFIC NAME	ID NUMBER	METHOD	SEX	AGE
Western Clawed Frog	Xenopus tropicalis (transgenic and non-transgenic)	2000	C	M&F	<15yr
African Clawed Frog	Xenopus laevis (transgenic and non-transgenic)	2000	C	M&F	<15yr

WILL ANIMALS BE IMPORTED INTO CALIFORNIA? ☒ YES, COMPLETE IMPORTATION SECTION ☐ NO, EXPLAIN:

IMPORT ONLY: COMPLETE THIS SECTION IF YOU ARE IMPORTING ANIMALS INTO CALIFORNIA

LIST SPECIES TO BE IMPORTED	NUMBER OF ANIMALS	ORIGIN *(State or Country)*
Xenopus tropicalis, Xenopus laevis	4000	Connecticut

PERSON/BUSINESS SHIPPING ANIMALS	DAY TELEPHONE
Yale University, Yale Animal Resources Center	860-895-7513

ADDRESS	CITY	STATE	ZIP CODE
1 Gilbert St.	New Haven	CT	06519

NAME OF CARRIER	POINT OF ENTRY INTO CALIFORNIA
Validated Delivery Solutions, LLC	Los Angeles International Airport, Los Angeles, CA (LAX)

I certify under penalty of perjury under the laws and regulations of the State of California that all information on this application is true and correct and I am not violating any city or county laws. I agree to comply with the provisions of Section 671, Title 14, of the CCR. I understand it is unlawful to use or possess a permit which was obtained by fraud or deceit (Fish and Game Code Section 1052b). I understand that in the event that this information is found to be untrue or incorrect, the permit will be considered invalid and must be surrendered where purchased and I will be subject to criminal prosecution. I further understand that failure to comply with the terms and conditions of a permit may result in revocation of current permit and/or denial of future permits. Violation of this section is a misdemeanor, punishable by fine of not more than $1,000.00, imprisonment in the county jail for not more than six months, or both the fine and the imprisonment. In addition, I may be subject to civil penalties as stated in Fish and Game Code Section 2125.

APPLICANT'S SIGNATURE *(Must be in ink)*	DATE
X	5/6/25

FOR DEPARTMENT OF FISH AND WILDLIFE USE ONLY

REVIEWED BY/DATE	TRANSACTION#	ISSUED BY/DATE

INSTRUCTIONS FOR COMPLETING THE RESTRICTED SPECIES PERMIT AMENDMENT REQUEST

Use this form to: 1) add species you are not currently authorized to possess; 2) increase the number of animals where there are condition limitations; or 3) add/change facility locations.

Please allow 45 business days for processing your request. Amendments for transgenic species must go before the Fish and Game Commission, so you must allow an additional 30 business days. Incomplete requests will be returned and could delay the issuance of your amendment. Contact the Department of Fish and Wildlife (Department), License and Revenue Branch at (916) 928-5846 or SPU@wildlife.ca.gov if you need additional information regarding Restricted Species Permits.

To complete this application, you must:

1. It is mandatory to complete all items unless exempted.
2. Sign and date the amendment request in ink (an **original** signature is required).
3. Provide a list of animals to be acquired.
4. Provide a statement of purpose describing in detail the planned use for each animal. Applicants shall include relevant materials, as appropriate, including any lists of prospective clients with their contact information or contracts with clients or websites, scripts, brochures or flyers promoting or describing the planned use of the animals. If the animals will be used in an educational program, the applicant shall provide an explanation why live restricted species are necessary and samples of the educational material and message that will be distributed (not required for animal care, AZA, breeding, research and single event breeding permittees).
5. Provide a resume that provides dates and details documenting you or your full-time employee's qualifying experience caring for restricted animals at a facility engaged in a similar or directly related activity to the permit requested and for the animal(s) to be acquired. This experience shall have been acquired within the previous five years and include a total of at least one year full-time, hands-on experience caring for a species in the same family or closely related taxonomic family as the species requested (required for breeding, exhibiting, nuisance bird abatement, shelter and single event breeding permittees only).
6. Provide a letter of recommendation, written within the previous five years on **letterhead stationery, with an original signature**, from the facility where you or your full-time employee gained the experience. Document the quality and extent of the knowledge and experience, as related to the species and permit requested (required for breeding, exhibiting, nuisance bird abatement, shelter and single event breeding permittees only).
7. Provide an updated copy of your Emergency Action Plan that includes the new species.
8. Provide an updated Breeding Plan that includes the new species (required for breeding and single event breeding permittees only).
9. Provide photograph(s) of the enclosure(s) for animal(s) to be acquired that includes all required elements of the minimum standards as specified in Section 671.3.
10. Provide any other supporting documentation required by regulations.
11. Mail the completed application and supporting documentation with a cashier's check, money order, personal or business check*, or credit card** authorization form with the appropriate fee to the Department of Fish and Wildlife, License and Revenue Branch, PO Box 944209, Sacramento, CA 94244-2090 or apply in person. **DO NOT SEND CASH**.

IMPORTANT INFORMATION FROM THE DEPARTMENT OF PUBLIC HEALTH

The Department of Public Health (CDPH) has regulatory authority over the importation of specified carnivores (including skunks and raccoons), nonhuman primates and bats, due to potential health hazards.

Section 2606.8, Title 17, of the CCR, prohibits the importation of skunks because the hazard to the public from exposure to rabies is extremely high. The CDPH is concerned that certain wild animals could carry rabies and introduce new strains of rabies into the state of California. Therefore, the Department routinely denies requests for the importation and possession of skunks and raccoons. Exceptions may rarely be made for zoological or research institutions demonstrating an extraordinary need. The importation of other specified carnivores, bats or nonhuman primates may be allowed under a CDPH permit in certain circumstances. **For more information on CDPH permits, please contact them at (916) 552-9740.**

NOTICE

Disclosure Statement—Under Section 671.1, Title 14, of the CCR, the Department of Fish and Wildlife is authorized to collect information from applicants to maintain a record of licensure. All information requested on this application is mandatory unless otherwise indicated. All information except the street address and telephone number of the applicant may be provided to the public, if requested. All information related to a business may be released, including the residence address if it is the same as the business address. Other personal information submitted on this application may be released for law enforcement purposes, pursuant to court order, or for official natural resources management purposes.

A licensee may obtain a copy of his/her license records maintained by the Department by submitting a written request to the Custodian of Records, at the Department of Fish and Wildlife, License and Revenue Branch, PO Box 944209, Sacramento, CA 94244-2090. All requests must include the requester's name, address, and telephone number.

