BEFORE THE
SCIENTIFIC AND MEDICAL FACILITIES WORKING GROUP OF THE
INDEPENDENT CITIZENS' OVERSIGHT COMMITTEE
TO THE CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE
ORGANIZED PURSUANT TO THE
CALIFORNIA STEM CELL RESEARCH AND CURES ACT

PUBLIC INFORMATIONAL MEETING REGARDING FUTURE FACILITIES REQUEST FOR APPLICATIONS

LOCATION: SHERATON SAN DIEGO HOTEL AND MARINA
WEST TOWER
1380 HARBOR ISLAND DRIVE
SAN DIEGO, CALIFORNIA

DATE: JUNE 19, 2007
1 P.M.

REPORTER: BETH C. DRAIN, CSR
CSR. NO. 7152

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I N D E X

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SAN DIEGO CALIFORNIA; TUESDAY, JUNE 19, 2007

1 P.M.

CHAIRMAN LICHTENGER: I'D LIKE TO CALL THE MEETING TO ORDER. I'M DAVID LICHTENGER. I'M THE CHAIR OF THE FACILITIES WORKING GROUP OF THE CALIFORNIA INSTITUTE OF REGENERATIVE MEDICINE. ALSO IN ATTENDANCE ARE WORKING GROUP MEMBERS STUART LAFF AND ED KASHIAN.

THIS IS THE FOURTH MEETING OF THE FACILITIES WORKING GROUP TO TAKE PUBLIC COMMENTS AND INFORMATION ON FUTURE FACILITIES GRANTS. $222 MILLION HAS BEEN IDENTIFIED IN CIRM'S STRATEGIC PLAN TO SPEND ON FUTURE FACILITIES GRANTS, AND THIS IS A LARGE SUM OF MONEY, AND THE WORKING GROUP HAS DECIDED TO HOLD FOUR PUBLIC INFORMATIONAL MEETINGS THROUGHOUT THE STATE, AND THIS IS OUR FOURTH AND FINAL MEETING.

THE AGENDA TODAY INCLUDES TWO PRESENTATIONS BY INVITED SPEAKERS. WE'LL HEAR FROM WENDELL BRASE FROM UC IRVINE AND LATER FROM ROBERT MCGHEE FROM THE HOWARD HUGHES RESEARCH INSTITUTE. ALSO WE'LL HAVE THREE INSTITUTIONS THAT WILL BE ALLOWED TEN MINUTES EACH TO PRESENT THEIR VIEWS ON WHAT INPUT THEY WOULD LIKE TO SEE IN TERMS OF PROVIDING CRITERIA TO THE FACILITIES WORKING GROUP.

WE'LL LIMIT THAT TO TEN MINUTES, AND RICK

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KELLER WILL ALSO INDICATE WHEN THERE'S ONE MINUTE LEFT IN EACH PRESENTATION. I'LL ASK EVERYONE TO TRY TO WRAP UP THEIR COMMENTS WITHIN THE TEN MINUTES. AFTER THERE WILL BE PROBABLY SOME QUESTIONS THAT THE FACILITIES WORKING GROUP WILL ASK PRESENTERS. AND AFTER THAT TIME, WE'LL ASK ANYONE WHO WISHES TO MAKE PUBLIC COMMENTS TO COME UP. PLEASE IDENTIFY YOURSELF AND YOUR AFFILIATION, IF ANY. THOSE COMMENTS WILL BE LIMITED TO THREE MINUTES, AND WE ASK YOU TO WRAP THOSE UP AFTER RICK INDICATES YOU HAVE ONE MINUTE LEFT. AND WE MAY ASK QUESTIONS AS WELL.

RICK, IF YOU COULD PLEASE INTRODUCE THE FIRST SPEAKER.

MR. KELLER: I CERTAINLY WILL, CHAIRMAN. FIRST SPEAKER TODAY IS WENDELL BRASE, WHO WE ASKED TO COME MAKE A PRESENTATION TO YOU TODAY. WENDELL IS THE VICE CHANCELLOR FOR ADMINISTRATION AND BUSINESS SERVICES AT THE UNIVERSITY OF CALIFORNIA RIVERSIDE -- HOW ABOUT IRVINE? I WAS JUMPING AHEAD HERE. CAREER CHANGE.

WENDELL HAS 28 YEARS OF SERVICE WITH THE UNIVERSITY OF CALIFORNIA, 13 YEARS AT UC SANTA CRUZ AND 15 YEARS AT UC IRVINE.

AND WENDELL ALSO -- I JUST WANT TO MAKE A BRIEF NOTE OF THE FACT THAT IRVINE ADMINISTRATIVE AND

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BUSINESS SERVICES HAVE BEEN CITED FOR 11 NATIONAL AWARDS FOR PROCESS IMPROVEMENT, INNOVATION, AND ADMINISTRATIVE STREAMLINING, INCLUDING FIRST PRIZE IN THE NACUBO'S HIGHER EDUCATION AWARDS PROGRAM. NACUBO IS THE NATIONAL ASSOCIATION OF COLLEGE AND UNIVERSITY BUSINESS OFFICERS. BEST PRACTICE AWARDS FOR CAUSE, THE U.S.A. TODAY QUALITY CUP AWARD, AND EDUCAUSE AWARD FOR EXCELLENCE IN ADMINISTRATIVE INFORMATION SYSTEMS.

WENDELL ALSO CHAIRS A COMMITTEE APPOINTED BY THE REGENTS' GROUNDS AND BUILDINGS COMMITTEE TO DEVELOP AND DISSEMINATE BEST PRACTICES FOR CAPITAL PROJECT COST CONTROL ON A UC-WIDE BASIS. HE HAS PROVIDED OVERALL LEADERSHIP AND PLANNING AND PROJECT DELIVERY FOR UC IRVINE'S NEW HOSPITAL, A PROJECT THAT IS NOW APPROACHING 50-PERCENT COMPLETION AND IS PROGRESSING ON TIME AND ON BUDGET.

SO WITH THAT, I WANT TO THANK WENDELL FOR AGREEING TO COME HERE TODAY AND SPEAK TO YOU AND SHARE SOME OF HIS THOUGHTS. WENDELL.

DR. BRASE: THANK YOU AND GOOD AFTERNOON. I DIDN'T REALIZE RICK WAS GOING TO SAY ALL OF THOSE THINGS. CONCERNING THOSE AWARDS, BY THE WAY, THERE'S ONE OTHER UNIVERSITY OF CALIFORNIA INSTITUTION WHICH HAS WON THE EXACT SAME AWARDS, AND THAT IS UC SAN DIEGO. AND I SHOULD ACKNOWLEDGE THAT.

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ALSO, OUR HOSPITAL, I GUESS THIS WAS WRITTEN A COUPLE MONTHS AGO, OUR HOSPITAL IS NOW 66 PERCENT COMPLETED AS OF TODAY, STILL ON TIME, AND ON BUDGET.

THANK YOU FOR THIS OPPORTUNITY TO OFFER SOME SUGGESTIONS THAT I HOPE WILL PROVE USEFUL TO YOU IN YOUR TASK OF EVALUATING PHYSICAL PLANNING, DESIGN, AND COST ASPECTS OF FACILITIES PROPOSALS. I HAVE SOME FAMILIARITY WITH EVERY UNIVERSITY THAT HAS MADE A PRESENTATION TO THIS WORKING GROUP. EVERY ONE OF THESE UNIVERSITIES HAS STRUGGLED WITH THE PROBLEM OF BALANCING ASPIRATIONS AND COMPETING DEMANDS WITHIN A LIMITED BUDGET. EVERY ONE OF THEM HAS A GOAL OF DESIGNING GREEN BUILDINGS, EVERY ONE OF THEM HAS TO INTEGRATE NEW BUILDINGS INTO A CAMPUS MASTER PLAN AND UTILITIES INFRASTRUCTURE. EVERY ONE OF THEM HAS STANDARDS FOR LIFE-CYCLE PERFORMANCE OF FACILITIES, AND HAS TO BALANCE THE CAPITAL COST OF THESE STANDARDS AGAINST LONG-TERM COSTS. EVERY ONE OF THEM HAS COST CONTROL STRATEGIES AND METHODS. IN SHORT, EVERY UNIVERSITY THAT'S PRESENTED TO YOU HAS PLANNED, DESIGNED, AND CONSTRUCTED EXCELLENT SCIENCE FACILITIES.

ARE ALL INSTITUTIONS EQUALLY SUCCESSFUL IN CARRYING OUT THESE ACTIVITIES? OBVIOUSLY NOT. I'VE HEARD THE WORKING GROUP DISCUSS HOW DIFFICULT IT IS TO EVALUATE CAPITAL PROPOSALS IN TERMS OF VALUE, DELIVERY,

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AND OTHER DESIRED OBJECTIVES. THERE IS NO SINGLE FOOLPROOF METRIC FOR ANY OF THESE PERFORMANCE ATTRIBUTES. I WILL OFFER A FEW SUGGESTIONS THAT I HOPE YOU MAY FIND USEFUL.

FIRST, SINCE I'VE HEARD THIS GROUP TALK ABOUT WHY LABORATORY COSTS ARE BOTH SO HIGH AND SO VARIABLE, HERE'S A TABLE THAT SUMMARIZES SOME PRIMARY COST FACTORS THAT APPLY PARTICULARLY TO LABORATORY BUILDINGS.

FIRST OF ALL, LABORATORIES ARE VERY ENERGY INTENSIVE, AND THIS FACT IN ITSELF DRIVES LOTS OF OTHER COSTS IN WAYS THAT I'LL EXPLAIN. JUST A TYPICAL MEDIUM SIZE LABORATORY AT A RESEARCH UNIVERSITY OFTEN HAS A PEAK POWER REQUIREMENT OF MORE THAN A MEGAWATT. THE THERMAL DEMANDS ARE ALSO HIGH BECAUSE WHAT HAPPENS IS THAT ALL THAT HEAT THAT COMES INTO THE BUILDING GETS DISSIPATED IN ONE FORM OR ANOTHER, HAS TO COME OUT AS HEAT BASICALLY IN THE FINAL ANALYSIS. AND THAT IS THROUGH AIR CONDITIONING. SO YOU WILL FIND ON EVEN PROJECTS WHICH ARE AS FAR AS NORTHERN CALIFORNIA, LAB BUILDINGS HAVE AIR CONDITIONING REQUIREMENTS YEAR-ROUND BECAUSE OF ALL THE ENERGY THAT'S BEING DISSIPATED.

MECHANICAL SYSTEMS AND STRUCTURAL LOADING REQUIREMENTS CREATE HIGH FLOOR-TO-FLOOR DISTANCE SPACING. MECHANICAL SYSTEMS ACTUALLY COMPRISE 40 TO 45

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PERCENT OF THE TOTAL COST OF A LABORATORY BUILDING. SIMILAR TO A HOSPITAL, AS A MATTER OF FACT, ABOUT THE SAME.

THE WAY LABORATORIES WORK, YOU PROBABLY KNOW THIS, SO FORGIVE ME IF I COVER THINGS THAT ARE OBVIOUS OR YOU MAY KNOW. LABORATORIES EXHAUST ALL THE AIR. ONE HUNDRED PERCENT OF THE AIR THAT COMES INTO A LABORATORY GETS FILTERED, AIR CONDITIONED, DEHUMIDIFIED, IT RUNS THROUGH THE LABORATORY ONE TIME, AND IT'S EXHAUSTED 100 PERCENT.

AIR HANDLERS AND DUCTS ARE MASSIVE IN LABORATORY BUILDINGS, AND THEY HAVE COMPLEX ENERGY MANAGEMENT SYSTEMS BASICALLY TO TRY TO CONTROL THE EXCESSIVE ENERGY COST OF ALL THIS ENERGY GOING THROUGH THE BUILDING ONE TIME 24 BY 7, 365 DAYS A YEAR. THERE ARE SPECIAL LIFE SAFETY FEATURES PER CODE.

NOW, I GET INTO A FEW FACTORS HERE WHICH CAUSE A LOT OF VARIANCE IN THE COSTS OF PROJECTS, WHICH MAY LOOK SIMILAR OTHERWISE, BUT SITES HAVE A BIG BEARING IN TERMS OF SOIL CONDITIONS, ACCESS, SIZE, AND STAGING TO A POINT WHERE ON MANY CAMPUSES THAT HAVE PRESENTED TO YOU, THE KIND OF STRUCTURAL SYSTEM AND THE KIND OF EVEN SOMETIMES EXTERIOR CLADDING SYSTEM MAY VARY BASED UPON THE SITE CONSTRAINTS IN A SPECIFIC CASE.

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THE SITES VARY IN TERMS OF INFRASTRUCTURE SUFFICIENCY AND PROXIMITY. I WILL COME BACK TO THAT POINT IN A MINUTE. PROJECTS BUILT WITH PUBLIC MONEY IN THE STATE OF CALIFORNIA ARE CONSTRUCTED WITH SKILLED TRADES PERSONS, PAID PREVAILING WAGES, AND CURRENTLY THIS ECONOMY IS OVERHEATED DUE TO THE BILLIONS OF DOLLARS WORTH OF PUBLIC WORKS PROJECTS APPROVED BY THE VOTERS, AS WELL AS ALL THE HOSPITAL SEISMIC PROJECTS THAT ARE UNDER WAY RIGHT NOW.

MECHANICAL COMPLEXITY IS A BIG COST DRIVER, AS YOU CAN SEE HERE, OFTEN CREATING SECONDARY COST IMPACTS AS WELL AS COMPRISING A MAJOR CONTRIBUTION TO OVERALL COST AS NOTED ON THE SLIDE. FOR EXAMPLE, IF THE ELECTRICAL OR THERMAL INFRASTRUCTURE IS AT CAPACITY, A PROJECT BUDGET MAY HAVE TO EXTEND OR EXPAND HOT WATER LINES, CHILLED WATER LINES, ELECTRIC LINES, UTILITY TUNNELS OR TRENCHES, TRANSFORMERS, SWITCH GEAR, AND EVEN CHILLERS OR BOILERS BACK AT THE CENTRAL PLANT. LABORATORIES, INCIDENTALLY, TYPICALLY HAVE REDUNDANT ELECTRIC FEEDERS AND BIG EMERGENCY GENERATORS TO PROVIDE POWER RELIABILITY AND PROTECT STORED AND CULTURED RESEARCH MATERIALS.

