FUME HOOD RETROFIT

HEIF Idea Paper Submission

Abstract

This is a proposal to investigate possible energy savings of the 100 fume hoods on the Humboldt State University Campus. Some of the equipment is almost fifty years old and efficiency savings could be found in focusing on replacing energy intensive equipment. The primary intent is to understand opportunities for investment in more efficient hoods and whether there is also user behavioral or operations changes that could reduce energy use while maintaining or improving safety

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Project Description

A chemical fume hood is used to reduce exposure to chemicals and hazardous vapors. A well-designed hood will protect workers or students from contaminants by ventilating the hood at an OSHA requirement of 150 ft/min (or appropriate rate based on the use case). A fume hood can use more energy than 3.5 residential homes (Sahai, 2016). The total energy measured from a study found that the exhaust fans in fume hoods can use 230-440 kwh/year per exhaust fan (Marian, 2010). Humboldt State University has approximately 100 fume hoods in the College of Natural Resources and Science department buildings (see Appendix for a preliminary table listing the fume hoods in use). The intent of this idea paper is to reduce energy consumption at HSU by identifying fume hoods that have potential for efficiency measures through either hardware investment or operational changes.

A team of students should investigate fume hoods on campus, understand how they are currently used, identify all of the pertinent safety requirements related to their use, and research efficiency measures to present would be a way for HEIF to invest in sustainability.

Need Statement

Investigating ways to reduce the energy use of fume hoods on campus addresses the mission and goals of HEIF, since these are high energy using pieces of equipment and are core to the mission of HSU.

Mission of HEIF

The mission of the Humboldt Energy Independence Fund (HEIF) is to reduce the environmental impact of energy use at HSU through student driven projects.

Faculty and students use fume hoods in many lab courses that handle chemicals, biological samples, and other applications. The high energy use of this mandated safety tool is an opportunity to bring awareness and energy savings to many students, staff and faculty that use fume hoods. Further investigation will enrich the student team's professional and technical skills as well as leave a legacy of sustainability for users of fume hoods at Humboldt State University.

HEIF Primary Goals

This project meets the five primary goals of the HEIF:

- The HEIF will achieve its mission through projects that are developed by students and, to the extent possible, implemented, monitored, and maintained with strong student involvement.

The project includes opportunities for students to get involved in the initial investigation of fume hoods, interfacing with CNRS staff and faculty on usage, and Facilities Management on technical information.

- The HEIF will require accountability by measuring and reporting quantitative and qualitative results, as well as levels of involvement by students and other participants, in all its projects.

Baseline energy use can be estimated and building energy use could be observed before implementation and depending on plan of action either engineering.

- The HEIF will strive to make its projects derive from and be connected to the curriculum of the university.

Because fume hoods are used in courses throughout the entire College of Natural Resources & Sciences, there is significant student, staff and faculty utilization of the equipment as part of the curriculum. The project would provide an opportunity for sustainability and safety to be highlighted in labs.

- The HEIF will support dissemination of information about its projects through public outreach and educational activities.

Fume hoods can be found in many classrooms and research labs on campus. If the project is implemented, informational signs can describe the outcomes.

- The HEIF will seek to publicize accomplishments and experiences associated with its program and projects through a variety of media.

Informational signs about sustainability with HEIF are physical, information provided to faculty could reach students, as well as postings on social media and the HEIF website.

Outcome

The outcome for this idea paper would be to **invest in a student team to research fume hood efficiency measures, investigate use on campus, collaborate with FM and CNRS staff for technical information on equipment, and identify recommendations to reduce energy use**.

Fume hoods are ubiquitous on campus and require careful consideration of safety and sustainability. Many of the fume hood fan units are almost 50 years old and may be suitable for upgrades to more energy-efficient models. An outcome of this project could be to identify where fume hood efficiency measures have high energy savings while considering financial viability and safety. Also, the findings of the project could help inform ongoing campus upgrades and capital investments to replace or build new fume hoods. Another outcome would be to provide informational signs at all fume hoods for users to understand safety standards and applicable efficiency measures.