PAYMENT POLICY

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State of California – Department of Fish and Wildlife

2024 RESTRICTED SPECIES PERMIT AMENDMENT REQUEST

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APR 25 2025

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FEE: $77.25 *(Nonrefundable application fee must accompany this amendment request.)*

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n/a			RD-10001

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APPLICANT'S SIGNATURE *(Must be in ink)*	DATE
X	4-18-2025

FOR DEPARTMENT OF FISH AND WILDLIFE USE ONLY

REVIEWED BY/DATE	TRANSACTION#	ISSUED BY/DATE

State of California – Department of Fish and Wildlife
2024 RESTRICTED SPECIES PERMIT AMENDMENT REQUEST
DFW 1313b (REV. 10/23/2023) Page 2 of 2

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Jeffrey A. Golden, MD

Director, Burns and Allen Research Institute

Executive Vice Dean, Research and Education

Linda and Jim Lippman Distinguished Chair in Academic Medicine

Professor of Pathology

8700 Beverly Blvd. – NT
Suite 2009
Los Angeles, CA 90048

310-423-9042
310-423-0119 Fax

jeffrey.golden@csmc.edu

cedars-sinai.org

April 18, 2025

California Department of Fish & Wildlife
License and Revenue Branch
P.O. Box 944209
Sacramento, CA 94244-2090

To Whom It May Concern:

I am writing to submit our request for an amendment to our recently granted permit (RD-10001) from the California Department of Fish & Wildlife (the Department) for the use of two frog species, Western Clawed Frog (*Xenopus tropicalis*) and African Clawed Frog (*Xenopus laevis*) in research at Cedars-Sinai Medical Center. We recently recruited a new faculty member, Dr. Mustafa Khokha, from Yale University who has current NIH funding to work with these frog species, including transgenic and non-transgenic models. We understand that per Title 14, §671(c)(11) of the California Code of Regulations, a restricted species permit is required for the use of *X. tropicalis and X. laevis*, and a review by the California Fish & Game Commission (the Commission) is required for the use of any transgenic aquatic animals, including these two frog species. To whatever extent possible, we would like to request expedited consideration for our application.

Cedars-Sinai Frog Facilities:
Cedars-Sinai is currently in the planning process of building the required facilities for housing and research involving frogs on the 7th floor of our Davis Research Building on the hospital campus. The facilities will be designed to ensure compliance with the *Guide for the Care and Use of Laboratory Animals, 8th Edition.* Our goal is to complete construction of the facilities by August 2025 and then begin importing Dr. Khoka's frog colony to Cedars-Sinai, which currently continues to operate at Yale University. The design of the system will include a closed water system and waste disposal process in place for bagging and incineration of frog carcasses. IACUC approval was granted for this research project, effective 4/1/25.

Summary of Supporting Documents:
Please find attached the following:

1) Completed Restricted Species Permit Amendment Request.
2) A check for the required fees.
3) Confirmation from USFWS that no permit is required for *X. tropicalis* and *X. laevis.*
4) A project description for the planned research involving frogs.
5) Emergency Action Plan for the new frog facility.
6) Images and documentation for the enclosures that will be used for housing frogs.
7) Floor Plan showing location of the planned Frog Facility within the Davis Research Building.
8) Updated OLAW Animal Welfare Assurance approval letter (2/7/25; exp. 2/28/29).

I appreciate your time and consideration in reviewing our amendment application. Should you require any additional information or have any questions, please do not hesitate to contact me at Jeffrey.Golden@cshs.org.

Thank you for your assistance.

Sincerely,

Jeffrey Golden, M.D.
Institutional Official
Cedars-Sinai Medical Center
8700 Beverly Blvd.
Jeffrey.Golden@cshs.org

Sagar, Ajay

From: epermits_communications@fws.gov
Sent: Wednesday, February 12, 2025 7:58 AM
To: Sagar, Ajay
Subject: [External] EPS0349655 - Unauthenticated program support request - Other - ajay.sagar@cshs.org

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

Hello Ajay,

Thank you for contacting ePermits Program Support.

Yes that is correct, neither "Xenopus laevis" or "Xenopus tropicalis" are CITES listed species so a CITES permit is not needed.

If you require assistance with another issue, please submit a new support request.

Thank you,
FWS ePermits Program Support

Ref:MSG1734018_Y4K0UnlU8zgMEymLO3sx

Project Description

The genome of animals must coordinate a multitude of signals to correctly generate an adult organism from the fertilized egg. If these signals fail to function properly, then infertility or birth defects result which are a common cause of serious human disease. While some of these signals have been identified, and some of their roles understood during development, the genome has a multitude of genes that likely play important roles during embryonic development for which nothing is yet known. In order to understand what these genes do during development, we study the genetics of frogs and mice. In particular, my lab is interested in axis formation and body axis patterning; that is, how an organism determines back from front, head from tail, and left from right in order to make an organism with correct functional pattern.

The Khokha Lab is interested in the genes and developmental mechanisms that lead to birth defects (congenital malformations). Our approach is novel gene discovery in congenital malformation patients followed by developmental mechanism discovery in Xenopus. Currently, both a genetic and a gene functional approach are necessary for annotating genes as disease causing. Sequencing these genes will then become the basis for genetic testing. Coupling genetic testing with clinical follow-up and functional analysis, we also hope to develop prognostic and therapeutic strategies by personalizing medicine towards the underlying genetic disorder rather than simply phenotype.

Functional analysis is performed in disease model systems. The frog Xenopus is particularly well-suited for studying birth defect genes. Experiments are fast and easy to perform, and as a tetrapod, Xenopus has many similarities to human development. Once we have identified a candidate gene from our patient, we test it in frog to see if it causes a similar phenotype. If it does, then we try to understand the underlying developmental mechanisms. We try to figure out "how" the gene directs embryonic development.

Similar testing will be carried out in mouse. In this case, genes discovered in Xenopus can also be studied in mouse. Here studying the gene in mouse allows us to even more closely model the human disease. By coupling the two model systems, we can maximize our discovery rate as well as closely understand the disease process that afflicts children.

CEDARS-SINAI EMERGENCY ACTION PLAN
Xenopus tropicalis and *Xenopus laevis* Facility
Version: 4/14/2025

- **List of the re-capture equipment available, including but not limited to darting equipment, nets, traps, and chemical immobilization drugs:**
  Access to the Davis Research Building is restricted with identification badge access granted by the Security department as needed. Access to specific animal use areas is controlled through Cedars-Sinai's Department of Comparative Medicine and only granted to personnel approved by the IACUC to work with animals. Only authorized personnel with badge access can enter the animal housing area using the badge-activated elevators to reach the floors and entrances. All animal room doors are locked, and only research staff whose animals are housed in those rooms are given access by Comparative Medicine personnel.