ANOTHER EXAMPLE OF THE SECONDARY IMPACT OF MECHANICAL SYSTEMS ON LABORATORY COSTS IS THE WAY THAT THE COST OF EVERYTHING VERTICAL IN THE BUILDING,

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CONDUITS, PIPES, WIRES, DUCTS, STRUCTURAL COLUMNS, STAIRS, ELEVATORS, EXTERIOR CLADDING AND GLAZING, AND EVEN SEISMIC SYSTEMS INCREASES DUE TO THE HIGH FLOOR-TO-FLOOR SPACING REQUIRED IN LABORATORIES. AND THE PRIMARY WAY TO IMPROVE THE EFFICIENCY OF LABORATORY HVAC, HEATING, VENTILATING, AND AIR CONDITIONING, A TERM I'LL PROBABLY USE AGAIN, HVAC SYSTEMS IS TO SLOW DOWN AIR SPEEDS IN AIR HANDLERS, FILTERS, PLENUMS, DUCTS, LOUVERS, TRANSITIONS, DAMPERS, AND FUME HOODS, WHICH MAKES HVAC COMPONENTS MASSIVE AND ADDS MANY CUBIC FEET TO A BUILDING IN THE FORM OF MECHANICAL ROOMS, ABOVE-CEILING SPACE, RISERS, AND MECHANICAL CHASES.

LABORATORY FACILITIES ALSO HAVE MORE COMPLEX HVAC AND LIFE SAFETY CONTROL SYSTEMS AS WELL AS HIGHER FLOOR LOADING AND MORE STRINGENT VIBRATION CRITERIA SPECIFICATIONS THAN DO OFFICE BUILDINGS.

FINALLY, SPECIALIZED FACILITIES, SUCH AS VIVARIA OR IMAGING SUITES, ARE SO EXPENSIVE, THEY CAN SKEW THE COST PER SQUARE FOOT OF ANY FACILITY.

LET ME TURN TO ANOTHER FACET OF COST. INSTITUTIONS ARE ALWAYS FACED WITH BALANCING INITIAL COSTS AGAINST LIFE-CYCLE VALUE EVEN BEFORE SUSTAINABILITY AND GREENNESS BECAME A POLICY REQUIREMENT. LET ME SHOW YOU AN EXTRACT FROM AN ACTUAL STUDY WE DID A FEW YEARS AGO. WHEN I SAY IT'S AN

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EXTRACT, I'M SHOWING YOU ABOUT HALF A DOZEN COST COMPONENTS IN BUILDINGS. WE LOOKED AT ABOUT 50. AND YOU CAN SEE WHAT WE'RE SHOWING HERE IS IN THE COSTS OF A COUPLE YEARS AGO WHAT A GOOD COMMERCIAL STANDARD WOULD BE. THAT WOULD BE TYPICALLY IN IRVINE A DEVELOPER BUILDING CLASS A OFFICE BUILDING OR CLASS A R&D SPACE VERSUS THE CAMPUS STANDARD.

ACTUALLY I JUST REALIZED I LEFT IN THE TRUNK OF MY CAR A COUPLE OF LOCK SETS I WAS GOING TO BRING IN TO SHOW YOU AN EXAMPLE. SO WHEN YOU SEE THE REMARKS HERE, YOU WILL SEE REFERENCE TO THE LOCKS, WHICH I FORGOT TO BRING IN. THE REASON I WANTED TO BRING IN A COUPLE OF LOCK SETS WAS BECAUSE I COULDN'T CARRY IN AN AIR HANDLER, BUT I ACTUALLY HAVE TWO LOCK SETS WHICH I USED ONCE FOR A HEARING IN SACRAMENTO IN ORDER TO EXPLAIN WHY BUILDINGS BUILT TO UNIVERSITY SPECIFICATIONS COST MORE THAN BUILDINGS BUILT IN THE PRIVATE SECTOR BY DEVELOPERS.

AND JUST ALL YOU HAVE TO DO IS WE HAVE A LOCK SET THAT'S ACTUALLY INSTALLED IN IRVINE BY A DEVELOPER WHO BUILDS CLASS A OFFICE SPACE AND ACTUALLY THE ONE WE INSTALLED IN THE HUMANITIES BUILDING ABOUT TEN YEARS AGO. IF YOU LIFT ONE, IT WEIGHS ABOUT 3 POUNDS. IF YOU LIFT THE OTHER, IT WEIGHS ABOUT A POUND. WE ACTUALLY KNOW THAT THE ONE THAT WEIGHS ONE POUND LASTS

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ABOUT FIVE YEARS BECAUSE WE DECIDED TO CUT COSTS AND TRY IT IN AN ACADEMIC BUILDING ABOUT TEN YEARS AGO, AND WE STARTED NOTICING QUITE A FEW FAILURES AFTER FIVE YEARS.

THE POINT OF THIS CHART IS THAT THE AMOUNT OF INCREASED LIFETIME EXCEEDS THE PERCENTAGE OF COST DIFFERENCE BY A WIDE MARGIN IN EVERY CASE. AND THAT'S IMPORTANT TO US BECAUSE OUR BUILDINGS NEVER RECEIVE QUITE ENOUGH MONEY FROM THE STATE TO MAINTAIN THEM AT A LEVEL THAT WOULD ENTAIL ONGOING MAINTENANCE COSTS. WE TRY TO INTENTIONALLY BUILD BUILDINGS, AND I THINK EVERY ONE OF THE INSTITUTIONS THAT HAS SPOKEN HERE TRIES TO BUILD BUILDINGS, WHICH DO NOT ENTAIL MAJOR MAINTENANCE COSTS FOR 15 OR 20 YEARS. AND THE REASON FOR THAT IS BECAUSE WE HAVE A LOT OF DEFERRED MAINTENANCE, AND WE CAN'T AFFORD TO BE ADDING TO IT.

LET ME GET BACK ON SCRIPT NOW THAT I REALIZED I HAD FORGOTTEN MY PROPS.

THE POINT ABOUT THE LOCK SETS IS NOT THAT THE DEVELOPER WITH WHOM WE'RE MAKING THE COMPARISON WAS MAKING A BAD DECISION, BUT MERELY APPLYING A DIFFERENT BUSINESS MODEL IN THAT COMMERCIAL USAGE REQUIRES LESS ROBUST HARDWARE THAN INSTITUTIONAL USE. IN OUR CASE, AS I MENTIONED A SECOND AGO, WE CAN'T AFFORD TO REPLACE THE LOCK SETS OR THE AIR HANDLERS OR THE EXHAUST DUCTS

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OR LAVATORY FAUCETS OR A HUNDRED OTHER BUILDING COMPONENTS NOT LISTED ON THIS TABLE THAT WOULD MAKE SENSE UNDER THE DEVELOPER'S BUSINESS MODEL.

OF COURSE, I DIDN'T COME HERE JUST TO TALK ABOUT LOCK SETS. THIS EXAMPLE IS JUST EMBLEMATIC OF THE DOZENS, IF NOT HUNDREDS, OF TRADE-OFFS THAT INSTITUTIONS HAVE TO MAKE ABOUT BUILDING SYSTEMS, QUALITY STANDARDS, AND LIFE-CYCLE COSTS.

NOW LET ME TURN TO SOME STRATEGIES THAT RESEARCH UNIVERSITIES USE TO LOWER THE CAPITAL COSTS OF WET LABORATORY BUILDINGS. AND I CAN SAY THAT I THINK ALL THE UNIVERSITIES THAT HAVE SPOKEN HERE USE THESE SAME STRATEGIES. I VISITED ALL THOSE UNIVERSITIES. I'VE SEEN BUILDINGS THERE. I'VE TALKED TO PEOPLE. WE DO A LOT OF TRADING OF BEST PRACTICES AMONG, NOT ONLY WITHIN THE UNIVERSITY OF CALIFORNIA, BUT WITH THE PRIVATE INSTITUTIONS THAT HAVE SPOKEN HERE AS WELL.

RATHER THAN READ THIS SLIDE TO YOU, WHICH I ALWAYS HATE WHEN PEOPLE DO THAT TO ME, I'LL LET YOU SCAN IT FOR A MINUTE. AND THEN THE NEXT SLIDE WILL BE A FLOOR PLAN THAT SHOWS EXAMPLES OF SOME OF THESE POINTS.

THIS IS A FLOOR PLAN WHICH SHOWS A NUMBER OF POINTS -- ILLUSTRATES A NUMBER OF POINTS FROM THE LAST SLIDE. HERE YOU CAN SEE OPEN LAB BAYS. IN OTHER

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WORDS, THERE ARE NO WALLS HERE BETWEEN BREAKING UP THIS WHOLE AREA. YOU CAN SEE THAT, RATHER THAN A HARD CORRIDOR, THERE'S A GHOST CORRIDOR HERE. THESE ARE JUST LIKE PARTIAL PARTITIONS ALONG HERE BOTH SIDES. YOU CAN SEE THE WET ZONE OF THE BUILDING. BY THAT I MEAN HERE ARE FUME HOODS ALONG HERE IN THESE ALCOVES, AND THERE IS NO PLUMBING OUTSIDE OF THE CENTRAL CORE. SO THAT'S THE WET ZONE.

AT EVERY OTHER BAY YOU SEE HERE, HERE, AND HERE, AND SO ON, THOSE ARE BIG LABORATORY GRADE TABLES, BUT THEY ARE MOVABLE TABLES. THEY'RE NOT FIXED CASEWORK, SO THAT REDUCES COSTS. AND IT'S MORE FLEXIBLE ULTIMATELY, AT LEAST FOR THIS KIND OF LABORATORY.

YOU SEE HERE THE SEPARATION OF THE OFFICES INTO A SEPARATE WING. THIS SAVES MONEY BECAUSE IN THIS PART THE AIR DOES RECIRCULATE, IN THIS PART IT DOESN'T, AS I MENTIONED EARLIER. IN THIS PART, THE FLOOR LOADING IS LIGHTER, THE VIBRATION CRITERIA ARE RELAXED. THERE ARE JUST A NUMBER OF FEATURES OF THIS BUILDING WHICH MAKE IT LESS EXPENSIVE. AND BY THE WAY, HERE I WON'T COMMENT TOO MUCH ON THIS, BUT THIS IS THAT INTERACTIVE AREA THAT A LOT OF UNIVERSITIES CARE ABOUT DESIGNING ARCHITECTURE IN WAYS THAT FOSTERS CHANCE INTERACTIONS AND COLLABORATION, SO THIS DOES TAKE INTO

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ACCOUNT.

WE HAVE WHAT I CALL A FAT FLOOR PLATE HERE, MEANING THAT BY PUTTING ALL OF THESE SHARED LAB SUPPORT FACILITIES IN THE MIDDLE WHICH DON'T NEED DAYLIGHT, YOU CAN HAVE A PRETTY WIDE DIMENSION FROM HERE TO HERE. AND THAT'S LESS EXPENSIVE THAN ELONGATING A BUILDING BECAUSE THAT INTERIOR SPACE COSTS LESS.

NOW, I CALL THESE STRATEGIES BECAUSE NOT ALL LAB DESIGNS MAY BE ABLE TO EMPLOY ALL THESE IDEAS. SOME SITES, FOR EXAMPLE, MAY NOT BE ABLE TO SUPPORT WHAT I CALL FAT BUILDING. SOME RESEARCH PROGRAMS MAY NOT WORK IN OPEN LABS WITH SHARED SUPPORT SPACES, AND SOME INSTITUTIONS MAY DECIDE THEMSELVES TO PAY THE PREMIUM TO MERGE OFFICES INTO THE LABORATORY FLOOR PLAN BECAUSE THEIR RESEARCHER CULTURE WORKS BEST WHEN OFFICES ARE NOT SEPARATED FROM LABS, AS YOU SEE HERE.

CONSPICUOUSLY ABSENT FROM THAT LIST I SHOWED YOU OF COST CONTROL STRATEGIES WAS THAT OF REDUCING THE STANDARDS FOR BUILDING MECHANICAL SYSTEMS. EVEN THOUGH THIS MIGHT BE A LUCRATIVE COST-CUTTING OPPORTUNITY IN THAT MECHANICAL, ELECTRICAL, AND PLUMBING SYSTEMS CONSTITUTE 40 OR AS MUCH AS 45 PERCENT OF THE ENTIRE COST OF A WET LAB BUILDING, LIFE-CYCLE COST PERFORMANCE, ALONG WITH EFFICIENCY AND OTHER ATTRIBUTES OF GREEN, SUSTAINABLE DESIGN REQUIRE ROBUST,

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SOPHISTICATED, HIGH QUALITY MECHANICAL SYSTEMS.

LET ME TURN FOR A SECOND TO THIS ISSUE OF LIFE-CYCLE COSTS. THESE ARE STRATEGIES THAT RESEARCH UNIVERSITIES OFTEN USE TO CONTROL LIFE-CYCLE COSTS. THE REASON OPEN LABORATORIES REDUCE LIFE-CYCLE COSTS IS BECAUSE YOU DON'T HAVE TO NOT ONLY MOVE THE WALLS AROUND, THERE ARE NO WALLS. IF ONE PRINCIPAL INVESTIGATOR'S RESEARCH PROGRAM GROWS AND THE PERSON NEXT TO THEM HAS LESS FUNDING, YOU JUST MOVE AN IMAGINARY LINE. YOU DON'T HAVE TO MOVE WALLS. WHAT'S EVEN MORE EXPENSIVE THAN MOVING WALLS IS MOVING ALL THE AIR CONDITIONING DUCTS AND CONTROLS THAT GO WITH THE WALLS.

HIGH ENERGY EFFICIENCY IS VERY IMPORTANT BECAUSE, AS I NOTED A MINUTE AGO, THESE LABS HAVE ONCE-THROUGH AIR. THEY HAVE A LOT OF AIR CHANGES, AND THEY RUN 365 DAYS A YEAR, 24 HOURS A DAY. ROBUST MECHANICAL SYSTEMS, TO ME THAT MEANS WHEN YOU DO HAVE TO MAKE CHANGES IN FUME HOODS OR VENTILATION OR ELECTRIC LOADS, YOU DON'T HAVE TO REBUILD THE BUILDING ALL THE WAY BACK TO THE MECHANICAL ROOM. YOU'VE GOT AN INFRASTRUCTURE IN THERE WHERE YOU'VE PROBABLY GOT THE PANEL CAPACITY, AND YOU HAVE THE EXTRA CAPACITY -- THAT GOES TO THE NEXT POINT TOO -- THE EXPANSION CAPACITY IN BUILDING SYSTEMS SO YOU DON'T HAVE TO REALLY RENOVATE

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THE BASIC MECHANICAL INFRASTRUCTURE OF THE BUILDING.