One possible solution is replacement of the fan models that are sufficiently outdated with higher efficiency fans. Another solution would be to identify fume hoods on campus that have high usage and install instructive signs on ways to safely reduce the amount of energy used to ventilate the space. Ultimately the student team findings will provide a more informed recommendation.

Partners

It is expected that this project will require mentoring from Facilities Management. Working with members of CNRS staff is also a possible partner. For this idea paper I reached out to department staff and some are enthusiastic about this project.

Appendix

Jr, J. S. M. (2016). “A study of factors affecting fume hood energy consumption.” *Laboratory Equipment*, <https://www.laboratoryequipment.com/article/2010/04/study-factors-affecting-fume-hood-energy-consumption> (Mar. 25, 2019).

https://sustainable.stanford.edu/sites/default/files/FumeHoodFactSheet_7.16.pdf

https://ehs.ucr.edu/safety/Fume_Hoods/fumehood.html

https://www.ars.usda.gov/northeast-area/docs/safety-health-and-environmental-training/ventilation-equipments/

Table 1 Working document of fume hoods on campus as of March 2019.

MBU	Room Type	PARENT ASSET	FUME HOOD ID (if any)	BUILDING	ROOM NUMBER	Hood_Fan	FUME HOOD DESCRIPTION	YEAR/MAKE/MODEL	FUME HOOD TYPE	ID OF FAN UNIT THE FUME HOOD IS CONNECTED TO (if any)	IS FAN UNIT DEDICATED OR SHARED?	IF SHARED, LIST OTHER FUME HOODS CONNECTED	DOES FUME HOOD HAVE AN AIR FLOW SENSOR OR ALARM?	IF YES, MAKE/MODEL	DEPARTMENT PRIMARILY RESPONSIBLE FOR OPERATION OF FUME HOOD
CNRS	Instruction	106601	104049	003C - SCIC	102	D3040: HOOD	D3040: HOOD - FUME 2	1971/HEMCO	CONNECTED TO DUCT	103940	DEDICATED		Yes	DWYER	D20042 BIOLOGICAL SCIENCES
CNRS	Research	106516	104083	040 - NR	108	D3040: HOOD	D3040: HOOD, FUME 5	1972/ALNOR/6000P	CONNECTED TO DUCT	104098	DEDICATED		Yes	DWYER	D20056 ENVIRONMENTAL SCIENCE - MGMT
CNRS	Instruction	106640	104055	027 - TML	112	D3040: HOOD	D3040: HOOD, FUME 2 - RM 112	1977	CONNECTED TO DUCT	103942	DEDICATED		Yes	DWYER	D20086 MARINE FACILITIES
CNRS	Instruction	106519	104081	040 - NR	118	D3040: HOOD	D3040: HOOD, FUME 4A	1972/ALNOR/6000P	CONNECTED TO DUCT	104097	SHARED	104077	Yes	DWYER	D20053 - OCEANOGRAPHY
CNRS	Research	106515	104077	040 - NR	119	D3040: HOOD	D3040: HOOD, FUME 4	1972/ALNOR/6000P	CONNECTED TO DUCT	104097	SHARED	104081	Yes	DWYER	D20047 FORESTRY
CNRS	Reseaarch	106517	104088	040 - NR	120	D3040: HOOD	D3040: HOOD, FUME 6	1972/ALNOR/6000P	CONNECTED TO DUCT	104099	DEDICATED		Yes	DWYER	D20047 FORESTRY
CNRS	Research	106583	104040	003B - SCIB	121	D3040: HOOD	D3040: HOOD - FUME 15	1971OR2006?/FISHER HAMILTON/70532	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106539	104031	003B - SCIB	122	D3040: HOOD	D3040: HOOD - FUME 10 - RIGHT	1971OR2006?/HAMILTON SAFEAIRE	CONNECTED TO DUCT	103920	DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106586	104044	003B - SCIB	122	D3040: HOOD	D3040: HOOD - FUME 18 - LEFT	1971OR2006?/HAMILTON SAFEAIRE	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Research	106542	104037	003B - SCIB	123	D3040: HOOD	D3040: HOOD - FUME 12A	?	CONNECTED TO DUCT		SHARED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106540	104033	003B - SCIB	126	D3040: HOOD	D3040: HOOD - FUME 11	1971OR2006?/HAMILTON SAFEAIRE/60114/PL-183-2	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106541	104035	003B - SCIB	132	D3040: HOOD	D3040: HOOD - FUME 12	1971OR2006?/HEMCO/H-7-13	CONNECTED TO DUCT		SHARED		Yes	AIRGUARD 405	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106587	104046	003B - SCIB	224	D3040: HOOD	D3040: HOOD - FUME 19	?	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106530	104004	003B - SCIB	228	D3040: HOOD	D3040: HOOD - FUME 01	1971	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405	D20042 BIOLOGICAL SCIENCES