  All enclosures are contained in a larger rack system with circulating water, and therefore the risk of escape is near zero. Frogs are moved between tanks with gloved hands or soft nets; traditional fish nets can damage the frog skin. In the event that a frog could escape its enclosure, it would be transported to the rack's internal water reservoir near the sump, and therefore is in secondary containment. The tanks are self-contained and not connected to external water sources. The sump has an overflow drain used for water exchanges which is protected with a mesh screen such that frogs are unable to gain access into the drain, and therefore would not escape the room.

  If a frog escapes to the secondary containment chamber or jumps out of the tank onto the counter or the ground while being transferred between tanks, all efforts will be made to return the frog to its proper tank using gloved hands or soft aquarium nets. If a frog has been out of water too long, it will be humanely euthanized to minimize discomfort and distress. All drains in the frog facility are equipped with mesh screens to prevent animals from accidentally escaping into the sewage system. Therefore, there is exceptionally low risk of escape.

- **Description of humane lethal dispatch methods for various animals and a list of qualified personnel who are trained to carry out the methods:**
  The principal investigator, Dr. Mustafa Khokha, and study coordinator, Maura Lane, are fully qualified and primarily responsible for ensuring all laboratory personnel are trained in these methodologies, and all protocols and personnel are approved by the Cedars-Sinai Institutional Animal Care and Use Committee (IACUC).
  - Embryos/larvae up to stage 36 (hatching) are euthanized by immersion in a 10% diluted bleach solution for 20 minutes.
  - Embryos stages 37 - 45 (approximately 2 - 4 days post-fertilization at 24°C) will be euthanized by immersion in MS-222 for 10 minutes to anesthetize, followed by a 10% diluted bleach solution for 20 minutes.
  - Euthanasia of adult *X. tropicalis* and *X. laevis* includes immersion in a buffered Syncaine/MS-222 (tricaine methanesulfonate) solution (2-4 g/L) for 20 minutes followed by decapitation, then pithing of the brain to ensure successful euthanasia.
  - Dead frogs are then bagged and frozen prior to incineration.

- **List of medical supplies/first aid kits and where they are located:**
  X. tropicalis and *X. laevis* do not pose risk of physical injury to humans. There is a very low risk of transmission of non- tuberculosis mycobacteria (e.g. *M. marinum*, *M. liflandii*) to humans through skin contact. Non-powdered gloves must be worn at all times when handling the frogs or the system water. Hand washing is mandatory after handling frogs or the water in the system, and before leaving the housing/procedure rooms. First aid kits for laboratory personnel are located in throughout the vivarium, near other personal safety equipment such as eye wash stations and showers.

  In the case of acute, life-threatening injury to frogs, they will be euthanized by submersion in buffered Syncaine/MS-222 (tricaine methanesulfonate), followed by decapitation and pithing.

- **Description of mobile transport cages and equipment on hand:**
  Animals are housed in Iwaki Double Sided, Six Shelf Stand Alone Racks. These feature a recirculating system with a point of use RO system equipped with automatic pH and salinity monitoring, alarming and dosing, as well as monitoring of room and water temp. The racks for housing are located in 7057, 7059 and 7061. The centralize life support systems are located in 7058.

  Animals used for research will be placed into a plastic 4L container containing system water, and transported to procedure room 7056, located in the same hallway as the housing rooms. Embryos are maintained inside of petri dishes, inside of a sealed incubator, and therefore pose no risk for escape.

- **List of emergency telephone numbers that includes the local department regional office, 911, and animal control agencies:**
  1) 911
  2) CA Fish & Game South Coast Regional Office: 858-467-4201
  3) Los Angeles Department of Animal Services: 888-452-7381
  4) Sandra Duarte Vogel, DVM, Cedars-Sinai Attending Veterinarian, (310-423-7684; 818-568-8043)

- **Written plan of action for emergencies.**
  Frogs are not physically harmful to humans and therefore pose no risk for attack in an emergency.

  In case of emergency, Comparative Medicine as well as the lab emergency plans will be activated, this includes communication between the different interdependencies, and depending on the severity of the emergency, the institutional command center. The institution's first priority is to ensure that humans are safe to enter the facility. Until it is safe for staff to enter the facility (i.e., cleared by emergency responders), no action will be taken on site. When

possible, remote monitoring of the environmental conditions of the room, is conducted by the Department of Comparative Medicine.

The animal holding rooms, water systems as well as HVAC controls are connected to emergency power. Air handlers are not connected to emergency power, but equipment to manage variations in temperature such as portable heaters and air conditioning units are available on site.

Once the facility is determined to be safe for entry of our staff, the next priority will be to re-establish conditions for the survival of the animals. The second critical feature is to make sure that no tanks are submerged; this is unlikely to be an issue at Cedars as the facility is elevated and not in a basement. Frogs are very hardy. They can survive for a week without water change or food. However, they breath air and cannot withstand dramatic temperature fluctuations. Therefore, air circulation, temperature, and any submerged tanks are a critical problem and will be addressed first.