AND WEATHER PROTECTION FOR ROOFTOP EQUIPMENT, THOSE EXHAUST FANS ARE REALLY EXPENSIVE, AND JUST PUTTING A CANOPY OVER THEM MAKES THEM LAST MUCH LONGER.

OPEN LABORATORY FLOOR PLANS AND EXPANSION CAPACITY REDUCES THE COST OF MODIFYING SPACE OVER ITS LIFE SPAN, WHICH IS ALWAYS NECESSARY AS RESEARCH FUNDING LEVELS EBB AND FLOW AND THE NATURE OF SCIENCE ITSELF EVOLVES AND MAKES CHANGING DEMANDS ON A LABORATORY FACILITY.

NOW, SO FAR I HAVE PAINTED A SIMPLIFIED PICTURE OF THE PROGRAMMATIC, TECHNICAL, QUALITY, AND SUSTAINABILITY FACTORS THAT AFFECT A LABORATORY BUILDING'S COST AND THE DESIGN AND COST TRADE-OFFS REQUIRED TO PLAN AND CONSTRUCT SUCH A FACILITY. FOR EXAMPLE, I SHOWED YOU HALF A DOZEN LIFE-CYCLE EVALUATIONS THAT LED TO STANDARDS FOR BUILDING COMPONENTS. ACTUALLY THERE WERE ABOUT 50 SUCH EVALUATIONS RANGING FROM FLASHINGS TO HARDWARE TO CONCRETE TO COUNTERTOPS, EVERY SINGLE BUILDING SYSTEM AND MATERIAL.

GIVEN ALL THE VARIABLES AND FACTORS, HOW CAN YOU HOPE TO EVALUATE THE QUALITY OF FACILITIES PROPOSALS? NOW I CAN OFFER A FEW SUGGESTIONS. FIRST, I SUGGEST THAT YOUR EVALUATION BE COMPREHENSIVE. BY

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THAT I MEAN ACROSS A NUMBER OF PROJECT ATTRIBUTES, AVOIDING RELIANCE ON A FEW SIMPLE METRICS OR RATIOS WHICH CAN PROVE MISLEADING. I WOULD SUGGEST USING DATA FROM INSTITUTIONS' ACTUAL TRACK RECORDS, FOCUSING ONLY ON THOSE THAT YOU VALUE THAT REALLY MATTER TO YOU AND KEEPING IN MIND IN DETERMINING THAT THAT SINCE SUBSTANTIAL MATCHING FUNDS WILL BE INVESTED IN ALL PROPOSED FACILITIES, THE INSTITUTIONS INVOLVED HAVE A STRONG INCENTIVE THEMSELVES TO DELIVER VALUE, EFFICIENCY, AND ON-BUDGET PERFORMANCE.

LET ME SUGGEST AN EXAMPLE OF WHAT I MEAN BY HARD DATA. I UNDERSTAND FROM LISTENING TO SEVERAL OF YOUR DISCUSSIONS THAT RAPID DELIVERY IS AN IMPORTANT MISSION-BASED OBJECTIVE. RATHER THAN JUST ASK FOR A PROSPECTIVE SCHEDULE, I RECOMMEND THAT YOU ALSO ASK FOR EVIDENCE OF THE FASTEST EXACT DURATION OF A SIMILAR PROJECT THAT HAS BEEN COMPLETED BY THE INSTITUTION, ONE OF SIMILAR SIZE WITH THE SAME KIND OF PROGRAM, FROM THE DATE FUNDS WERE APPROPRIATED TO THE DATE OF BENEFICIAL OCCUPANCY.

ANOTHER EXAMPLE, IF YOU DECIDE THAT GREEN DESIGN IS AN IMPORTANT OBJECTIVE, ASK FOR FACTUAL EVIDENCE IN REFERENCE TO AN OBJECTIVE STANDARD, SUCH AS THE U.S. GREEN BUILDING COUNCIL'S LEAD PROGRAM. THIS WOULD BE MORE PRECISE THAN A GENERAL STATEMENT ABOUT AN

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INSTITUTION'S GREEN POLICY. NOTE THAT I'M SUGGESTING DATA ABOUT INSTITUTIONS' PERFORMANCE CAPABILITIES BASED ON TRACK RECORD FACTS RATHER THAN ATTRIBUTES OF THE PROPOSED BUILDING DESIGNS THEMSELVES. I DO THIS FOR TWO REASONS.

FIRST, AS I THINK YOU KNOW, INSTITUTIONS HAVE ALREADY MADE A NUMBER OF PLANNING AND DESIGN DECISIONS THAT COULD BE DISTORTED RATHER THAN ACTUALLY IMPROVED BY AN OVERLY PRESCRIPTIVE APPROACH FOR PROJECT CRITERIA. AND SECOND, AS I NOTED EARLIER, INSTITUTIONS HAVE SKIN IN THE GAME; AND, HENCE, THEY HAVE ALL THE INCENTIVES TO DESIGN AND DELIVER HIGH-VALUE PROJECTS.

ANOTHER IMPORTANT FEATURE OF A COMPREHENSIVE EVALUATION, AND BY THAT I MEAN ONE THAT SPANS A NUMBER OF PROJECT ATTRIBUTES THAT YOU DEEM IMPORTANT AND THAT CAN BE SUBSTANTIATED BY FACTUAL TRACK RECORD DATA, IS THAT INSTITUTIONS WILL BE ABLE TO EMPLOY METHODS THAT WORK FOR THEM RATHER THAN ADOPTING AN UNPROVEN APPROACH FOR THE SAKE OF APPEARING INNOVATIVE OR TO ADDRESS SPECIFIC EXPECTATION. FOR EXAMPLE, IT WOULD NOT BE WISE TO CREATE AN EXPECTATION THAT, IN EFFECT, FORCES A DELIVERY PROCESS THAT HAS NOT BEEN USED BEFORE BY AN INSTITUTION. THIS IS NOT THE TIME OR PLACE TO EXPERIMENT WITH A NEW DELIVERY VEHICLE FOR A PROJECT OF SUCH COMPLEXITY.

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I HOPE THAT I'VE OFFERED SOME USEFUL IDEAS AND SUGGESTIONS, AND I WOULD WELCOME ANY QUESTIONS YOU MAY HAVE.

CHAIRMAN LICHTENGER: THANK YOU VERY MUCH FOR THE PRESENTATION, WENDELL. FIRST OF ALL, IF YOU COULD SEND TO RICK YOUR SLIDE SHOW SO THAT WE CAN SEND IT --

MR. BRASE: THE SLIDES ARE EMBEDDED IN THE TEXT.

CHAIRMAN LICHTENGER: OKAY. GREAT. I THINK THAT WOULD BE GREAT, SO IT GETS TO OTHER FACILITIES WORKING GROUP MEMBERS THAT AREN'T HERE TODAY. ED, STUART, DO YOU HAVE ANY QUESTIONS? I HAVE A FEW, BUT I'LL DEFER.

MR. KASHIAN: NO, I DON'T.

MR. LAFF: I HAVE JUST ONE QUESTION. ISN'T IT TRUE THAT IN THE UNIVERSITIES THE OPERATING BUDGETS, YOUR MAINTENANCE BUDGET TO MAINTAIN THESE BUILDINGS WOULD COME OUT OF YOUR GENERAL BUDGET GIVEN TO YOU YEAR TO YEAR AS OPPOSED TO THE CAPITAL FUNDS WHICH YOU GET?

MR. BRASE: YES.

MR. LAFF: SO IT'S A REAL COST FOR YOU IN AN OPERATING SENSE?

MR. BRASE: IT IS. AND ODDLY ENOUGH, ONE OF THE ANOMALIES ABOUT THE WAY THOSE OPERATING COSTS ARE FUNDED, AT LEAST IN THE UNIVERSITY OF CALIFORNIA, WE

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GET THE SAME FIGURE WHETHER IT'S A HUMANITIES BUILDING OR WET LABORATORY BUILDING. AND SO WHENEVER WE BUILD A WET LABORATORY BUILDING, WE'RE ALWAYS A LITTLE BIT SHORT IN TERMS OF THE ALLOCATION FOR OPERATING COST. THAT'S JUST ANOTHER REASON WHY WE TRY TO MAKE THEM SO GREEN AND SO EFFICIENT.

CHAIRMAN LICHTENGER: DO YOU HAVE ANY OTHER?

MR. LAFF: NO. I'M FORMULATING ONE. COME BACK.

CHAIRMAN LICHTENGER: SO WHAT KIND OF DELIVERY METHOD ARE YOU USING ON THIS WONDERFUL HOSPITAL PROJECT YOU'RE TALKING ABOUT?

MR. BRASE: IT'S THE FIRST DESIGN-BUILD DELIVERY OF AN ACADEMIC MEDICAL CENTER IN THE STATE OF CALIFORNIA.

CHAIRMAN LICHTENGER: SO ACCORDING TO YOUR RECOMMENDATION, WE WOULDN'T NECESSARILY HAVE ASKED YOU OR RECOMMENDED YOU GO DESIGN-BUILD. YOU HADN'T DONE IT BEFORE.

MR. BRASE: WELL, IT WOULD HAVE BEEN INSANITY ON OUR PART TO HAVE TRIED A HOSPITAL AS OUR FIRST DESIGN-BUILD PROJECT. THE IRVINE CAMPUS GRADUALLY CLIMBED THE LEARNING CURVE FOR DESIGN-BUILD. WE STARTED OUT, AS MANY INSTITUTIONS DO, WITH PARKING STRUCTURES AND HOUSING. THEN WE WENT TO OFFICE

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BUILDINGS WITHOUT LAB COMPONENTS. THEN WE STARTED ON WET LAB BUILDINGS IN 1994. WE'VE COMPLETED EIGHT WET LAB BUILDINGS USING DESIGN-BUILD. AND BASED UPON THAT LEARNING CURVE, WE DECIDED TO TRY IT ON AN ACUTE CARE HOSPITAL.

CHAIRMAN LICHTENGER: HAVE YOU SEEN ANY STUDIES OR DONE ANY STUDIES COMPARING TRADITIONAL LUMP SUM, JUST DESIGN AND THEN BUILD, BID BUILD VERSUS DESIGN-BUILD? HAVE YOU SEEN ANY STUDIES IN TERMS OF WHAT PERCENTAGE DIFFERENCE IS IN TERMS OF COST?

MR. BRASE: YES. I NEVER QUITE BELIEVE THOSE NUMBERS. THEY'RE ALWAYS WRITTEN FROM A POSITION OF ADVOCACY. AND MY VIEW IS THAT ANY DELIVERY PROCESS THAT IS AGGRESSIVELY MANAGED CAN SUCCEED. BY THE WAY, WHEN I WAS AT SANTA CRUZ THOSE 13 YEARS THAT RICK MENTIONED, WE DIDN'T USE DESIGN-BUILD. WE DELIVERED PROJECTS ON TIME AND ON BUDGET. I THINK IT HAS A LOT TO DO WITH ONE'S WILLINGNESS TO ACCEPT THE PREMISE THAT EVERY SINGLE PART OF THE PROCESS CAN BE MANAGED.

I ACTUALLY HEARD, I WON'T NAME NAMES, BUT I HEARD A PERSON PRESENT TO THIS GROUP SAY THAT THERE ARE PARTS OF THE PROCESS THAT CAN'T BE MANAGED. WELL, THAT'S A LUDICROUS PREMISE, AND IT WILL LEAD TO COST OVERRUNS AND LATE DELIVERY EVERY TIME.

WE HAPPEN TO THINK THAT DESIGN-BUILD FOR US

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HAS OFFERED SOME ADVANTAGES, AND WE ARE USING IT BECAUSE WE THINK IT PRODUCES GOOD VALUE, AND IT'S HELPED US TO MANAGE COST AND SCHEDULE. IT'S NOT THE ONLY DELIVERY METHOD BY FAR.

MR. LAFF: ONE OF THE ISSUES IN DESIGN-BUILD IS TYPICALLY YOU DON'T HAVE FULL SETS OF DRAWINGS WHEN YOU'RE BUILDING THIS BUILDING.

MR. BRASE: THAT'S RIGHT.

MR. LAFF: SO ON THE BASIS OF FIVE OR SEVEN YEARS, NINE YEARS FROM NOW WHEN YOU HAVE TO GO BACK AND DO SOMETHING, HAVE YOU FOUND IT BEING A PROBLEM THAT YOU DON'T HAVE A FULL SET OF ENGINEERING DRAWINGS OR WHATEVER?

MR. BRASE: WE DO END UP WITH A FULL SET OF AS-BUILT DRAWINGS. WHAT WE DON'T HAVE IS THAT FULL SET WHEN WE GO OUT TO BID, SO IT'S NOT BASED UPON A BID DOCUMENT SET THAT INCLUDES SPECIFICATIONS AND WORKING DRAWINGS. WHAT WE DO, THOUGH, HAVE IS 56 POUNDS OF STANDARDS. AND IN DESIGN-BUILD THESE STANDARDS HAVE TO DO WITH ALL THOSE QUALITY THINGS AND LIFE-CYCLE THINGS THAT I ALLUDED TO IN MY PRESENTATION. WHAT ONE HAS TO DO DIFFERENTLY IN DESIGN-BUILD IS BE PREPARED FOR THE SUBMITTALS BECAUSE WHEN THEY COME IN, WE TURN THEM OVER IN A MATTER OF DAYS. AND WE HAVE TO DETERMINE WHETHER SUBMITTALS THAT ARE COMING IN ARE COMPLIANT WITH OUR

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QUALITY STANDARDS. AND SO IT'S A DIFFERENT PROCESS. IT'S MORE PROACTIVE AT THAT STAGE CERTAINLY.

MR. LAFF: MOST OF WHAT YOU WERE PRESENTING HERE HAD TO DO WITH LARGE INSTITUTIONS. CLEARLY MONEY IS GOING TO BE GIVEN TO OTHER THAN THE LARGE INSTITUTIONS. AND HOW WOULD YOU LOOK AT CONTROLLING COST FOR AN INSTITUTION THAT MAYBE HASN'T DONE THIS BEFORE?

CHAIRMAN LICHTENGER: I WOULDN'T SAY THAT -- WE HAVEN'T DECIDED WHAT SIZE GRANTS THEY'RE GOING TO BE, AND THERE MAY BE SMALLER INSTITUTIONS AS WELL.

MR. LAFF: RIGHT. BUT I'M SAYING HOW DO YOU MANAGE THAT FROM YOUR PERSPECTIVE?