CNRS	Research	106531	104006	003B - SCIB	230	D3040: HOOD	D3040: HOOD - FUME 02	1971	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106533	104011	003B - SCIB	328	D3040: HOOD	D3040: HOOD - FUME 04	1971	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106535	104014	003B - SCIB	330	D3040: HOOD	D3040: HOOD - FUME 06	1971	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106536	104016	003B - SCIB	330	D3040: HOOD	D3040: HOOD - FUME 07	1971	CONNECTED TO DUCT	103910	DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106534	104082	003B - SCIB	334	D3040: HOOD	D3040: HOOD - FUME 05	1971	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106673	104045	003A - SCIA	359	D3040: HOOD	D3040: HOOD - FUME 18	2012/HEMCO	CONNECTED TO DUCT	103936	DEDICATED		Yes	DWYER	D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106676	104047	003A - SCIA	369	D3040: HOOD	D3040: HOOD - FUME 19 - LEFT	1983/SUPREME AIR LV	CONNECTED TO DUCT	103938	SHARED	106674, 106675	Yes	KEWAUNEE	D20043 CHEMISTRY
CNRS	Instruction	106677	106674	003A - SCIA	369	D3040: HOOD	D3040: HOOD, FUME 19A [HD01] - FH - MIDDLE	SUPREME AIR LV	CONNECTED TO DUCT	103938	SHARED	104047, 106675	Yes	KEWAUNEE	D20043 CHEMISTRY
CNRS	Instruction	106678	106675	003A - SCIA	369	D3040: HOOD	D3040: HOOD, FUME 19B [HD01] - FH - RIGHT	SUPREME AIR LV	CONNECTED TO DUCT	103938	SHARED	104047, 106674	Yes	KEWAUNEE	D20043 CHEMISTRY
CNRS	Instruction	106691	104063	003A - SCIA	373	D3040: HOOD	D3040: HOOD - FUME 25 - LEFT	1983	CONNECTED TO DUCT	103951	SHARED	106690	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106692	106690	003A - SCIA	373	D3040: HOOD	D3040: HOOD, FUME 25A [HD01] - FH - RIGHT	1983	CONNECTED TO DUCT	103951	SHARED	104063	Yes	DWYER	D20043 CHEMISTRY
CNRS	Research	106689	104062	003A - SCIA	377	D3040: HOOD	D3040: HOOD - FUME 24	1983	CONNECTED TO DUCT	103950	DEDICATED		Yes	DWYER	D20054PHYSICS
CNRS	Instruction	106645	104010	003A - SCIA	552	D3040: HOOD	D3040: HOOD, FUME 03 - LEFT	2012/ST CHARLES	CONNECTED TO DUCT		SHARED		Yes	PHOTOHELIC	D20043 CHEMISTRY
CNRS	Instruction	106646	106644	003A - SCIA	552	D3040: HOOD	D3040: HOOD, FUME 03A [HD01] - FH - RIGHT	ST CHARLES	CONNECTED TO DUCT		SHARED		Yes	PHOTOHELIC	D20043 CHEMISTRY
CNRS	Laboratory	106650	104013	003A - SCIA	554	D3040: HOOD	D3040: HOOD - FUME 05	2012/ST CHARLES	CONNECTED TO DUCT		DEDICATED		Yes	PHOTOHELIC	D20043 CHEMISTRY
CNRS	Instruction	106653	104018	003A - SCIA	555	D3040: HOOD	D3040: HOOD - FUME 08 - LEFT	2012/ST CHARLES	CONNECTED TO DUCT	103912	SHARED	106654, 106655	Yes	PHOTOHELIC	D20043 CHEMISTRY
CNRS	Instruction	106658	106654	003A - SCIA	555	D3040: HOOD	D3040: HOOD, FUME 08A [HD01] - FH - MIDDLE	ST CHARLES	CONNECTED TO DUCT	103912	SHARED	104018, 106655	Yes	PHOTOHELIC	D20043 CHEMISTRY
CNRS	Instruction	106659	106655	003A - SCIA	555	D3040: HOOD	D3040: HOOD, FUME 08B [HD01] - FH - RIGHT	ST CHARLES	CONNECTED TO DUCT	103912	SHARED	104018, 106654	Yes	PHOTOHELIC	D20043 CHEMISTRY
CNRS	Instruction	106660	104020	003A - SCIA	555	D3040: HOOD	D3040: HOOD - FUME 09 - LEFT	2012/ST CHARLES	CONNECTED TO DUCT	103914	SHARED	106656, 106657	Yes	PHOTOHELIC	D20043 CHEMISTRY