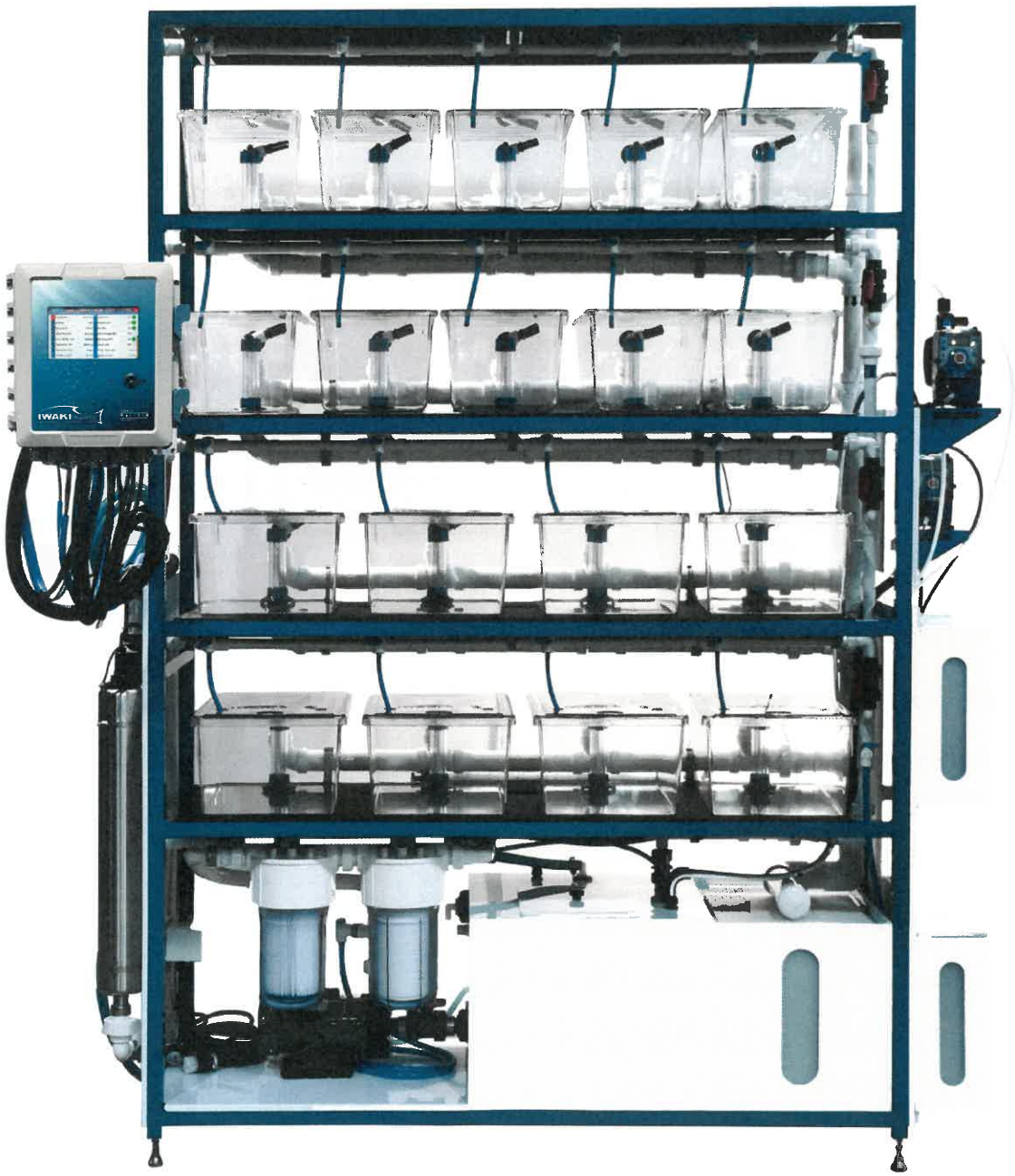
If these conditions cannot be adequately sustained, then evacuation of a subset of frogs will be attempted. Our colony will have a "library rack" for which critical individual lines are housed in small, easily moved tanks via carts. From these frogs, all lines can be derived and so the transport of these animals to another facility will be the priority. Once transported to a facility with adequate environmental conditions, we will resume water changes and feeding of the frogs. Of note, feeding without being able to change the water is detrimental as wastes need to be removed from the tank water or will harm the frogs. Fortunately, frogs can survive for at least a week without feeding and survive without any signs of harm. As these frogs will be undergoing manual water changes, the risk of escape from a tank is higher than in the frog facility. However, most likely the room will not have drains in this emergency situation or if it does, we will place mesh screens over the drains to prevent escape. Therefore, escape will remain nearly impossible.

We note that in an emergency it Is unlikely that adequate space or staff will be available to maintain all of the frogs outside the recirculating facility in which case we will euthanize frogs in that scenario. The lab maintains a stock of approved euthanasia solution's to be used in emergency situations

LABREED®

Iwaki Aquatic

XENOPUS System



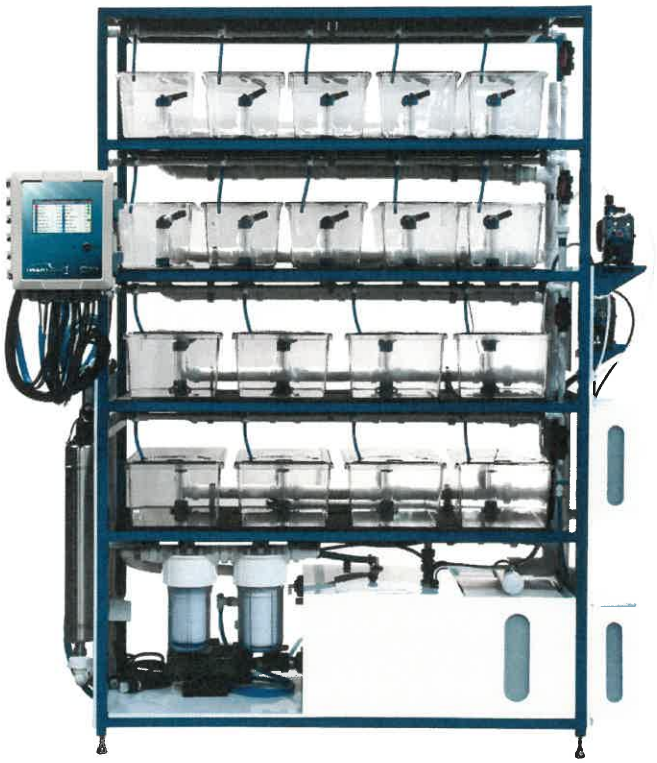
IWAKI AQUATIC
SYSTEMS AND SERVICES

System Features

LABREED®

Four-Shelf Single-Sided System

- Available in stand-alone, flow-through and multi-rack configurations
- Standard configuration is a four-shelf system. Custom configurations available, please inquire
- All systems feature Iwaki Aquatic magnetic drive pumps for minimal noise and vibration
- Powder coated aluminum with leveling feet options
- Open shelving provides easy access to tanks, water feed and drain manifolds
- System plumbing is designed with unions in strategic locations so the entire system can be easily disassembled for cleaning
- Titanium chiller options



Easy access to all components including UV, titanium chiller, pumps and web enabled controller

Filtration System

- Low maintenance oversized moving bed biofilter
- Stainless steel UV unit
- Large capacity 50-micron cartridge filter
- 600 gram capacity activated carbon filter
- 150-200 micron filter pad

Innovative Tank Design

- 16 liter and 23 liter polycarbonate tanks and lids standard. Other sizes are available, please inquire
- Tanks feature our "flood and flush" siphon drain assembly for unmatched solids removal efficiency
- Overflow drain in rear tank wall provides added redundancy
- Tanks are placed on black shelf decking for reduced algal growth and preferred background for Xenopus
- Aeration option for tanks
- Tadpole drains available