MR. BRASE: I'M NOT SURE QUITE WHAT THE PREMISE OF THE QUESTION IS. I DOUBT YOU'D BE GIVING MONEY TO AN INSTITUTION THAT'S NEVER BUILT A WET LAB ON A CAMPUS, WOULD YOU?

MR. LAFF: I HAVE NO IDEA.

MR. BRASE: IT WOULD BE RISKY, I MUST SAY THAT. I WOULD HOPE THAT IF PUBLIC MONEY WERE GOING TO BE USED FOR AN INSTITUTION WHICH HAS NEVER DEVELOPED THE SOPHISTICATION TO DELIVER A WET LAB PROJECT, THEY SHOULD PARTNER WITH SOMEBODY PROBABLY WHO HAS THAT KIND OF EXPERIENCE.

MR. LAFF: OKAY. THAT'S FAIR ENOUGH.

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CHAIRMAN LICHTENGER: SO --

MR. KASHIAN: I'D LIKE TO EXPLORE YOUR DESIGN-BUILD PREMISE. DO YOU START WITH A GENERAL CONTRACTOR OR DEVELOPER, OR AT WHAT POINT WHO CONTROLS THE PROJECT?

MR. BRASE: WELL, WE CONTROL THE PROJECT. I MEAN --

MR. KASHIAN: WE BEING THE UNIVERSITY? THEY ACT AS THE GENERAL CONTRACTOR?

MR. BRASE: WE BEING THE UNIVERSITY ON BEHALF OF THE TAXPAYERS OF THE STATE. WE TAKE VERY SERIOUSLY OUR STEWARDSHIP.

MR. KASHIAN: SO YOU ACT AS GENERAL CONTRACTOR?

MR. BRASE: NO. WHAT WE HIRE IS A DESIGN-BUILD TEAM. AND THE WAY IT WORKS IS WE PREQUALIFY A SMALL NUMBER OF DESIGN-BUILD TEAMS. THIS IS A CASE WHERE THE MORE BIDS, THE BETTER IT IS, A FALSE PREMISE. WE ACTUALLY HAVE THE MOST ROBUST COMPETITION WHEN THERE ARE JUST THREE OR FOUR BIDDERS. WE LIKE TO HAVE THREE IN CASE ONE DROPS OUT, THAT LEAVES TWO. AND WHAT WE DO IS WE OFFER REASONABLE STIPENDS TO THOSE WHO ARE NOT SELECTED. WE GO THROUGH A SEPARATE TECHNICAL EVALUATION ON A BUILDING LIKE THE KIND I SHOWED YOU THE FLOOR PLAN OF. THE TECHNICAL

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EVALUATION WOULD TAKE ALMOST A WEEK AND WOULD INVOLVE LOTS OF ARCHITECTS AND ENGINEERS WHO WOULD GIVE A BLIND EVALUATION OF THE TECHNICAL ATTRIBUTES USING A MATRIX, WHICH, OF COURSE, IS IN THE RFP, AND THEN THAT'S WEIGHTED AGAINST THE VALUE.

MR. KASHIAN: I'M NOT SURE I'M ASKING THE QUESTION ON THE TECHNICAL MERIT FROM YOUR STANDPOINT. BUT WHEN SOMEONE DECIDES YOU ARE GOING TO BUILD A LABORATORY, AND YOU HIRE A GENERAL ARCHITECT, WHO GIVES YOU THE BROAD BIG PICTURE OF AN ARCHITECT, AND THEN YOU HIRE A GENERAL CONTRACTOR WHO THEN BIDS THE COMPONENTS OF THAT BUILDING, IS THAT THE WAY THE PROCESS RUNS?

MR. BRASE: WE BID TO THESE DESIGN-BUILD TEAMS. THEY HAVE FORMED A CONTRACTUAL PARTNERSHIP.

MR. KASHIAN: YOU'RE BIDDING A WHOLE TEAM INCLUDING GENERAL CONTRACTOR.

MR. BRASE: WE ARE INDEED. YOU HAVE IT.

MR. KASHIAN: HAVE YOU THOUGHT ABOUT HAVING THE GENERAL CONTRACTOR PICK AND CHOOSE THE INDIVIDUAL SUBCONTRACTORS FOR DESIGN-BUILD RATHER THAN BUILDING AS A TEAM?

MR. BRASE: WELL, FOR PUBLICLY FUNDED PROJECTS, IT'S REQUIRED THAT ALL THE SUBCONTRACTS BE BID. THERE'S A COMPETITIVE BIDDING PROTOCOL THAT'S REQUIRED. AND THE ONLY VARIANT WE TRIED IS WE HAVE HAD

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AN EXECUTIVE ARCHITECT THAT WILL TAKE IT THROUGH SCHEMATIC DESIGN, AND THEN WE'LL BID THAT PACKAGE. WHAT WE'RE DOING MORE CONSISTENTLY NOW IS DOING A PURE DESIGN-BUILD COMPETITION. THE REASON WE DO THAT IS IT TAKES ABOUT SIX MONTHS OUT OF THE DELIVERY PROCESS. AND RIGHT NOW WE'RE IN COST ESCALATION CONDITIONS WHERE A MONTH IS WORTH ABOUT A PERCENT. SO WE'RE SAVING 6 PERCENT OR SO BY DOING IT THROUGH DESIGN-BUILD COMPETITION.

MR. KASHIAN: THANK YOU.

CHAIRMAN LICHTENGER: SO I HAVE TWO FINAL QUESTIONS, AND WE'RE RUNNING OUT OF TIME. THANK YOU. THAT'S OKAY. IT'S GREAT.

YOU MENTIONED HARD DATA FROM ACTUAL TRACK RECORDS. BUT WE ALL KNOW THAT, YOU KNOW, INSTITUTION -- I MEAN WE CAN'T GO TO AN INSTITUTION AND SAY SHOW ME ALL THE PROJECTS YOU DIDN'T INCLUDE IN YOUR RESPONSE. SO DO YOU HAVE ANY SUGGESTIONS HOW WE MIGHT -- EVERYBODY IS GOING TO -- YOU KNOW, WHEN WE REVIEWED THE LAST ROUND OF GRANT APPLICATIONS, YOU KNOW, NO ONE IS GIVING US BAD PROJECTS TO REVIEW. SO I'M OPEN TO ANY SUGGESTIONS YOU HAVE HOW WE DIG DEEPER ON THIS.

MR. BRASE: WELL, YOUR STAFF IS PRETTY SAVVY ABOUT THE KINDS OF GAMES THAT CAN BE PLAYED WITH DATA.

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SO I'D REALLY COUNT ON THEM TO FORMULATE THE KINDS OF DATA REQUIREMENTS THAT WOULD GET AT WHAT I CALL HARD DATA. I THINK THEY CAN DO THAT FOR YOU.

CHAIRMAN LICHTENGER: GREAT. A FINAL QUESTION. SO I DON'T THINK ANYONE ON THE FACILITIES WORKING GROUP IS SURPRISED WHAT THE LABS COST. I THINK WHAT WE WERE SURPRISED AT IS THAT THERE SEEMS TO BE A HUGE VARIATION THAT ONE CAN'T TOTALLY EXPLAIN BY REGIONAL OR OTHER SITE CONDITIONS. SO I GUESS ANY INSIGHT YOU HAVE INTO THAT. I THINK THAT'S WHAT -- YOU KNOW, THERE WAS A CONSENSUS OF VIEW WHERE SOME OF THE INSTITUTIONS WERE QUITE EFFICIENT IN HOW THEY BUILT THESE LABS AND OTHERS WERE NOT.

SO I'M OPEN TO HEARING FROM YOU IF YOU HAVE ANY WORDS OF WISDOM ON THIS.

MR. BRASE: WELL, IT'S USUALLY A COMPOUNDING EFFECT OF A BUNCH OF FACTORS, NONE OF WHICH BY ITSELF EXPLAINS THE WHOLE DIFFERENCE. FOR EXAMPLE, SITE CONDITIONS ARE QUITE DISTINCT FROM THAT INFRASTRUCTURE ISSUE I MENTIONED. IN THE WORST CASE, YOU'D HAVE BAD SOIL CONDITIONS ON A STEEP SLOPE AND A CONSTRAINED SITE WHERE YOU COULDN'T DO ANY STAGING, WHERE YOU HAD TO LIFT THE BUILDING IN WITH A CRANE PIECE BY PIECE, AND THE INFRASTRUCTURE IS DEFICIENT ALL THE WAY BACK TO THE CENTRAL PLANT. NOT ONLY DO YOU NOT HAVE THE CHILLED

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AND HOT WATER LINES AND THE ELECTRICAL INFRASTRUCTURE, YOU DON'T HAVE THE SWITCH GEAR, YOU DON'T HAVE CHILLERS, YOU DON'T HAVE THE BOILERS IN THE CENTRAL PLANT. YOU IN A PROJECT BUDGET ACTUALLY DO ALL THOSE THINGS. YOU MAY NOT HAVE THE ROADS, YOU MAY NOT HAVE THE ACCESS, YOU MAY NOT HAVE THE SERVICE DRIVE THAT CONNECTS TO WHERE YOU NEED TO HAVE A POINT OF ACCESS. THAT'S VERY IMPORTANT FOR A RESEARCH BUILDING, ESPECIALLY ONE WITH A VIVARIUM.

SO IT'S USUALLY A COMPOUNDING OF THESE THINGS. IT'S NOT JUST ONE THING. IT COULD NEVER BE JUST SITES THAT WOULD EXPLAIN SOME OF THE DIFFERENCES THAT I HEARD DISCUSSED.

CHAIRMAN LICHTENGER: WELL, YOU KNOW, I WANT TO THANK YOU VERY MUCH FOR COMING TODAY AND MAKING YOUR PRESENTATION. IT WAS VERY WELL PREPARED AND WELL DONE. THANK YOU VERY MUCH.

MR. BRASE: THANKS FOR INVITING ME.

CHAIRMAN LICHTENGER: FIRST OF ALL, I'D LIKE TO ACKNOWLEDGE AN ICOC MEMBER, DUANE ROTH, WHO'S IN ATTENDANCE HERE TODAY.

NEXT WE WILL BE HEARING FROM STANFORD UNIVERSITY, DR. MICHAEL LONGAKER.

MR. KELLER: I'LL GIVE YOU A ONE MINUTE TO GO.

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DR. LONGAKER: I'M NOT GOING TO TAKE ANYWHERE NEAR THAT AMOUNT OF TIME. SO MY NAME IS MIKE LONGAKER. I'M AT STANFORD UNIVERSITY. RELEVANT TO THIS, I'M THE DEPUTY DIRECTOR OF THE INSTITUTE OF STEM CELL BIOLOGY AND REGENERATIVE MEDICINE AND DIRECT A CAMPUSWIDE ORGANIZATION CALLED THE PROGRAM OF REGENERATIVE MEDICINE, WHICH IS ABOUT 300 FACULTY AT ALL SEVEN SCHOOLS.

BY BACKGROUND, I'M AN M.D., WHO'S ALSO A STEM CELL BIOLOGIST. I HAVE MY BOARDS IN GENERAL SURGERY AND PLASTIC SURGERY AND CRANIOFACIAL SURGERY, SO I'VE SEEN THE RAVAGES OF TISSUE DEFICIENCY AND TISSUE SHORTAGES BOTH AS A CLINICIAN AND AS A STEM CELL BIOLOGIST.

GIVEN THAT THIS IS THE FOURTH MEETING AND YOU'VE HAD THREE WHERE UNIVERSITIES SUCH AS STANFORD AND OTHERS HAVE ADDRESSED THE ISSUES, I THOUGHT I'D LEAVE YOU WITH SOME ADDITIONAL THOUGHTS THAT I THINK ARE PERTINENT FOR THE FACILITIES WORKING GROUP TO CONSIDER.

NO. 1, I THINK CIRM CAN EXPECT A HIGHER PROBABILITY FOR AN OUTSTANDING RETURN ON YOUR INVESTMENT IF AWARDS ARE MADE TO INSTITUTIONS WITH COMPREHENSIVE STEM CELL PROGRAMS, ALSO HAVE NECESSARY INFRASTRUCTURE TO SUPPORT THE RESEARCH PROGRAMS, AND

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PROVEN TRACK RECORD OF SUCCESS BOTH IN FUNDAMENTAL DISCOVERIES AND TRANSLATING THEM INTO COMMERCIAL PRODUCTS THAT BENEFITS CALIFORNIANS AND BEYOND.

SECONDLY, I THINK A MAJOR FACILITIES RFA SHOULD ASK ABOUT, AS WE'VE TALKED ABOUT, AN INSTITUTIONAL TRACK RECORD IN CAPITAL PROJECTS. I MIGHT ADD, DAVID, ONE WAY AROUND THAT IS TO LIST THE LAST THREE CONSECUTIVE PROJECTS OR PUT A TIME-BOUND GOAL ON THAT. THAT AVOIDS THE GAMING OF THE SYSTEM. SO THE LAST THREE PROJECTS THAT WOULD BE COMMENSURATE WITH THE SIZE WE'RE TALKING ABOUT. AND I THINK THAT'S IMPORTANT.

ALSO, THEIR SCIENTIFIC PRODUCTIVITY AND THE INFRASTRUCTURE TO SUPPORT THE SCIENCE.

SO DRILLING DOWN IN SOME DETAIL. SO TRACK RECORD OF BUILDING PROJECTS, TIMELINESS OF COMPLETION, COST OVERRUNS, SUCCESSFUL COMPLETION OF MAJOR PROJECTS, AND I WOULD SAY IN THE LAST SIX MONTHS OR LAST THREE BUILDINGS, AS I MENTIONED.

SECONDLY, WHAT'S THE TRACK RECORD OF SCIENTIFIC DISCOVERY AS YOU PLAN AN RFA? HOW DO YOU ADDRESS THAT? I WOULD SAY A HISTORY OF FUNDAMENTAL DISCOVERIES AND THE TRANSLATION AND NOVEL THERAPIES ARE THE OVERALL VIEW FOR THAT, BUT THEN SOME INDICATION OF FACULTY PERFORMANCE AND COMPETENCE. FOR EXAMPLE, A

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TWO-PAGE BIOSKETCH LISTING OTHER GRANT SUPPORT, LISTING PEER REVIEW PUBLICATION. THERE ARE WAYS THAT YOU CAN GET A METRIC ANALYSIS OF SCIENTIFIC PRODUCTIVITY, AT LEAST GIVING YOU MORE THAN OPINION.