CNRS	Instruction	106661	106656	003A - SCIA	555	D3040: HOOD	D3040: HOOD, FUME 09A [HD01] - FH - MIDDLE	ST CHARLES	CONNECTED TO DUCT	103914	SHARED	104020, 106657	Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Instruction	106662	106657	003A - SCIA	555	D3040: HOOD	D3040: HOOD, FUME 09B [HD01] - FH - RIGHT	ST CHARLES	CONNECTED TO DUCT	103914	SHARED	104020, 106656	Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Instruction	106648	104012	003A - SCIA	556	D3040: HOOD	D3040: HOOD - FUME 04 - LEFT	2012	CONNECTED TO DUCT		SHARED		Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Instruction	106649	106647	003A - SCIA	556	D3040: HOOD	D3040: HOOD, FUME 04A [HD01] - FH - RIGHT	2012	CONNECTED TO DUCT		SHARED		Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Instruction	106663	104032	003A - SCIA	557	D3040: HOOD	D3040: HOOD - FUME 10	2012/ST CHARLES	CONNECTED TO DUCT	103919	SHARED	106708	Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Instruction	106709	106708	003A - SCIA	557	D3040: HOOD	D3040: HOOD - FUME	2012/ST CHARLES	CONNECTED TO DUCT	103919	SHARED	104032	Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Instruction	106706	104067	003A - SCIA	559	D3040: HOOD	D3040: HOOD - FUME 29	1983	CONNECTED TO DUCT	103955	DEDICATED		Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106682	104058	003A - SCIA	567	D3040: HOOD	D3040: HOOD - FUME 20 - FAR LEFT	1983	CONNECTED TO DUCT	103944	SHARED	106679, 106680, 106681	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106683	106679	003A - SCIA	567	D3040: HOOD	D3040: HOOD, FUME 20A [HD01] - FH - MIDDLE LEFT	1983	CONNECTED TO DUCT	103944	SHARED	104058, 106680, 106681	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106684	106680	003A - SCIA	567	D3040: HOOD	D3040: HOOD, FUME 20B [HD01] - FH - MIDDLE RIGHT	1983	CONNECTED TO DUCT	103944	SHARED	104058, 106679, 106681	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106685	106681	003A - SCIA	567	D3040: HOOD	D3040: HOOD, FUME 20C [HD01] - FH - FAR RIGHT	1983	CONNECTED TO DUCT	103944	SHARED	104058, 106679, 106680	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106703	104066	003A - SCIA	568	D3040: HOOD	D3040: HOOD - FUME 28	1983	CONNECTED TO DUCT	103954	SHARED	106701, 106702	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106704	106701	003A - SCIA	568	D3040: HOOD	D3040: HOOD, FUME 28A [HD01] - FH - MIDDLE	1983	CONNECTED TO DUCT	103954	SHARED	104066, 106702	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106705	106702	003A - SCIA	568	D3040: HOOD	D3040: HOOD, FUME 28B [HD01] - FH - RIGHT	1983	CONNECTED TO DUCT	103954	SHARED	104066, 106701	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106696	104064	003A - SCIA	571	D3040: HOOD	D3040: HOOD - FUME 26 - FAR LEFT	1983	CONNECTED TO DUCT	103952	SHARED	106693, 106694, 106695	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106697	106693	003A - SCIA	571	D3040: HOOD	D3040: HOOD, FUME 26A [HD01] - FH - MIDDLE LEFT	1983	CONNECTED TO DUCT	103952	SHARED	104064, 106694, 106695	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106698	106694	003A - SCIA	571	D3040: HOOD	D3040: HOOD, FUME 26B [HD01] - FH - MIDDLE RIGHT	1983	CONNECTED TO DUCT	103952	SHARED	104064, 106693, 106695	Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106699	106695	003A - SCIA	571	D3040: HOOD	D3040: HOOD, FUME 26C [HD01] - FH - FAR RIGHT	1983	CONNECTED TO DUCT	103952	SHARED	104064, 106693, 106694	Yes	DWYER	D20043 CHEMISTRY