Flood and Flush Drain Assembly

16 Liter

23 Liter

Iwaki Aquatic Life Support Controller

- Monitor and control your system remotely with any internet ready device and our powerful cloud based software platform
- Sends email or SMS text alerts when parameters are out of range
- Chart/graph water quality parameters over time. Up to 90 days with 15 minute sampling intervals
- Standard with pH, temperature, conductivity sensors and dosing control
- System includes level and flow sensors for safety and shut-down of electrical components in the event of a low water or low flow situation

Specifications

LAB REED®

ITS-X Four Shelf System

Tank Options	16 Liter		23 Liter
Tank Quantity	20		16
Xenopus laevis Capacity @ 1 Adult/3.0 Liter	106		122
Xenopus tropicalis Capacity @ 1 Adult/0.75Liter	426		490
Total System Volume (Liters)	460		508
Total Tank Volume (Liters)	320		368
Turnover Rate per Hour	3-5		
UV Dose Rate uW-sec/cm2 (*EOLL 12 Months)	100,000 at 4 turnovers per hour		
Mechanical Filter, 50 Micron	0.55 M2		
Activated Carbon Filter	600 grams		
	Width	Depth	Height
System Dimensions, Centimenters	201	64	236
System Dimensions, Inches	79	25	93
Operating Weight with 23 Liter Tanks	759 Kg, 1,685 Lbs		
Voltage/Hertz/Amps with Standard Chiller	120/60/12	or	230/50-60/6

Notes:
16 and 23 liter tanks can be mixed on a rack, just not on each level
* EOLL - end of lamp life

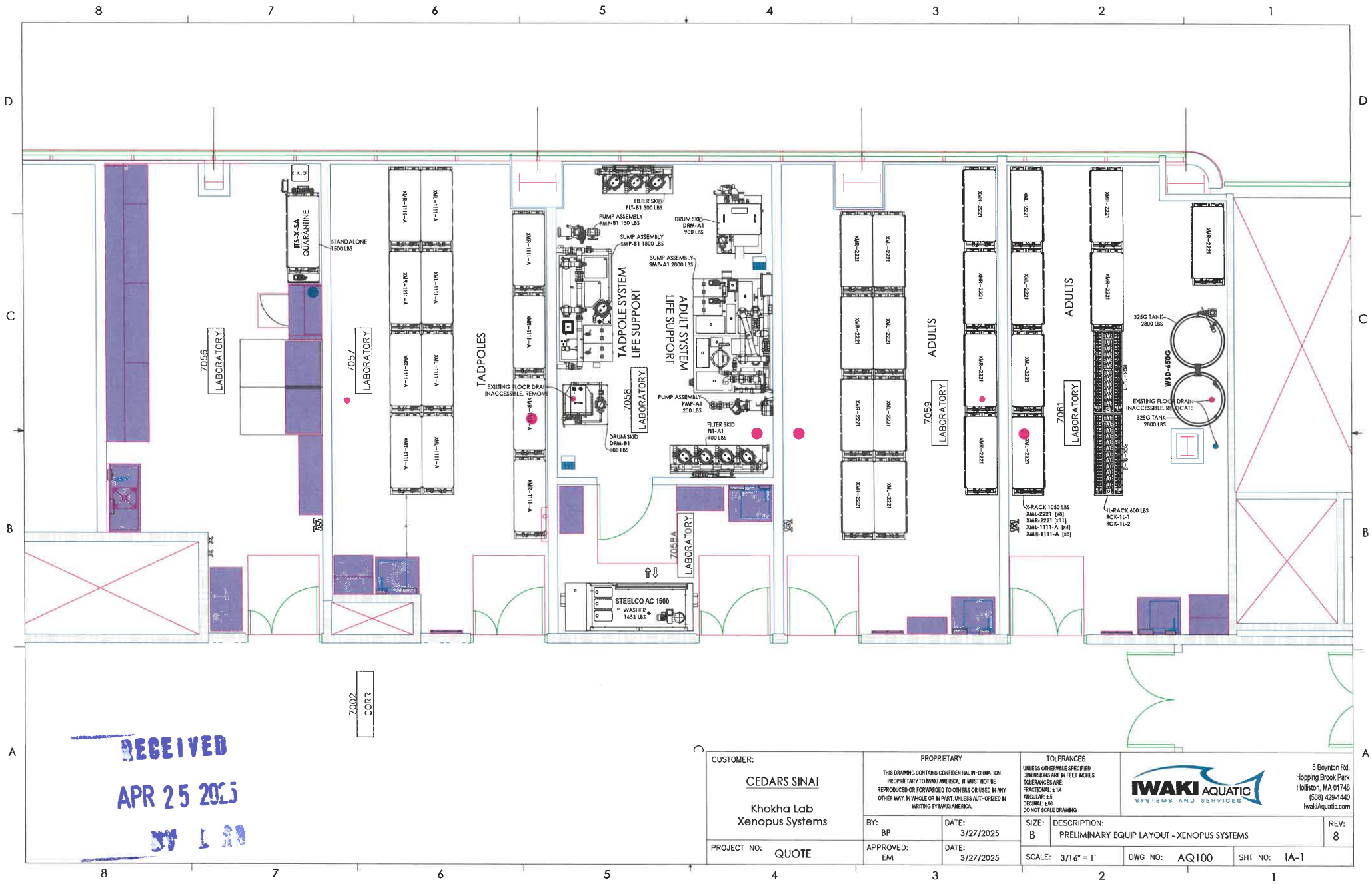
About Iwaki Aquatic

Iwaki Aquatic was established as a division of Iwaki America in 2016 to support the aquatic research community. Iwaki Aquatic's mission is to build quality aquatic research systems that are extremely reliable and easy to both use and maintain. Our 60+ years of experience in designing and building controllers and pumps for global water treatment applications, position us as the leader in both technology and value. Our aquatic team includes aquaculture specialists, biologists, engineers and customer service experts with many years of experience supporting aquatic research systems.
Our standard aquaria rack systems are designed specifically for the African Clawed Frog Xenopus spp. and Zebrafish Danio rerio, but over the years our experts have designed and built custom systems for over 150 different aquatic organisms. No project is too big or too small.

Contact us today to start your project!