I THINK YOU SHOULD CONSTRUCT THE RFA TO BE DATA RICH, AND NOT OPINION RICH. THIS IS SOME OF THE WAYS YOU CAN GET ABOUT THAT. TRACK RECORD OF ACTIVITY BY THE OFFICE OF TECHNOLOGY LICENSING. WE'RE CERTAINLY NOT GOING TO CURE DISEASE BY SENDING OUT ENVELOPES FROM MY GARAGE OR LAB. WE NEED TO COMMERCIALIZE THESE DISCOVERIES EVENTUALLY TO IMPROVE HUMAN HEALTH.

WHAT IS THE LEVEL OF ACTIVITY IN THE LAST TWELVE MONTHS BY AN OFFICE OF TECHNOLOGY LICENSING AT A UNIVERSITY? ARE THESE THINGS HAPPENING? IS IT PART OF THE CULTURE OF THAT UNIVERSITY?

AND THEN THE INFRASTRUCTURE TO SUPPORT STEM CELL RESEARCH. THIS IS NOT DONE IN ISOLATION. AND I'LL JUST SUMMARIZE IT. THERE ARE CORE FACILITIES THAT MANY PRESENTATIONS HAVE ADDRESSED. THERE'S THE CAPABILITIES OF THAT UNIVERSITY'S INSTITUTIONAL RESEARCH MANAGEMENT PROGRAM. THESE ARE COMPLICATED GRANTS FROM CIRM OR ANOTHER INSTITUTION OR ANOTHER FUNDING AGENCY, AND YOU WANT TO MAKE SURE THERE'S THE INFRASTRUCTURE OF SUPPORT HOW THESE GRANTS ARE MANAGED.

INSTITUTIONAL REVIEW BOARDS. IF YOU HAVE A

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HOSPITAL, HOW DO YOU LOOK AT HOW YOU DESIGN NEW THERAPIES? WHAT IS THE RIGOR? AND ARE THEY IN PLACE? OR ARE THEY PARTNERING WITH SOMEONE WHO DOESN'T HAVE THEM?

INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE, WE WANT TO AVOID BEING ON THE FRONT PAGE OF A NEWSPAPER BECAUSE WE'RE MISHANDLING ANIMALS. IT WILL BE IMPORTANT TO KNOW THE TRACK RECORD OF THE INSTITUTION YOU'RE MAKING AN INVESTMENT IN.

STEM CELL RESEARCH OVERSIGHT COMMITTEE, THE SO-CALLED ACRONYM SCRO, IS VITALLY IMPORTANT TO HOW THIS PARTICULARLY SENSITIVE ISSUE OF STEM CELL RESEARCH IS HANDLED. DO THEY HAVE A SCRO COMMITTEE? DO THEY PARTNER IN WITH ANOTHER ONE?

THE OFFICE OF TECHNOLOGY LICENSING, AS I MENTIONED EARLIER, IS A SIGNIFICANT PART OF THIS. DO THEY HAVE AN OFFICE OF GENERAL COUNSEL THAT CAN HELP MITIGATE ANY PROBLEMS THAT DEVELOP? IS THERE AN EXPERTISE IN BIOETHICS, PARTICULARLY AS IT RELATES TO STEM CELLS? THESE ARE ALL EXTERNALITIES THAT ADD VALUE TO A DOLLAR OF INVESTMENT IN A UNIVERSITY WHEN YOU ARE MAKING A CAPITAL INVESTMENT. DO THEY HAVE A CLINICAL TRIALS OFFICE? DO THEY HAVE THE CAPABILITY OF GOING FROM THE FUNDAMENTAL DISCOVERY AND THEN DOING A CLINICAL TRIAL THAT BRINGS -- THAT TAKES THE FIRST STEP

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TO BRINGING A PRODUCT TO MARKET? AND DO THEY HAVE A HISTORY OF INTERACTIONS WITH THE MECHANISMS BY WHICH THINGS ARE COMMERCIALIZED, VENTURE CAPITAL AND BIOTECHNOLOGY FIRMS?

I THINK YOU CAN LIST THINGS IN THE RFA OR RFP THAT WOULD GIVE YOU AN IDEA OF HOW ACTIVE AND PRODUCTIVE THE UNIVERSITY IS BOTH ON THE SCIENCE SIDE AND ON THE TRANSLATIONAL SIDE. SO WITH THAT, I'LL JUST CONCLUDE MY REMARKS, THAT THESE ARE ADDITIONAL THOUGHTS I THINK SHOULD COME TO BEAR AS YOU BEGIN TO THINK ABOUT HOW THIS RFP IS CONSTRUCTED.

CHAIRMAN LICHTENGER: THANK YOU FOR YOUR COMMENTS. ED, STUART, ANY QUESTIONS?

MR. LAFF: ACTUALLY, DO YOU HAVE A WRITE-UP?

MR. LONGAKER: IT IS. IT'S OUTSIDE. WE CAN GIVE IT TO YOU. THIS IS THE ADDITIONAL THOUGHTS. I THINK IT'S CRITICALLY IMPORTANT THE STATE OF CALIFORNIA HAS RUN SIGNIFICANT DEFICITS IN ITS ANNUAL BUDGET. LEVERAGE IS GREAT IN GOOD TIMES, BUT IN BAD TIMES IS NOT SO GOOD. YOU NEED TO EXPECT A SIGNIFICANT RETURN ON THIS INVESTMENT, AND I THINK THERE ARE LOTS OF THINGS THAT COULD BE IN THE RFA THAT WOULD GIVE YOU AN IDEA OF THE METRICS FOR THAT.

MR. KASHIAN: DR. LONGAKER, I READ SOME OF THE ADVENTURES OF STANFORD UNIVERSITY IN THE NEWSPAPER

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IN RECENT TIMES. IS THE IDEA OF HAVING THIS KIND OF FACILITY, IS IT INCORPORATED IN YOUR GENERAL PLAN? HAVE YOU GOT THE SUPPORT OF THE LOCAL COMMUNITY? IS THE INFRASTRUCTURE IN PLACE? DOES IT REQUIRE AN EIR? WHERE ARE YOU IN TERMS OF THESE?

DR. LONGAKER: I THINK THOSE ARE IMPORTANT QUESTIONS. STANFORD INTERFACES WITH ITS -- WE'RE A SEED IN THE SOIL. AROUND US IS PALO ALTO AND THE COUNTY THAT WE WORK IN. SO WE HAVE A TEN-YEAR PLAN, WHICH IS GOVERNANCE USE PERMIT, SO-CALLED. AND THE BUILDING I'M TALKING ABOUT, WHICH IS STANFORD INSTITUTE OF MEDICINE, IN THEORY, IS IN THAT. SO WE HAVE THIS IN PLACE AND HAVE NEGOTIATED, SO THOSE THINGS WON'T BE BARRIERS THAT POP UP THEY WOULD HAVE TO DEAL WITH. IT'S PART OF THE, I THINK THE NUMBER IS, 2 MILLION SQUARE FEET IN A DECADE STANFORD CAN DEVELOP, INCLUDING THE FOOTBALL STADIUM TO A PARKING LOT ESSENTIALLY. AND THIS FACILITY THAT WE HAVE PLANNED IS PART OF THAT, WHICH IS A CRITICAL PART OF OUR CULTURE AND HOW WE BUILD RELATIVE TO OUR SURROUNDING COMMUNITY.

MR. KASHIAN: AND HAS AN EIR BEEN ADOPTED AND CERTIFIED?

DR. LONGAKER: LET ME JUST ASK.

DR. FOX: IT DOESN'T APPLY BECAUSE THE PROJECT IS APPROVED AS PART OF THE GENERAL USE PERMIT.

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SO AN EIR IS NOT NECESSARY.

DR. LONGAKER: IT WOULD BE COVERED BY THE ABILITY TO DO THOSE TWO MILLION SQUARE FEET.

CHAIRMAN LICHTENGER: WELL, THANK YOU VERY MUCH FOR COMING TODAY AND GIVING YOUR PRESENTATION. WE APPRECIATE IT. AND THANK YOU VERY MUCH. HAVE A GOOD DAY. RICK, IF YOU COULD INTRODUCE THE NEXT SPEAKER.

MR. KELLER: NEXT IS DR. RICHARD LUBEN FROM THE -- FORMER VICE CHANCELLOR FOR RESEARCH FOR UNIVERSITY OF CALIFORNIA RIVERSIDE.

DR. LUBEN: GOOD AFTERNOON, GENTLEMEN. RATHER THAN SHOWING THE POWERPOINT, I'LL SAVE TIME HOOKING UP THE COMPUTER. YOU ALREADY HAVE THE SLIDES IN FRONT OF YOU.

CHAIRMAN LICHTENGER: THANK YOU FOR HAVING THIS. THIS IS VERY HELPFUL.

DR. LUBEN: I'D LIKE TO ADDRESS THE ISSUE HOW CIRM CAN BEST DISTRIBUTE ITS FACILITIES DEVELOPMENT FUNDS IN ORDER TO MEET ITS ULTIMATE OBJECTIVES, SCIENTIFIC RESEARCH LEADING TO CURES.

ONE VERY IMPORTANT FACT IS THAT THE SPACE AVAILABLE TO DO HUMAN EMBRYONIC STEM CELL RESEARCH IN CALIFORNIA IS EXTREMELY LIMITED. AND THIS HAS TO BE AN IMMEDIATE OBJECTIVE OF THE CIRM DISTRIBUTION RFA.

WE THINK THAT SPACE HAS TO BE LOCATED WHERE

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THE STEM CELL RESEARCHERS ARE. THERE ARE MANY STEM CELL RESEARCH CENTERS OF EXCELLENCE IN CALIFORNIA, AND THAT'S WHERE THESE FUNDS SHOULD BE FOCUSED.

WE ALSO THINK, HOWEVER, THAT IF ALL FUNDING GOES TO A SMALL NUMBER OF INSTITUTIONS, THE FUNDS WILL NOT NECESSARILY BE MAXIMALLY UTILIZED AND THAT EFFECTIVE COLLABORATIONS BETWEEN COMPREHENSIVE CENTERS AND SMALLER NICHE TYPES OF INSTITUTIONS WOULD BE EXTREMELY VALUABLE AND WOULD, IN FACT, MAXIMIZE THE USEFULNESS OF THE FUNDS.

JUST LOOKING AT THE KINDS OF FUNDING THAT IS AVAILABLE AND THE KIND OF PROJECTS THAT HAVE BEEN ENVISIONED IN THESE KINDS OF MEETINGS, WE THINK THAT FOUR OR FIVE COMPREHENSIVE CENTERS OF EXCELLENCE SHOULD BE FUNDED WITH LARGE GRANTS, AND THAT ROUGHLY FOUR OR FIVE SMALLER CENTERS THAT HAVE SPECIFIC EXPERTISE THAT CAN COMPLEMENT THE EXPERTISE AND ACCOMPLISHMENTS OF THE MAJOR COMPREHENSIVE CENTERS WOULD BE A VERY VIABLE MODEL, PARTICULARLY IF THERE ARE FORMAL, SYNERGISTIC COLLABORATIONS BETWEEN THE COMPREHENSIVE CENTERS THAT ARE FUNDED AND THE SMALL NICHE CENTERS.

WE THINK THAT THE TWO-TIER FUNDING STRUCTURE THAT WE'RE DESCRIBING HERE DISTRIBUTES THE AVAILABLE FUNDING MOST EFFECTIVELY WITHOUT DILUTING THE FUNDS TO THE POINT WHERE THEY LOSE THE DOLLAR PER RESULTS

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EFFECTIVENESS. AND WE THINK THAT THIS PRODUCES MAXIMAL UTILIZATION OF THE EXISTING RESOURCES AND TALENT.

EXAMPLES OF THESE KINDS OF COLLABORATIONS ARE REGIONAL IN UNIVERSITIES SUCH AS UC IRVINE AND UC RIVERSIDE, WHICH ALREADY HAVE A LONG-STANDING COLLABORATION AT SEVERAL LEVELS IN HUMAN EMBRYONIC STEM CELL RESEARCH AND OTHER KINDS OF STEM CELL RESEARCH.

HOW DOES ONE GO ABOUT DESCRIBING THE CENTERS? I'D LIKE TO STAY WITH THE SCIENTIFIC GOALS AND THE OBJECTIVES OF THE PROGRAM AS A WHOLE RATHER THAN THE DETAILS. I CERTAINLY AGREE THAT THE FACTS OF THE DATA, WHO CAN ACCOMPLISH THINGS EFFECTIVELY, IS VERY IMPORTANT.

WE THINK THAT ONE WAY TO DETERMINE WHERE FUNDING FOR FACILITIES SHOULD BE DIRECTED IS BY LOOKING AT THE CENTERS THAT HAVE ALREADY BEEN EFFECTIVE IN ATTRACTING STEM CELL FUNDING FROM CIRM AND FROM OTHER SOURCES. WE THINK THAT CIRM FUNDING IS PERHAPS ONE OF THE BEST WAYS OF LOCATING THE CENTERS OF EFFECTIVE STEM CELL RESEARCH, BOTH COMPREHENSIVE CENTERS OF EXCELLENCE AND SMALL NICHE CENTERS IN THE STATE OF CALIFORNIA.

A SCENARIO FOR FUTURE SUCCESS IN MEETING THE OBJECTIVES OF SCIENTIFIC RESEARCH AND CURES IS THAT THERE MAY BE OTHER FUNDING FROM THE FEDERAL GOVERNMENT IN THE FUTURE, BUT WE CAN'T LOOK TO THAT FOR AT LEAST

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THE NEXT FEW YEARS. THERE WILL BE PROBABLY, EVEN IF THERE'S A COMPLETE CHANGE IN THE FEDERAL GOVERNMENT POSITION ON STEM CELL RESEARCH, IT WILL TAKE AT LEAST THREE YEARS TO GET FUNDING TO THE INSTITUTIONS IN CALIFORNIA. AND IN ADDITION TO THAT, EVEN AFTER THAT OCCURS, CIRM WILL BE FUNDING MOST OF THE STEM CELL RESEARCH IN CALIFORNIA BY FAR.