CNRS	Research	106512	104050	040 - NR	223A	D3040: HOOD	D3040: HOOD, FUME 2	1972/ALNOR/6000P	CONNECTED TO DUCT	104095	DEDICATED		Yes	DWYER	D20047 FORESTRY
CNRS	Research	106514	104070	040 - NR	225B	D3040: HOOD	D3040: HOOD, FUME 3	1972/ALNOR/6000P	CONNECTED TO DUCT	104096	DEDICATED		Yes	DWYER	D20056 ENVIRONMENTAL SCIENCE - MGMT
CNRS	Research	106538	104019	003B - SCIB	324D	D3040: HOOD	D3040: HOOD - FUME 09	1971	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405 ALNOR	D20042 BIOLOGICAL SCIENCES
CNRS	Research	106532	104009	003B - SCIB	334A	D3040: HOOD	D3040: HOOD - FUME 03	1971	CONNECTED TO DUCT		DEDICATED		Yes	AIRGUARD 405	D20042 BIOLOGICAL SCIENCES
CNRS	Research	106686	104059	003A - SCIA	369C	D3040: HOOD	D3040: HOOD - FUME 21	1983	CONNECTED TO DUCT	103947	DEDICATED		Yes	DWYER	D20043 CHEMISTRY
CNRS	Research	106529	104005	003A - SCIA	550D	D3040: HOOD	D3040: HOOD - FUME 01	2012/ST CHARLES	CONNECTED TO DUCT		DEDICATED		Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Instruction	106652	104017	003A - SCIA	555B	D3040: HOOD	D3040: HOOD - FUME 07	2012/ST CHARLES	CONNECTED TO DUCT		DEDICATED		Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Research	106665	104034	003A - SCIA	559C	D3040: HOOD	D3040: HOOD - FUME 11 - LEFT	2012/ST CHARLES	CONNECTED TO DUCT	103921	SHARED	106664	Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Research	106666	106664	003A - SCIA	559C	D3040: HOOD	D3040: HOOD, FUME 11A [HD01] - FH - RIGHT	ST CHARLES	CONNECTED TO DUCT	103921	SHARED	104034	Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Research	106667	104036	003A - SCIA	559D	D3040: HOOD	D3040: HOOD - FUME 12	2012/ST CHARLES	CONNECTED TO DUCT	103923	DEDICATED		Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Research	106668	104038	003A - SCIA	559E	D3040: HOOD	D3040: HOOD - FUME 13	2012	CONNECTED TO DUCT	103925	DEDICATED		Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Research	106669	104039	003A - SCIA	559E	D3040: HOOD	D3040: HOOD - FUME 14	2012	CONNECTED TO DUCT	103927	DEDICATED		Yes	PHOTOH ELIC	D20043 CHEMISTRY
CNRS	Laboratory	106687	104060	003A - SCIA	567B	D3040: HOOD	D3040: HOOD - FUME 22	1983	CONNECTED TO DUCT	103948	DEDICATED		Yes	DWYER	D20043 CHEMISTRY
CNRS	Research	106700	104065	003A - SCIA	568A	D3040: HOOD	D3040: HOOD - FUME 27	1983	CONNECTED TO DUCT	103953	DEDICATED		Yes	DWYER	D20043 CHEMISTRY
CNRS	Laboratory	106688	104061	003A - SCIA	569A	D3040: HOOD	D3040: HOOD - FUME 23	1983	CONNECTED TO DUCT	103949	DEDICATED		Yes	DWYER	D20043 CHEMISTRY
CNRS	Instruction	106608	104090	003D - SCID	9	D3040: HOOD	D3040: HOOD - FUME 6 - RM 9	1983/FISHER SCIENTIFIC/1981	CONNECTED TO DUCT		DEDICATED		No		D20045 - ENGINEERING
CNRS	Research	106604	104027	003D - SCID	11	D3040: HOOD	D3040: HOOD - FUME 1 - RM 11	1983/HANSON/3AA58	CONNECTED TO DUCT	103917	DEDICATED		No		D20045 - ENGINEERING
CNRS	Instruction	106605	104056	003D - SCID	23	D3040: HOOD	D3040: HOOD - FUME 2 - RM 23	2012/HANSON/3SA70A	CONNECTED TO DUCT	103941	DEDICATED		No		D20045 - ENGINEERING
CNRS	Research	106609	104021	006 - FH	23	D3040: HOOD	D3040: HOOD, FUME 1		CONNECTED TO DUCT		NONE		No		D20048 GEOLOGY