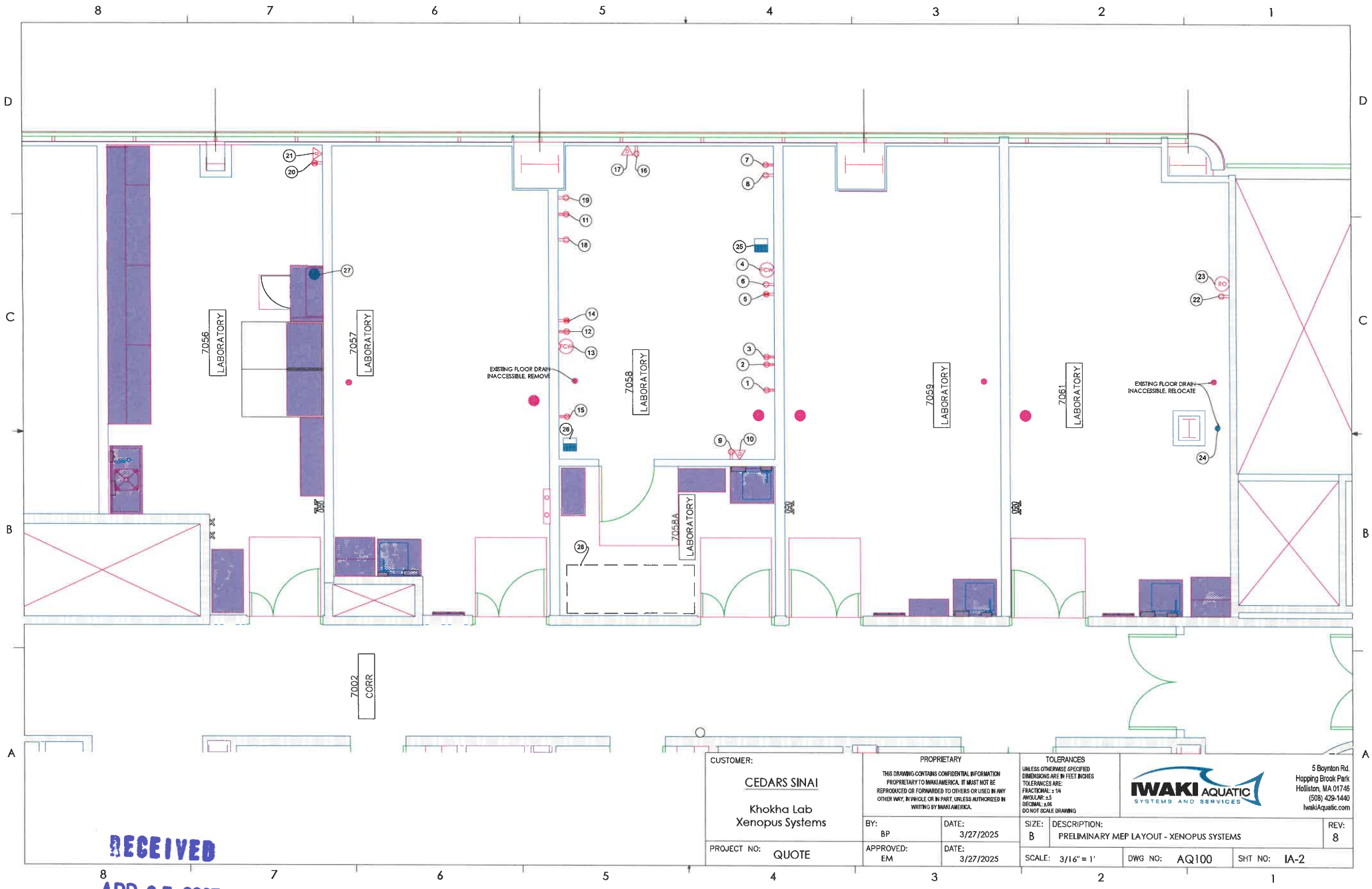
ISO 9001 registered company

• Iwaki Aquatic • 330 Hopping Brook Rd • Holliston MA 01746 • 508.782.3585 • gofish@iwakiaquatic.com • iwakiaquatic.com •



RECEIVED
APR 25 2025
BY

CUSTOMER: CEDARS SINAI Khokha Lab Xenopus Systems	PROPRIETARY: THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO IWAKI AMERICA. IT MUST NOT BE REPRODUCED OR FORWARDED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART, UNLESS AUTHORIZED IN WRITING BY IWAKI AMERICA.	TOLERANCES: UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN FEET INCHES. TOLERANCES ARE: FRACTIONAL: ± 1/4 ANGULAR: ± 5 DECIMAL: ± .06 DO NOT SCALE DRAWING	IWAKI AQUATIC SYSTEMS AND SERVICES	5 Boynton Rd. Hopping Brook Park Holliston, MA 01746 (508) 429-1440 IwakiAquatic.com	
PROJECT NO: QUOTE	BY: BP / DATE: 3/27/2025	SIZE: B	DESCRIPTION: PRELIMINARY EQUIP LAYOUT - XENOPUS SYSTEMS	REV: 8	
	APPROVED: EM / DATE: 3/27/2025	SCALE: 3/16" = 1'	DWG NO: AQ100	SHT NO: IA-1	



CUSTOMER: CEDARS SINAI Khokha Lab Xenopus Systems	PROPRIETARY THIS DRAWING CONTAINS CONFIDENTIAL INFORMATION PROPRIETARY TO IWAKI AMERICA. IT MUST NOT BE REPRODUCED OR FORWARDED TO OTHERS OR USED IN ANY OTHER WAY, IN WHOLE OR IN PART, UNLESS AUTHORIZED IN WRITING BY IWAKI AMERICA.	TOLERANCES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN FEET INCHES TOLERANCES ARE: FRACTIONAL: ± 1/4 ANGULAR: ±.5 DECIMAL: ±.06 DO NOT SCALE DRAWING	IWAKI AQUATIC SYSTEMS AND SERVICES 5 Boynton Rd. Hopping Brook Park Holliston, MA 01746 (508) 429-1440 IwakiAquatic.com
PROJECT NO: QUOTE	BY: BP / DATE: 3/27/2025 APPROVED: EM / DATE: 3/27/2025	SIZE: B / DESCRIPTION: PRELIMINARY MEP LAYOUT - XENOPUS SYSTEMS / REV: 8 SCALE: 3/16" = 1' / DWG NO: AQ100 / SHT NO: IA-2	