SO HOW CAN WE LOOK AT THE SCIENTIFIC CRITERIA BY WHICH A STEM CELL RESEARCH PROGRAM, PARTICULARLY A COLLABORATIVE STEM CELL PROGRAM BETWEEN COMPREHENSIVE CENTERS, SUCH AS UCI AND SMALLER NICHE CENTERS SUCH AS UC RIVERSIDE, COULD HAVE FAVORABLE CHARACTERISTICS. THE NICHE CENTERS, FIRST OF ALL, SHOULD HAVE PROGRAMS THAT FIT INTO THE COMPREHENSIVE CENTERS PROGRAMS WITHOUT NECESSARILY HAVING TO REPLICATE THESE THINGS AT THE COMPREHENSIVE CENTER. FOR EXAMPLE, HIGH THROUGHPUT MOLECULAR SCREENING PROCESSES THAT MAY OR MAY NOT BE AVAILABLE AT THE COMPREHENSIVE CENTER CAN BE ADDED AT A NICHE CENTER. STUDIES ON THINGS LIKE THE ENVIRONMENT OF THE STEM CELLS RATHER THAN THE STEM CELLS THEMSELVES.

ANOTHER VERY IMPORTANT FACTOR IS THE POTENTIAL FOR TRAINING OF NEW STEM CELL SCIENTISTS AND PEOPLE WHO CAN BOTH USE AND APPLY STEM CELL CULTURE -- STEM CELL THERAPIES IN THE FUTURE. SO HAVING A MODEL

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IN WHICH REGIONAL AND DIVERSE TRAINING IS PART OF THE PROCESS IS ALSO SOMETHING THAT NEEDS TO BE LOOKED AT.

THE ESTABLISHMENT OF FORMAL COLLABORATIONS AND PREFERABLY PREEXISTING FORMAL COLLABORATIONS BETWEEN COMPREHENSIVE CENTERS AND SMALLER CENTERS IS ABSOLUTELY CRITICAL. THERE NEEDS TO BE LETTERS OF AGREEMENT THAT HAVE BEEN SIGNED BY TOP LEVEL ADMINISTRATORS. THERE NEED TO BE COMMITMENTS TO SHARE SPACE AND TRAINING AND FACILITIES BETWEEN THE INSTITUTIONS THAT ARE INVOLVED. THERE NEED TO BE EFFECTIVE INTELLECTUAL PROPERTY AND TECHNOLOGY COMMERCIALIZATION ACTIVITIES, AGAIN SUPPORTED WITH DATA. THERE NEEDS TO BE SEAMLESS INTEGRATION OF THE OVERSIGHT AND REGULATORY ACTIVITIES, SUCH AS THE SCRO COMMITTEE, THE IACUC, THE IRB, BETWEEN THE CENTERS, AND PREFERABLY THIS SHOULD BE PREEXISTING.

THERE'S ALSO AN ABSOLUTE NECESSITY FOR COMPREHENSIVE LONG-TERM PLANNING. WHAT HAPPENS FOR NOT THE NEXT THREE YEARS OR THE NEXT TEN YEARS, BUT FOR THE LONG-TERM FUTURE OF STEM CELL RESEARCH AND REGENERATIVE MEDICINE. AND THIS INVOLVES, AGAIN, COMMITMENTS BY THE ADMINISTRATIONS, COMMITMENTS IN THE FORM OF SPACE THAT'S ALREADY BEEN PROVIDED OR THAT WILL BE PROVIDED AS MATCHING SPACE, COMMITMENTS IN TERMS OF FACULTY POSITIONS AND STAFF POSITIONS, AND IN TERMS OF STUDENT

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TRAINING PROGRAMS. THESE ARE ALL CRITICAL TO DETERMINING WHICH OF THE NICHE CENTERS AND WHICH OF THE COMPREHENSIVE CENTERS SHOULD BE AVAILABLE FOR FUNDING.

SO WE REALLY THINK THERE ARE SEVERAL ISSUES THAT NEED TO BE LOOKED AT. THE URGENCY OF THE NEED FOR STEM CELL RESEARCH. THERE NEEDS TO BE SOMETHING DONE AT CAMPUSES, AND INSTITUTIONS NEED TO BE ABLE TO DEMONSTRATE THEY CAN WORK EFFECTIVELY WITHIN THE KINDS OF TIMEFRAMES THAT ARE NECESSARY.

WE BELIEVE THAT THE TWO-TIERED SYSTEM IS ONE OF THE BETTER WAYS OF ENSURING THAT THERE WILL BE COMPREHENSIVE INNOVATION. BRINGING SMALL CENTERS INTO THE COLLABORATION WITH LARGE COMPREHENSIVE CENTERS IS A SYNERGISTIC WAY OF DEVELOPING INNOVATION.

WE THINK THAT THE VALUE ADDED BY THESE PARTNERSHIPS LEADS TO A SYNERGISM IN THE EXCELLENCE OF THE SCIENTIFIC AND MEDICAL RESULTS. AND WE BELIEVE THAT, IN SUMMARY, THAT THE TWO-TIERED FUNDING SYSTEM WILL LEVERAGE FUNDING FROM THE STATE AND OTHER SOURCES, WILL PROMOTE COLLABORATIONS THAT ARE SYNERGISTIC, AND ULTIMATELY WILL MAXIMIZE THE IMPACT OF THE FUNDS.

AND I HAVE A COUPLE OF SLIDES THAT JUST SHOW YOU SOME OF THE POSITIVE CHARACTERISTICS OF UC RIVERSIDE THAT I WILL NOT PUT IN MY ORAL PRESENTATION.

CHAIRMAN LICHTENGER: THANK YOU VERY MUCH FOR

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YOUR PRESENTATION. ED, STUART, ANY QUESTIONS?

EXCELLENT PRESENTATION. I DON'T HAVE ANY QUESTIONS RIGHT NOW, BUT I ASSUME IF I IN THE FUTURE HAVE QUESTIONS, I'LL HAVE RICK REACH OUT TO YOU.

DR. LUBEN: THANK YOU VERY MUCH. I'LL ALWAYS BE AVAILABLE.

CHAIRMAN LICHTENGER: THANK YOU. RICK, THE NEXT SPEAKER.

MR. KELLER: THE NEXT PRESENTATION IS THE SAN DIEGO CONSORTIUM FOR REGENERATIVE MEDICINE, AND IT WILL BEGIN WITH SOME REMARKS BY VICE CHANCELLOR FOR RESEARCH AFFAIRS, ART ELLIS OF UNIVERSITY OF CALIFORNIA SAN DIEGO.

DR. ELLIS: GOOD AFTERNOON. WELCOME TO SAN DIEGO, AND THANK YOU FOR THE OPPORTUNITY TO SPEAK TODAY. MY NAME IS ART ELLIS. I'M VICE CHANCELLOR FOR RESEARCH AT UC SAN DIEGO, AND I'M SPEAKING TODAY ON BEHALF OF THE SAN DIEGO CONSORTIUM FOR REGENERATIVE MEDICINE. THERE ARE A NUMBER OF MY COLLEAGUES FROM OUR PARTICIPATING INSTITUTIONS WHO ARE HERE WITH ME TODAY. I'D LIKE TO ACKNOWLEDGE A FEW OF THEM: MARY ANNE FOX, CHANCELLOR AT UCSD, A MEMBER OF THE CONSORTIUM'S BOARD OF DIRECTORS; RUSTY GAGE FROM SALK INSTITUTE FOR BIOLOGICAL STUDIES -- I'LL SAY MORE ABOUT RUSTY IN A MOMENT -- AND LOUIS KOFFMAN, THE CONSORTIUM'S EXECUTIVE

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DIRECTOR. EACH OF US WOULD BE PLEASED TO ANSWER ANY QUESTIONS YOU MAY HAVE.

LOCATED WITHIN A FEW SQUARE MILES OF ONE ANOTHER, FOUR PARTNER INSTITUTIONS OF THE CONSORTIUM, EACH OF UNQUESTIONED RENOWN IN THE RESEARCH COMMUNITY IN ITS OWN RIGHT ARE EXCITED BY THE OPPORTUNITY CIRM HAS CREATED FOR US TO COME TOGETHER TO LEVERAGE OUR HUMAN EMBRYONIC STEM CELL RESEARCH ACTIVITIES IN THE QUEST TO IMPROVE HUMAN HEALTH.

THE FOUR INSTITUTIONS ARE THE BURNHAM INSTITUTE FOR MEDICAL RESEARCH, THE SALK INSTITUTE FOR BIOLOGICAL STUDIES, THE SCRIPPS RESEARCH INSTITUTE, AND UC SAN DIEGO. THESE FOUR INSTITUTIONS HAVE A HISTORY OF COLLABORATION, BUT THE CREATION OF THE CONSORTIUM HAS STRENGTHENED AND FORMALIZED THOSE RELATIONSHIPS. WE BELIEVE STRONGLY THAT MULTIDISCIPLINARY RESEARCH AND EDUCATION ARE VITAL TO BIOMEDICAL INNOVATION IN THE 21ST CENTURY. AND THE SCIENTIFIC STRENGTHS, REPUTATION, AND PHILOSOPHY THESE INSTITUTIONS BRING TO THE TABLE ARE IDEAL COMPLEMENTS.

I'D LIKE TO INTRODUCE YOU NOW TO DR. FRED "RUSTY" GAGE. RUSTY IS A MEMBER OF THE NATIONAL ACADEMY OF SCIENCES AND INSTITUTE OF MEDICINE AND A PROFESSOR OF GENETICS AT THE SALK INSTITUTE. HIS WORK CONCENTRATES ON BOTH HUMAN EMBRYONIC STEM CELLS AND

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SOMATIC STEMS FROM THE ADULT CENTRAL NERVOUS SYSTEM. HIS WORK MAY LEAD TO METHODS OF REPLACING OR ENHANCING BRAIN AND SPINAL CORD TISSUES LOST OR DAMAGED DUE TO NEURODEGENERATIVE DISEASES OR TRAUMA.

RUSTY IS ALSO PART OF THE SCIENTIFIC TEAM THAT HAS BEEN WORKING TO ENSURE THAT EVEN NOW HUMAN EMBRYONIC STEM CELL TRAINING AND RESEARCH PROGRAMS ACROSS THE FOUR PARTNER INSTITUTIONS ARE COMPLEMENTARY AND LEVERAGE THE STRENGTH OF EACH PARTNER. RUSTY WILL DISCUSS THE CONSORTIUM'S SCIENTIFIC VISION AND DESCRIBE WHY NEW FACILITIES ARE NEEDED TO BRING THAT VISION TO FRUITION. THANK YOU.

DR. GAGE: THANKS, ART. WELCOME TO SAN DIEGO, COMMITTEE MEMBERS. I'M GOING TO --

MR. KASHIAN: IT'S A WONDERFUL DAY.

DR. GAGE: YOU CAN ENVISION IT. I'M GOING TO TELL YOU A LITTLE BIT ABOUT WHAT OUR PLANS ARE WITH HOPES THAT THAT WILL GIVE YOU AN IDEA OF WHAT WE THINK IS THE RIGHT THING TO DO.

WE HAVE A UNIQUE SITUATION HERE IN SAN DIEGO, AND THAT IS THAT THE FOUR MAJOR RESEARCH INSTITUTES ON THE MESA CONCLUDED THAT BY SHARING AND COOPERATING WITH EACH OTHER AS A CONSORTIUM, WE CAN QUICKLY AND EFFECTIVELY, MORE QUICKLY AND EFFECTIVELY ACHIEVE OUR AIMS IN STEM CELL RESEARCH AND REGENERATIVE MEDICINE.

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EACH OF THE SEPARATE INSTITUTES, WE'VE DECIDED, BRING SOMETHING UNIQUE, AND BY WORKING TOGETHER, WE CAN GET THERE FASTER.

FOR EXAMPLE, SCRIPPS INSTITUTE HAS CHEMISTRY AND HIGH THROUGHPUT SCREENING METHODS THAT ARE COMPLEMENTARY TO MANY OTHER PEOPLE, AND WE CAN LEARN FROM THEM ALREADY. THE BURNHAM HAS BEEN PREMIERE IN DEVELOPING NEW STEM CELLS THEMSELVES AND METHODS FOR GENERATING NEW STEM CELLS, WHICH IS IMPORTANT FOR ALL OF US. AT THE SALK WE'RE BASIC BIOLOGISTS, BASIC TECHNOLOGY DRIVERS, AND DEVELOP METHODS TO INSERT GENES VERY SPECIFICALLY INTO HUMAN EMBRYONIC STEM CELLS, WHICH IS NOW SORT OF THE LANDMARK AND HALLMARK OF ACHIEVING THAT IN AN EFFECTIVE WAY. AND FINALLY, USCD IS NOT ONLY A MEDICAL SCHOOL WHICH SUPPLIES THAT MEDICAL INFRASTRUCTURE, BUT ALSO THEY HAVE A FANTASTIC ENGINEERING DEPARTMENT, COMPUTER SCIENCE DEPARTMENT, PHYSICS DEPARTMENT, AND EVEN PHILOSOPHY, WHICH IS THE CORE OF SOME OF OUR ISSUES SURROUNDING THE ETHICS.

SO WE FEEL LIKE PUTTING ALL OF THESE GROUPS TOGETHER, WE CAME TO THIS CONCLUSION AS THE WAY TO GO. WE CALL THIS THE SAN DIEGO CONSORTIUM FOR RESEARCH IN REGENERATIVE MEDICINE, AND I'M REPRESENTING THEM, ALL FOUR OF THEM TODAY.

SO STEM CELL RESEARCH HAS THE POTENTIAL TO

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REVOLUTIONIZE THE TREATMENT OF MANY HUMAN DISEASES, AND THIS IS GOING TO BE MANIFEST IN DIAGNOSTICS AND CELL REPLACEMENT IN DRUG DISCOVERY, TISSUE ENGINEERING, NONINVASIVE IMAGING, AND MANY OTHER APPROACHES TO DISEASE DIAGNOSTIC AND CLINICAL MANAGEMENT.

THE LEADERSHIP GROUP, TOGETHER WITH OUR COMMUNITY LEADERS AND OUR FIVE TECHNOLOGY COLLABORATORS, WE'VE COME UP WITH WHAT WE BELIEVE TO BE THE FOUR CRITICAL ELEMENTS OF OUR VISION. THE FIRST IS TO STIMULATE CREATIVE APPROACHES. IF WE'RE GOING TO STIMULATE CREATIVE APPROACHES TO COMPLEX MEDICAL PROBLEMS, WE NEED TO PROMOTE CLOSE COLLABORATIONS BETWEEN BIOLOGISTS, PHYSICIANS, ENGINEERS, PHYSICISTS, CHEMISTS, COMPUTER SCIENTISTS, AND ETHICISTS. WE NEED AN ANCILLARY MIX OF THESE PEOPLE RUBBING ELBOWS TOGETHER EVERY DAY IN THE SAME LOCATION. IT'S BY HAVING THIS MIX TOGETHER THAT WILL REALLY MAKE THE DIFFERENCE.