CNRS	Office	106603	104069	003C - SCIC	108	D3040: HOOD	D3040: HOOD - FUME 3 - PACKAGED	HEMCO	SELF CONTAINED		NONE		No		D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106638	104072	026 - VMH	110	D3040: HOOD	D3040: HOOD, FUME 3 [HD01] - RM 110	1990/KEWAUNEE	CONNECTED TO DUCT	106215	DEDICATED		No		D20048 GEOLOGY
CNRS	Laboratory	106639	104028	027 - TML	110	D3040: HOOD	D3040: HOOD, FUME 1 - RM 110	2008/Labconco	SELF CONTAINED		NONE		No		D20086 MARINE FACILITIES
CNRS	Research	106622	104073	011 - WDFS	112	D3040: HOOD	D3040: HOOD, FUME 3 - RM 112	1998/BENNET/AB5-FPA	SELF CONTAINED		NONE		No		D20046 FISHERIES BIOLOGY
CNRS	Research	106607	104085	003D - SCID	149	D3040: HOOD	D3040: HOOD - FUME 5 - RM 149	1983/FISHER SCIENTIFIC/1981	CONNECTED TO DUCT	103958	DEDICATED		No		D20042 BIOLOGICAL SCIENCES
CNRS	Instruction	106606	104079	003D - SCID	151	D3040: HOOD	D3040: HOOD - FUME 4 - RM 151	1983/FISHER SCIENTIFIC/1981	CONNECTED TO DUCT	103957	DEDICATED		No		D20042 BIOLOGICAL SCIENCES
CNRS	Laboratory	106595	104022	003C - SCIC	203	D3040: HOOD	D3040: HOOD - EXHAUST 1	1971	CONNECTED TO DUCT		DEDICATED		No		D20042 BIOLOGICAL SCIENCES
CNRS	Research	106628	104094	011 - WDFS	214	D3040: HOOD	D3040: HOOD, FUME 9 - RM 214	1998/BENNET/AB6-FPA	SELF CONTAINED		NONE		No		D20046 FISHERIES BIOLOGY
CNRS	Research	106710	104023	040 - NR	222	D3040: HOOD	D3040: HOOD, EXHAUST 1	1972/GREENHECK	CONNECTED TO DUCT	103586	DEDICATED		No		D20047 FORESTRY
CNRS	Instruction	106589	104057	003B - SCIB	224	D3040: HOOD	D3040: HOOD - EXHAUST 20	?	CONNECTED TO DUCT		DEDICATED		No		D20042 BIOLOGICAL SCIENCES
CNRS	Laboratory	106627	104093	011 - WDFS	224	D3040: HOOD	D3040: HOOD, FUME 8 - RM 224	1998/BENNET/AB5-FPA	SELF CONTAINED		NONE		No		D20057 WILDLIFE MANAGEMENT
CNRS	Research	106624	104086	011 - WDFS	244	D3040: HOOD	D3040: HOOD, FUME 5 - RM 244	1998/BENNET/AB5-FPA	SELF CONTAINED		NONE		No		D20057 WILDLIFE MANAGEMENT
CNRS	Research	106625	104089	011 - WDFS	264	D3040: HOOD	D3040: HOOD, FUME 6 - RM 264	1998/BENNET/AB4-FPA	SELF CONTAINED		NONE		No		D20046 FISHERIES BIOLOGY
CNRS	Laboratory	106626	104091	011 - WDFS	272	D3040: HOOD	D3040: HOOD, FUME 7 - RM 272	1980/WEBBER	SELF CONTAINED		NONE		No		D20046 FISHERIES BIOLOGY