RECEIVED
APR 25 2025
BY

ITEM #	SYSTEM	TAG	DESCRIPTION	QTY	VOLTS	PHASE	AMPS	PROVIDED BY CEDARS SINAI	QTY	NEMA CONFIG	DEDICATED CIRCUIT	BACK-UP POWER PRIORITY
1	ADULT	PMP-A1	5 HP CENTRIFUGAL WATER PUMP	1	208	3	12.8	IEC PIN & SLEEVE RECEPTACLE & MALE PLUG,208VAC/3PH,20A,MIN IP44 RATED,78"AFF	1		Y	2
2	ADULT	HTR-A1	6,000 BTU SUBMERSIBLE HEATER	1	208	3	17	IEC PIN & SLEEVE RECEPTACLE & MALE PLUG,208VAC/3PH,30A,MIN IP44 RATED,78"AFF	1		Y	3
3	ADULT	HTR-A2	6,000 BTU SUBMERSIBLE HEATER	1	208	3	17	IEC PIN & SLEEVE RECEPTACLE & MALE PLUG,208VAC/3PH,30A,MIN IP44 RATED,78"AFF	1		Y	3
4	ADULT	HTX-A1	HEAT EXCHANGER	1				FACILITY COOLING WATER, 10GPM, 45°F,100 PSI MAX, 3/4" NPT SUPPLY & RETURN VALVES, 48"AFF	1			
5	ADULT	UV-A1-A2	880W UV UNITS	1	120	1	10	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,78"AFF	1	5-20R	Y	3
6	ADULT	AIR-A1	AIR PUMP/DOSING ASM	1	120	1	5	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,48"AFF	1	5-20R	N	1
7	ADULT	DRM-A1	DRUM FILTER	1	208	3	5	IEC PIN & SLEEVE RECEPTACLE & MALE PLUG,208VAC/3PH,16A,MIN IP44 RATED,78"AFF	1		Y	3
8	ADULT	DRM-A1	DRUM CONTROL POWER SUPPLY	1	120	1	2	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,78"AFF	1	5-20R	N	3
9	ADULT	CON-A1	SYSTEM MONITOR & CONTROLLER	1	120	1	5	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,78"AFF	1	5-20R	N	1
10	ADULT	CON-A1	SYSTEM MONITOR & CONTROLLER	1				LOCAL AREA NETWORK [L.A.N.] DATA PORT,78"AFF	1			
11	TADPOLE	PMP-B1	3 HP CENTRIFUGAL WATER PUMP	1	208	3	5.3	IEC PIN & SLEEVE RECEPTACLE & MALE PLUG,208VAC/3PH,16A,MIN IP44 RATED,78"AFF	1		Y	2
12	TADPOLE	HTR-B1	6,000 BTU SUBMERSIBLE HEATER	1	208	3	17	IEC PIN & SLEEVE RECEPTACLE & MALE PLUG,208VAC/3PH,30A,MIN IP44 RATED,78"AFF	1		Y	3
13	TADPOLE	HTX-B1	HEAT EXCHANGER	1				FACILITY COOLING WATER, 10GPM, 45°F,100 PSI MAX, 3/4" NPT SUPPLY & RETURN VALVES, 48"AFF	1			
14	TADPOLE	UV-B1	UV & BIOFILTER AIR PUMP	1	120	1	10	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,78"AFF	1	5-20R	Y	1
15	TADPOLE	DRM-B1	DRUM FILTER	1	208	3	5	IEC PIN & SLEEVE RECEPTACLE & MALE PLUG,208VAC/3PH,16A,MIN IP44 RATED,78"AFF	1		Y	1
16	TADPOLE	CON-B1	SYSTEM MONITOR & CONTROLLER	1	120	1	5	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,78"AFF	1	5-20R	N	3
17	TADPOLE	CON-B1	SYSTEM MONITOR & CONTROLLER	1				LOCAL AREA NETWORK [L.A.N.] DATA PORT,78"AFF	1			
18	TADPOLE	SDB-1	SUMP DISTRIBUTION BOX	1	120	1	5	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,78"AFF	1	5-20R	N	3
19	TADPOLE	AIR-B1	AIR PUMP RACKS	1	120	1	5	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,78"AFF	1	5-20R	N	1
20	SYSTEM-Q	ITS-X-SA-1	STANDALONE SYSTEM	1	120	1	12	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI,48"AFF	1	5-20R	Y	2
21	SYSTEM-Q	ITS-X-SA-1	STANDALONE SYSTEM	1				LOCAL AREA NETWORK [L.A.N.] DATA PORT,48"AFF	1			
22	WSD	WSD-1	650G RO STORAGE SYSTEM	1	120	1	5	DUPLEX ELECTRICAL RECEPTACLE,120VAC,20A,GFI, 48" AFF	1	5-20R	N	3
23	WSD	RO-1	WSD-1 SOURCE WATER	1				FACILITY RO WATER TAP,1/2" MNPT VALVE, 80 PSI MAX, 78" AFF	1			
24	WSD	FD-WSD	WSD OVERFLOW	1				FLOOR SINK DRAIN W. PARTIAL GRATE	1			
25	ADULT	FD-A1	DRUM WASTE/SUMP OVERFLOW	1				FLOOR SINK DRAIN W. PARTIAL GRATE	1			
26	TADPOLE	FD-B1	DRUM WASTE/SUMP OVERFLOW	1				FLOOR SINK DRAIN W. PARTIAL GRATE	1			
27	SYSTEM-Q	FD-Q1	WATER EXCHANGE/SUMP OVERFLOW	1				FLOOR SINK DRAIN W. PARTIAL GRATE	1			
28	WASHER	WASH-1	STEELCO AC1500 CAGE WASHER	1				POWER, DRAIN, CW & HW, VENT [SEE STEELCO DWG FOR DETAILS]	1			