TO SUPPORT RESEARCH AND DEVELOPMENT GOALS, WE MUST INVENT THE NEXT GENERATION OF TOOLS AND INSTRUMENTATION. AGAIN, THIS BRINGS US TO THE INTERDISCIPLINARY APPROACH. WE NEED TO BE IN CLOSE CONTACT FOR ALL TO UNDERSTAND THE DAILY NEEDS. FOR US TO DEVELOP THE NEW TECHNIQUES, THE NOVEL STRATEGIES THAT WILL HELP US SOLVE THE PROBLEMS THAT WE'RE FACING,

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WE NEED TO HAVE PEOPLE WORKING TOGETHER IN THE SAME FACILITY.

TO ENSURE THAT WE SUSTAIN LEADERSHIP AND CREATIVITY, WE HAVE TO TRAIN. WE HAVE TO TRAIN THE NEXT GENERATION OF SCIENTISTS WHO CAN SOLVE THE PROBLEMS FROM AN INTERDISCIPLINARY PERSPECTIVE. THE NEXT PEOPLE THAT COME ALONG THAT WE CAN TRAIN IN THIS FACILITY WILL BE HYBRIDS BY VIRTUE OF THEIR TRAINING. AND THEY WILL NOT ONLY BE ABLE TO DO EXPERIMENTS IN WAYS THAT WE AS INDIVIDUAL EXPERIMENTERS CAN'T DO FROM OUR INDIVIDUAL STRENGTHS, BUT THESE NEWLY TRAINED SCIENTISTS WILL THINK OF PROBLEMS IN NEW WAYS, AND THIS, WE BELIEVE, IS CRUCIAL. SO THE TRAINING ELEMENT IS CRITICAL.

IN ADDITION, WE FEEL STRONGLY, AND THIS IS IN PART BECAUSE THIS HAS BEEN A COMMUNITY EFFORT HERE IN SAN DIEGO, TO MAXIMIZE COMMUNITY SUPPORT ENGAGEMENT, WE MUST DEVELOP A COMMUNICATIONS AND OUTREACH EFFORT THAT INFORMS AND EDUCATES THE PUBLIC ABOUT OUR SCIENTIFIC MEDICAL PROGRESS AND ASPIRATIONS.

THE FACILITIES FUNDS THAT ARE BEING SUPPLIED BY CIRM SHOULD PROVIDE A VENUE FOR CITIZENS OF CALIFORNIA TO LEARN AND UNDERSTAND THE VALUE AND COMMITMENT THEY'VE MADE THROUGH PASSING PROPOSITION 71. THIS WILL BE PART OF THE LEGACY OF THIS PROPOSITION,

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AND WE PLAN TO HAVE OPEN LECTURES IN AN EDUCATIONAL VENUE, AND THIS BUILDING WILL BE THE CENTERPIECE OF THAT.

BRINGING TOGETHER THESE UNIQUE PHYSICAL AND HUMAN RESOURCES WILL ENHANCE OUR ABILITY TO TACKLE THESE KEY PROBLEMS. AND, AGAIN, I'M EMPHASIZING THE CRITICAL IMPORTANCE OF HAVING A FACILITY THAT BRINGS THESE TOGETHER. AS A COMBINED GROUP, THERE ARE SOME UNIQUE CORE COMPETENCIES, AND I REALIZE THIS IS NOT NECESSARILY WITHIN YOUR SWEET SPOT OF INTEREST, BUT I SHOULD SAY THAT WE BELIEVE THAT THERE ARE CERTAIN SCIENTIFIC AREAS OF CRITICAL IMPORTANCE THAT WE CAN TACKLE. AND THESE INVOLVE IN PARTICULAR DEVELOPING NEW CELL TYPES AND TISSUE TYPES WHICH WILL BE ABLE TO UNDERSTAND HOW THESE CELLS AND TISSUES DIFFERENTIATE AUTHENTICALLY INTO THE MOST APPROPRIATE THERAPEUTIC CELL TYPES.

WE ALSO FEEL THAT BY DISCOVERING NEW TYPES OF DRUGS, BY BUILDING AND STUDYING TRUE HUMAN CELLULAR MODELS OF HUMAN DISEASE, HUMAN STEM CELL RESEARCH PROVIDES THE OPPORTUNITY TO LOOK AT HUMANS AS A MODEL OF REAL DISEASE. IN THE PAST THIS HAS NOT BEEN POSSIBLE. THESE CELLS CERTAINLY PROVIDE THAT OPPORTUNITY.

BY USING THE TECHNOLOGY THAT'S NOW

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DEVELOPING, BUT WILL BE DEVELOPED FURTHER, THERE WILL BE HUMAN MODELS OF EVERY SINGLE HUMAN DISEASE. SO THE LIMITS OF INVESTIGATION WILL BE BROKEN DOWN, AND WE WILL BE ABLE TO DEVELOP PHARMOCOGENETIC AND PHARMACOGENOMIC METHODS FOR EVALUATING THESE DEVELOPING METHODS FOR GENE TRANSFER INTO THESE CELLS.

FINALLY, STIMULATING CLINICAL TRANSLATION AND SURGICAL METHOD TO DEVELOP NEW RADIOLOGICAL AND IMAGING METHODS TO TRACK GENETICALLY MODIFIED CELLS IN VIVO. ALL OF THIS IS, WE BELIEVE, CRUCIALLY SUPPORTED BY A COMPUTATIONAL AND ANALYTICAL METHOD FOR UNDERSTANDING AND PREDICTING THE FUTURE. AND ALL OF THESE, AS YOU CAN SEE, REALLY REQUIRE THAT THERE IS A COOPERATION ACROSS A LARGE INTERDISCIPLINARY GROUP.

A FEW FEATURES THAT WE THINK ARE CRUCIAL TO THE INSIDE WORKING OF THIS, WE HAVE WHAT WE CALL A JUNIOR RESEARCH FELLOWS PROGRAM, WHICH WE'RE GOING TO BRING IN TEN TO 15 YOUNG PEOPLE RIGHT OUT OF THE M.D. AND PH.D. PROGRAMS THAT HAVE MADE A COMMITMENT TO COMMIT THEMSELVES TO STUDYING HUMAN STEM CELL RESEARCH AND ITS APPLICATION IN DISEASE.

WE'RE GOING TO HAVE A SENIOR SCHOLARS PROGRAM TOO WHERE SENIOR INVESTIGATORS FROM BASIC, CLINICAL, AND INDUSTRIAL SCIENTISTS AND EXPERTS IN GOVERNMENT POLICY WILL SPEND THREE MONTHS IN RESIDENCE WHERE THEY

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CAN INTERACT ON ISSUES IMPORTANT TO THEM, TRAIN THEMSELVES, AND TAKE THAT INFORMATION BACK OUT INTO THE COMMUNITY, BACK OUT INTO THESE AREAS. LISTENING TO SOME OF THE OTHER SPEAKERS, I THINK IT WOULD BE A VENUE FOR PEOPLE EVEN DISTANT FROM SAN DIEGO TO COME IN AND SPEND A THREE-MONTH PERIOD OF TIME. THESE SCHOLARS WILL PARTICIPATE IN A SHARED CITYWIDE TRAINING ACTIVITY.

WE'LL HAVE, LIKE EVERYONE ELSE, CORE FACILITIES, AND UNIQUELY WE'LL HAVE A PATIENT CELL BANK WHICH WE WILL DEVELOP, NOT JUST FOR OUR OWN COMMUNITY, BUT GLOBALLY FOR THE COMMUNITY AT LARGE IN CALIFORNIA.

FINALLY, WE'RE GOING TO HAVE SENIOR RESIDENT SCIENTISTS, SOME OF THOSE THAT ARE ALREADY EXISTING IN OUR COMMUNITIES THAT ARE GOING TO JOIN IN THIS BUILDING AND MOVE TO THE BUILDING, BUT ALSO USE THIS TO RECRUIT NEW SCIENTISTS. AND WE ALREADY HAVE MANY SCIENTISTS, KEY SCIENTISTS AROUND THE WORLD THAT HAVE EXPRESSED INTEREST IN COMING TO SAN DIEGO TO BE A PART OF THIS COMBINED EFFORT BETWEEN FOUR INSTITUTIONS.

THE RECENT CONVERGENCE OF SCIENTIFIC, POLITICAL, AND SOCIAL EVENTS IN THE FIELD OF STEM CELL RESEARCH HAS PROVIDED A UNIQUE OPPORTUNITY FOR NOVEL MULTIDISCIPLINARY PROGRAMS SUCH AS WHAT YOU ALL ARE HEARING TODAY. HAVING SCIENTISTS WITH DIFFERENT

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SKILLS, BUT WITH COMMON PURPOSE AND DEDICATION IN THE SAME LOCATION WILL MAKE THE DIFFERENCE. ACHIEVING THESE GOALS WILL REQUIRE AN UNPRECEDENTED LEVEL OF COOPERATION, WE BELIEVE, BETWEEN NOT JUST ACADEMIC INSTITUTIONS, BUT WITH OUR COMMUNITY AND WITH THE PRIVATE SECTOR. AND THAT'S ONE, I THINK, CRUCIAL ELEMENT FOR YOU ALL TO CONSIDER IS HOW MUCH THE COMMUNITY AND THE PRIVATE SECTOR HAVE JOINED TOGETHER WITH THESE ACADEMIC INSTITUTES TO SUPPORT THEIR EFFORTS AS A GROUP.

IN ADDITION, CONSTRUCTION OF A NEW SHARED PHYSICAL PLANT WOULD GALVANIZE, WHICH IS REALLY THE GOAL, WHICH IS OUR CLINICAL SUCCESS. AND THERE'S REALLY TWO ISSUES, I THINK, TWO ADDITIONAL ISSUES THAT ONE SHOULD CONSIDER WHEN THINKING ABOUT CLINICAL SUCCESSES. HOW DO YOU FOSTER CLINICAL TRANSLATION? HOW DO YOU GET THE BASIC RESEARCH DISCOVERIES THAT ARE GOING TO BE MADE IN THESE INSTITUTES? HOW CAN THEY BE TRANSLATED INTO A CLINICAL SETTING? HOW WELL LINKED ARE THEY? AS OTHER SPEAKERS HAVE SAID BEFORE, WHAT IS THE TRACK RECORD FOR DOING THAT IN THE PAST?

IN A RELATED WAY, WE FEEL LIKE THE PRIVATE -- YOU NEED TO FOSTER PRIVATE SECTOR TECHNOLOGY TRANSFER. TO THIS END, WE HAVE A STRONG, REALLY STRONG TECHNOLOGY CENTER WITH OVER 500 COMPANIES HERE IN THE SAN DIEGO

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AREA, SOME OF WHICH ARE ALREADY LEADERS IN STEM CELL BIOLOGY. AND MANY OF THESE COMPANIES WERE FOUNDED BY FACULTY MEMBERS AT THESE INSTITUTES. SO THERE'S A HISTORY OF WORKING TOGETHER.

FINALLY, THE KEY INGREDIENTS FOR MAKING THESE A SUCCESS, WE BELIEVE, IS HAVING A CORE OF OUTSTANDING, DEDICATED, INTERDISCIPLINARY INVESTIGATORS WHO HAVE COMMITTED THEIR CAREERS TO MAKING THIS HAPPEN. WE NEED TO HAVE STATE-OF-THE-ART CORE FACILITIES WHICH ARE EVER DEVELOPING AND NOVEL TECHNOLOGY BEING A CENTRAL PORTION OF WHAT'S GOING ON FOR DEVELOPMENT OF NEW TECHNOLOGY ALL THE TIME.

FINALLY, FROM A BUILDING PERSPECTIVE, I THINK FLEXIBILITY OF SPACE AND SPACE THAT CAN BE REPURPOSED FOR NEW IDEAS, NEW EXPERIMENTS, AND NEW INVESTIGATORS IS CRUCIAL TO WHAT'S GOING ON. SO SMART, ACCOMPLISHED PEOPLE WITH AMPLE RESOURCES AND FLEXIBLE WORK SPACE. THANKS FOR YOUR INTEREST.

CHAIRMAN LICHTENGER: THANK YOU FOR YOUR PRESENTATION.

MR. KASHIAN: THANK YOU. I'M A GREAT PROPONENT OF THIS TYPE OF FACILITY. BUT WITH IT, THIS COLLABORATION BRINGS WITH IT SOME CHALLENGES. HAVE YOU GIVEN ANY THOUGHT TO A GOVERNANCE STRUCTURE?

DR. GAGE: THAT WAS ACTUALLY PART OF OUR

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DISCUSSIONS RIGHT FROM THE VERY BEGINNING. AND AS YOU MAY KNOW, WE'VE SIGNED A MEMORANDUM OF UNDERSTANDING BETWEEN THE FOUR INSTITUTES, ALL OF WHICH REQUIRED THE ESTABLISHMENT OF AN EXTERNAL BOARD OF GOVERNANCE THAT INCLUDES LEADERS FROM EACH OF THE FOUR INSTITUTIONS, AS WELL AS A SCIENTIFIC ORGANIZATION. SO THERE WILL BE AN OVERSIGHT BOARD, WHICH IS REPRESENTATIVE OF THE ALL THE -- EACH OF THE REPRESENTATIVES OF EACH OF THE INSTITUTIONS. AND THEN THERE WILL BE A SCIENTIFIC BOARD THAT WILL ALSO BE REPRESENTATIVE, AND WE'VE ESTABLISHED THIS. AND WE'VE STARTED WORKING GROUPS ALREADY, AND THAT HAS PLAYED OUT, IN FACT, IN OUR REGULAR MEETINGS ON THE BUILDING THAT WE'VE BEEN HAVING, WHICH INVOLVE, NOT JUST THE SCIENTISTS, BUT THE SENIOR ADMINISTRATORS OF FOUR INSTITUTES ALL IN THE SAME ROOM SORT OF DISCUSSING WITH EACH OTHER THEIR BEST PRACTICES AND SHARING THOSE IDEAS.

MR. KASHIAN: HAVE YOU DECIDED WHERE THIS FIRST BUILDING IS GOING TO BE LOCATED?

DR. GAGE: WE HAVE. AND IF I COULD SHOW YOU A MAP, I COULD TELL YOU --

MR. KASHIAN: IS IT ON ONE OF THE FOUR INSTITUTIONS?