CNRS	Instruction	106643	104008	003A - SCIA	552	D3040: HOOD	D3040: HOOD, FUME 02 - TABLE TOP HOODS	2012	NONE		SHARED		No		D20043 CHEMISTRY
CNRS	Instruction	106670	104041	003A - SCIA	555	D3040: HOOD	D3040: HOOD - FUME 15 - TABLE TOP HOODS	2012	NONE	103930	SHARED		No		D20043 CHEMISTRY
CNRS	Instruction	106671	104042	003A - SCIA	555	D3040: HOOD	D3040: HOOD, FUME 16 - TABLE TOP HOODS	2012	NONE	103932	SHARED		No		D20043 CHEMISTRY
CNRS	Instruction	106672	104043	003A - SCIA	555	D3040: HOOD	D3040: HOOD - FUME 17 - TABLE TOP HOODS	2012	NONE	103934	SHARED		No		D20043 CHEMISTRY
CNRS	Instruction	106651	104015	003A - SCIA	556	D3040: HOOD	D3040: HOOD - FUME 06 - TABLE TOP HOODS	2012	NONE		SHARED		No		D20043 CHEMISTRY
CNRS	Instruction	106707	104074	003A - SCIA	566	D3040: HOOD	D3040: HOOD - FUME 30	1983	SELF CONTAINED		NONE		No		D20043 CHEMISTRY
CNRS	Research	106621	104053	011 - WDFS	100A	D3040: HOOD	D3040: HOOD, FUME 2 - RM 100A	1998/BENNET/WB6-FPA	SELF CONTAINED		NONE		No		D20046 FISHERIES BIOLOGY
CNRS	Research	106637	104054	026 - VMH	110B	D3040: HOOD	D3040: HOOD, FUME 2 [HD01] - RM 110B	1990/KEWAUNEE	CONNECTED TO DUCT	106214	DEDICATED		No		D20048 GEOLOGY
CNRS	Laboratory	106636	104029	026 - VMH	110C	D3040: HOOD	D3040: HOOD, FUME 1 [HD01] - RM 110C	1990/KEWAUNEE	CONNECTED TO DUCT	103897	DEDICATED		No		D20048 GEOLOGY
CNRS	Laboratory	106641	104068	027 - TML	112A	D3040: HOOD	D3040: HOOD, FUME 3 - RM 112A	1977	CONNECTED TO DUCT	103956	DEDICATED		No		D20086 MARINE FACILITIES
CNRS	Laboratory	106642	104076	027 - TML	113A	D3040: HOOD	D3040: HOOD, FUME 4 - RM 113A	2008/Labconco/3030000	SELF CONTAINED		NONE		No		D20086 MARINE FACILITIES
CNRS	Laboratory	106620	104030	011 - WDFS	120A	D3040: HOOD	D3040: HOOD, FUME 1 - RM 120A	1998/BENNET/AB6-FPA	SELF CONTAINED		NONE		No		D20057 WILDLIFE MANAGEMENT
CNRS	Laboratory	106623	104080	011 - WDFS	166A	D3040: HOOD	D3040: HOOD, FUME 4 - RM 166A	1998/BENNET/AB5-FPA	SELF CONTAINED		NONE		No		D20057 WILDLIFE MANAGEMENT
CNRS	Laboratory			027 - TML	111A	D3040: HOOD	D3040: HOOD, FUME 5 - RM 111A	FiltairXL 1004	SELF CONTAINED		NONE		Yes	Captair	D20046 FISHERIES BIOLOGY
CNRS	Research				559B										D20043 CHEMISTRY