CUSTOMER: CEDARS SINAI
Khokha Lab
Xenopus Systems

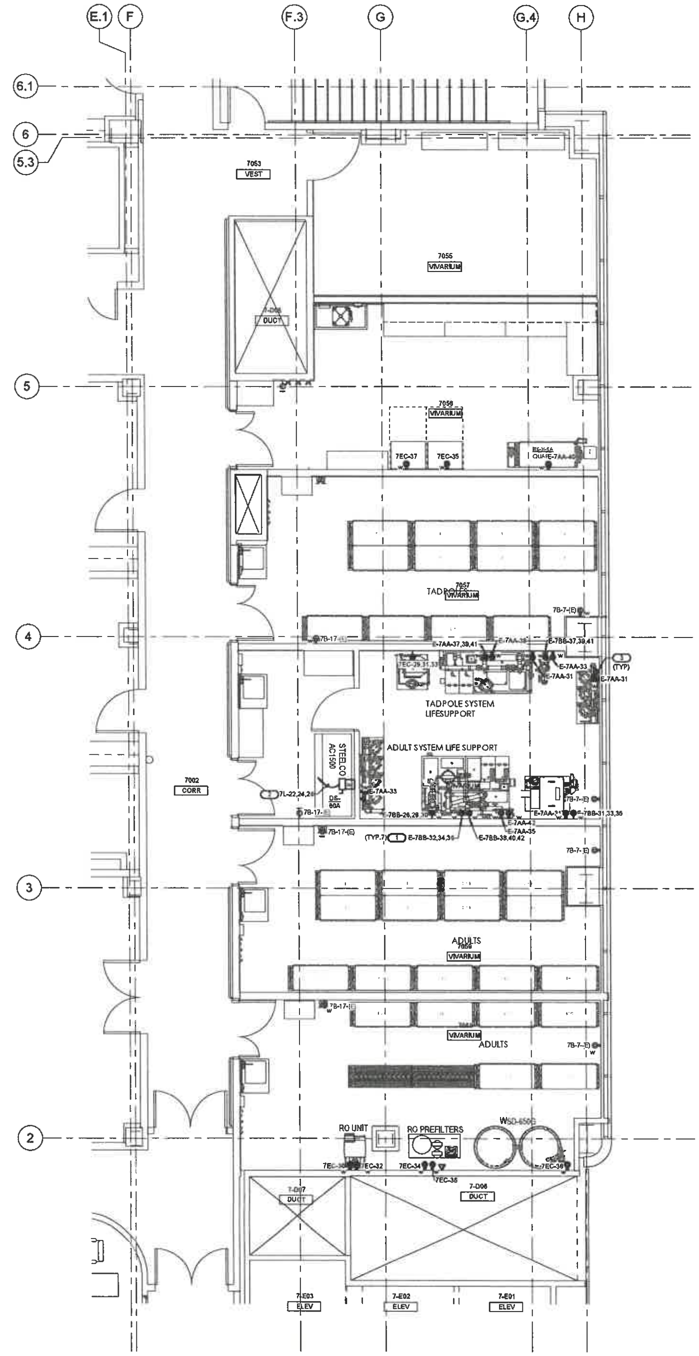
PROJECT NO: QUOTE

BY: BP | DATE: 3/27/2025
APPROVED: EM | DATE: 3/27/2025

TOLERANCES
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN FEET INCHES
TOLERANCES ARE:
FRACTIONAL: ± 1/4
ANGULAR: ±5
DECIMAL: ±.06
DO NOT SCALE DRAWING

IWAKI AQUATIC SYSTEMS AND SERVICES
5 Boynton Rd.
Hopping Brook Park
Holliston, MA 01746
(508) 429-1440
IwakiAquatic.com

SIZE: B | DESCRIPTION: PRELIMINARY MEP SCHEDULE - XENOPUS SYSTEMS | REV: 8
SCALE: NTS | DWG NO: AQ100 | SHT NO: IA-3



1 SEVENTH FLOOR - ENLARGED - POWER PLAN

1/4" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR TO COORDINATE THE EXACT LOCATION OF PLUMBING AND MECHANICAL EQUIPMENTS PRIOR TO ROUGH-IN.
2. ALL EXISTING RECEPTACLES AND POWER DEVICES TO REMAIN. REFER REMODEL PLAN FOR MORE INFORMATION.

KEYNOTES:

1. PROVIDE AND INSTALL 32A/3P RECEPTACLE, LEVITON#S332-S9 WITH 1"C, 4#8,1#10 GND.
2. PROVIDE AND INSTALL NEMA 4X DISCONNECT SWITCH 60AS/3P/480V WITH 1-1/4"C,4 #4,1#10 GND.
3. PROVIDE 4S BOX FOR ROUGH IN WITH 1-1/4"C.O. TO STUB UP 6" ABOVE THE CEILING. WIRING BY OTHERS.

Cedars Sinai

CEDARS-SINAI MEDICAL CENTER
8700 BEVERLY BOULEVARD
LOS ANGELES, CA 90048

LEO A DALY

CONSULTANTS
IMEG

ARCHITECT STAMP

CONSULTANT STAMP

REVISION - DATE

AGENCY APPLICATION NUMBER

AGENCY APPROVAL STAMP

BUILDING TITLE

PROJECT TITLE
CSMC DAVIS 7TH FLOOR XENOPUS FACILITY
6500 Wilshire Ave

SHEET TITLE
SEVENTH FLOOR - ENLARGED - POWER PLAN

CSMC PROJECT NO.	CONSULTANT PROJ. NO.
25-016	25000555.00
PROJECT STATUS: Project Status DATE: 02/12/25 SCALE: 1/4" = 1'-0" DRAWN BY: CL CHECKED BY: MG	SHEET NUMBER: E111 SHEET OF

DEPARTMENT OF HEALTH & HUMAN SERVICES

PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH

FOR US POSTAL SERVICE DELIVERY:
Office of Laboratory Animal Welfare
Division of Assurances
6700B Rockledge Drive
Suite 2500, MSC 6910
Bethesda, Maryland 20892-6910
Home Page: https://olaw.nih.gov

FOR EXPRESS MAIL:
Office of Laboratory Animal Welfare
Division of Assurances
6700B Rockledge Drive, Suite 2500
Bethesda, Maryland 20817
Telephone: (301) 496-7163

February 7, 2025

Re: Assurance Approval for D16-00420 (A3714-01)

Jeffrey A. Golden, M.D.
Executive Vice Dean for Research and Education
Cedars-Sinai Medical Center
North Tower, Room 2009
8700 Beverly Boulevard
Los Angeles, California 90048-1865

Dear Dr. Golden:

I am pleased to inform you that the Office of Laboratory Animal Welfare (OLAW) reviewed and approved your institution's Animal Welfare Assurance (Assurance) that was submitted in accordance with the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals (Policy), revised 2015.

Your Assurance, identification number **D16-00420 (A3714-01)**, became effective on **February 7, 2025,** and will expire on **February 28, 2029**. Please include the Assurance number on all correspondence to OLAW. You will receive a copy of the signed Assurance document by email. The signature page provides verification of approval by OLAW and specifies the period during which your institution's Assurance is effective.

The Assurance is a key document that sets forth the responsibilities and procedures of your Institution regarding the care and use of laboratory animals according to the PHS Policy. The practices described in the Assurance document must be followed by all individuals in the animal care and use program.

If I may be of any further assistance, please do not hesitate to contact me.

Sincerely,

Robyn M. Engel -S
Digitally signed by Robyn M. Engel -S
Date: 2025.02.07 09:13:52 -05'00'

Animal Welfare Program Specialist, Division of Assurances
OLAW, National Institutes of Health

cc: IACUC Contact
POCs