MS. FOX: THE REGENTS HAVE NOT YET APPROVED IT. WITHOUT THE REGENTS' APPROVAL, WE, OF COURSE,

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DON'T COMMIT ANY LAND, BUT THERE ARE TWO PLACES ADJACENT AND IN VERY CLOSE PROXIMITY OF ALL FOUR INSTITUTIONS WHERE THE SITE COULD BE LOCATED. AND WE HAVE A STRONG PREFERENCE FOR ONE.

CHAIRMAN LICHTENGER: SO --

MR. KASHIAN: SO YOU'RE BRINGING THE SCIENTISTS TO THE BUILDING AND NOT VICE VERSA?

DR. GAGE: THAT'S RIGHT.

MR. KASHIAN: THANK YOU.

CHAIRMAN LICHTENGER: SO HOW LONG WOULD IT TAKE YOU TO BUILD THIS BUILDING?

DR. GAGE: ME PERSONALLY, A LONG TIME.

MR. KOFFMAN: IT'S A CHALLENGING TASK. IT'S A DAUNTING TASK. AND, AGAIN, SPECIFICALLY THERE ARE FOUR INSTITUTES THAT ARE INVOLVED. WE BELIEVE THAT WE CAN MARSHAL THE RESOURCES TO GET IT DONE TIMELY. CERTAINLY THE 24-MONTH PERIOD IS GOING TO BE A CHALLENGE. WE HAVE 31. SO OUR CHARGE IS TO PLAN, DESIGN, FINANCE, PERMIT, AND CONSTRUCT A BIOMEDICAL RESEARCH FACILITY IN SAN DIEGO IN 31 MONTHS.

CHAIRMAN LICHTENGER: SO HAVE YOU STARTED THAT PROCESS YET?

MR. KOFFMAN: PROCESS IS BEING DONE. YES. AS RUSTY ALLUDED TO, THE SCIENTISTS HAVE MET WITH THE LABORATORY PLANNER AND COME UP WITH A CONCEPTUAL DESIGN

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OF WHAT THIS BUILDING WILL LOOK LIKE. THE PROCESS INSOFAR AS CHOOSING THE SITE AND RATING OF THE SITE IS UNDER WAY.

CHAIRMAN LICHTENGER: SO THE CLOCK IS TICKING ON THAT 31 MONTHS?

MR. KOFFMAN: THE CLOCK IS ON THE FIELD, UH-HUH.

MR. LAFF: IT'S A LITTLE OBTUSE, BUT I GUESS I HAVE. THE GREATER FLEXIBILITY, I HAPPEN TO AGREE WITH THE STATEMENT OF FLEXIBILITY, THE GREATER FLEXIBILITY ONE PLANS INTO A PHYSICAL STRUCTURE, THE GREATER THE COST. HOW ARE YOU GOING TO BALANCE BETWEEN THESE FOUR INSTITUTIONS THE FLEXIBILITY AND THE COST OF THIS FACILITY?

DR. GAGE: THE GLIB ANSWER IS WITH GREAT CARE. BUT I'VE BEEN AMAZED AT -- IN FACT, WHEN WE HAVE THESE MEETINGS, AND THE SCIENTISTS TOGETHER WITH THE PLANNERS GET TOGETHER, WE'RE GOING TO DO THIS. WE'RE GOING TO MAKE IT HAPPEN, AND THIS MEANS THAT THERE HAS TO BE COMPROMISES. BUT I THINK THAT FOR THE MOST PART, THIS ISSUE OF FLEXIBILITY HAS BEEN EVIDENCED IN SOME STRUCTURES THAT EXIST IN SAN DIEGO. WE HAVE SOME MODELS OF BUILDING THAT DO HAVE THAT AND COORDINATOR. THE BUILDING PLANNERS HAVE EXPERIENCE WITH INTERACTIONS WITH EACH OTHER IN THIS COMMUNITY.

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SO WE'RE GOING TO TRY TO TAKE THE BEST FROM EACH OF THE DIFFERENT GROUPS AND WORK TOGETHER. IT'S AN OBTUSE ANSWER TO YOUR QUESTION.

MR. LAFF: THAT'S OKAY.

MR. KOFFMAN: IF I CAN SUPPLEMENT. OUR EXPERIENCE AMONG THE FOUR INSTITUTES IS THE FOCUS HAS TO BE ON FUNCTION OVER FORM. AND BASICALLY OUR CHARGE IS TO PROVIDE A FACILITY WHERE THE SCIENTISTS CAN DO THE SCIENCE, AS RUSTY ALLUDED TO, AND THAT ENABLES US TO, ONE, BUILD A BUILDING THAT'S MORE FLEXIBLE THAT IS, INDEED, EXPANSIVE AND, INDEED, STIMULATES THE COLLABORATION THAT RUSTY ALLUDED TO. BUT FUNCTION OVER FORM MORE OFTEN THAN NOT GETS TO THE CORE OF WHAT NEEDS BE TO BE DONE AND CAN ELIMINATE SOME OF THE EXTREMES.

CHAIRMAN LICHTENGER: HOW BIG IS THIS BUILDING TO BE?

MR. KOFFMAN: ESTIMATES RANGE, BUT AROUND A 135,000 SQUARE FEET.

CHAIRMAN LICHTENGER: OKAY. THAT'S NOT AN OBTUSE ANSWER. ANY OTHER QUESTIONS? THANK YOU VERY MUCH FOR MAKING A PRESENTATION TODAY.

MR. KELLER: MR. CHAIRMAN, I RECOMMEND THAT IF WE COULD JUST TAKE A BRIEF THREE-MINUTE BREAK TO ALLOW A BREAK FOR EVERYONE HERE AS WELL AS AN OPPORTUNITY FOR US TO SET UP THE AUDIOVISUAL FOR THE

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NEXT PRESENTATION.

CHAIRMAN LICHTENGER: SO BE IT. WE'LL TAKE A THREE-MINUTE RECESS.

(A RECESS WAS TAKEN.)

CHAIRMAN LICHTENGER: I'D LIKE TO RECONVENE THE MEETING. RICK, IF YOU COULD INTRODUCE THE NEXT SPEAKER, PLEASE. PLEASE TAKE YOUR SEATS. THANK YOU.

MR. KELLER: MR. CHAIRMAN, TODAY WE HAVE WITH US ROBERT MCGHEE, WHO SERVES AS THE INSTITUTE ARCHITECT AND SENIOR FACILITIES OFFICER FOR THE HOWARD HUGHES MEDICAL INSTITUTE. HE HAS DIRECTED THE PROGRAMMING AND PLANNING EFFORT FOR OVER $1 BILLION IN HHMI LABORATORY CONSTRUCTION AND RENOVATION PROJECTS.

MR. MCGHEE WROTE THE FACILITIES PROGRAM FOR THE JANELIA FARM RESEARCH CAMPUS AND IS IN CHARGE OF ITS IMPLEMENTATION. HE HAS SERVED AS CONSULTANT TO MANY INSTITUTIONS IN THE AREA OF RESEARCH FACILITIES PLANNING, PROMOTING THE ADOPTION OF PLANNING MODELS THAT ARE FOCUSED ON THE ECONOMICAL CONSTRUCTION AND LONG-TERM USE OF A FACILITY.

MR. MCGHEE IS ALSO INITIATING A PROGRAM IN RESEARCH BUILDING DESIGN AT THE RICE UNIVERSITY SCHOOL OF ARCHITECTURE. I'D LIKE ALSO TO ACKNOWLEDGE HIS GRACIOUS ACCEPTANCE TO AGREE TO PREPARE THE STAFF ANALYSIS TO THE SHARED RESEARCH LABORATORY PROPOSAL FOR

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WHICH LORI AND I BOTH HAD A CONFLICT OF INTEREST ON, AND HE AGREED TO DO FOR THE CIRM. SO THANK YOU VERY MUCH FOR DOING THAT. BOB, WITH THAT, BOB MCGHEE.

MR. MC GHEE: I'M GOING TO TRY TO TALK ABOUT THE BIG PICTURE OF LABORATORY BUILDINGS, HOW THEY'VE CHANGED, GIVE AN EXAMPLE OF WHAT'S HAPPENED IN THE RECENT BUILDING, AND TALK ABOUT WHY I THINK THAT'S IMPORTANT IN YOUR DELIBERATION.

SO I HAVE TO GO BACK ALWAYS AND TALK ABOUT THE HISTORY OF THESE BUILDINGS SO WE UNDERSTAND WHERE THEY'RE MOVING FROM. AND I'LL COVER ABOUT FIVE BUILDINGS FROM THE '50S THROUGH 2007.

IN THE EARLY BUILDINGS, THEY WERE SMALL LABS, OFFICES IN THE LAB, NOT VERY COMPLEX FACILITIES, BUT THAT INTIMATE INDIVIDUAL RESEARCH UNIT WITH AN INVESTIGATOR AND A STAFF, NOT A PARTICULARLY COLLABORATIVE MODEL. SALK WAS THE FIRST OF OUR GREAT BUILDINGS IN THE 1960S, AND IT WENT FROM A SMALL INDIVIDUAL LAB BUILDING TO A BIG FLOOR PLATE, 16,000 SQUARE FEET PER FLOOR, AND STARTED TO INTRODUCE SOME THINGS THAT MIGHT BE SHARED, COMMON FACILITIES. AND THIS IS JUST ONE OF THE BUILDINGS AT SALK.

AND IT ALSO INTRODUCED THE NOTION THAT THESE BUILDINGS WERE BECOMING MECHANICALLY COMPLEX. THEY HAD A LOT OF SERVICES, SO THEY HAVE INTERSTITIAL FLOOR JUST

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TO DELIVER ALL THOSE SERVICE TO THE FLOOR PLATE.

IN 1960S THE ENGINEERS GOT HOLD OF THAT CONCEPT AND JUST CHASED THE BACK LABS TO OFFICES ON THE OUTSIDE. THERE WAS RARELY A CORRIDOR THROUGH THESE CENTERS, SO THESE WERE REALLY TWO-SIDED BUILDINGS, BUT THEY WERE STILL SIMPLE COMPONENTS OF LABS AND OFFICES.

AND BY THE 1970S, YOU REALLY REALIZED THAT THERE WERE OTHER COMPONENTS DRIVING THESE BUILDINGS. AND SOME OF THOSE WERE COLD ROOMS, DARKROOMS, EQUIPMENT ROOMS, CELL SORTER ROOMS, MICROSCOPE ROOMS, AND SO ON. AND ONE WAY TO THINK ABOUT ORGANIZING THOSE IS TO PUT THEM IN THE CENTER AND HAVE THE LABS AND OFFICES AROUND ON THE OUTSIDE. IN THIS MODEL IT JUST SHOWS SORT OF IDIOSYNCRATIC OFFICE RELATIONSHIP TO LABS.

BUT BY THE MID '80S, THERE'S SOME NOTIONS ABOUT STANDARDIZING THESE BUILDINGS THAT REALLY CAME ABOUT. AND THIS IS THE WHITEHEAD INSTITUTE DESIGNED BY GOODY CLANCY, BUT WITH DAVID BALTIMORE DRIVING IT. AND SO THIS HAD GENERIC LABS LINED UP TO EACH OTHER SO THAT YOU COULD CHANGE THE SIZE OF A LAB GROUP BY JUST MERELY OPENING THE DOOR FROM ONE LAB TO THE NEXT. OFFICES GATHERED OUTSIDE THE LAB UNITS, SO YOU DID NOT HAVE TO WORRY ABOUT THAT OFFICE IN THE LAB AND HAVING TO MOVE IT. AND WHEN BALTIMORE DID THIS, HE THOUGHT YOU NEEDED 55 SQUARE FEET OF SUPPORT FOR EVERY HUNDRED SQUARE FEET

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OF LABS, AND THAT WAS A REALLY NOVEL STANDARD AT THE TIME.

HERE'S A BUILDING, THE CLARK CENTER, AND THE BUILDINGS WE MOVED INTO THE 2000S ARE MUCH MORE -- MUCH DIFFERENT. THIS HAS LABS IN THE SORT OF CENTER OF THE SPACES IN HERE, SUPPORT SPACE IN THE BACK, REALLY A BUILDING THAT HAS VISIBLE LABS. IT'S THE NOTION OF STARTING TO VISUALLY CONNECT SCIENTISTS' ACTIVITIES TO EACH OTHER.

THIS IS REALLY A TERRIFIC BUILDING DONE BY FOSTER. HERE'S THE ICHAN LAB DONE BY VINOLLI (PHONEDTIC). THE LABS IN EACH OF THE GRAY WINGS, THE OFFICES IN PURPLE, THE SOCIAL SPACE, THE GATHERING SPACE, THE COLLABORATION SPACE IN THE YELLOW SPACE IN THE CENTER, AND IT REALLY STARTS TO SHOW HOW FAR THE DESIGNS HAVE COME TO MAKE COLLABORATION HAPPEN, NOT JUST FROM ONE SCIENTIST TO ANOTHER, BUT ACROSS THIS BUILDING, AND IT'S A SPACE THAT WORKS ACROSS THE CAMPUS AS A GATHERING SPACE.

SO IN STARTING WITH THE PLANNING APPROACH, YOU CAN START WITH AN INDIVIDUAL APPROACH AND GIVE THE SCIENTISTS THEIR OWN SPACE AND LET THEM DIVIDE IT UP. BUT I THINK WHAT'S HAPPENED OVER THE YEARS IS WE'VE GONE TO A MORE GENERIC PLANNING NOTION, THAT YOU BUILD A SERIES OF SPACES AND ASSIGN THEM TO PEOPLE, AND

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THEY'LL GIVE A TERRITORY TO THEM.

HERE'S AN EXAMPLE AT UCSF IN THE TOWERS BEFORE WHERE THEY DECIDED LET'S LET EVERYONE DESIGN THEIR OWN LAB. YOU CAN IMAGINE A SCIENTIST GETTING THIS LAB RIGHT HERE AFTER SOMEONE LEFT WOULD INSIST THAT IT BE RENOVATED BECAUSE YOU COULDN'T UNDERSTAND WHY THEY DID THAT IN THE FIRST PLACE. AND SECOND, THE EGO WOULDN'T ALLOW THEM TO OCCUPY IT ANYWAY. SO THAT JUST SAYS THAT THERE'S SOMETHING WRONG WITH THIS, AND USCF WAS SPENDING ENORMOUS AMOUNT OF DOLLARS BUILDING SPECIALTY SPACES AND EQUALLY DOING THAT AGAIN AND AGAIN, RENOVATING THEM FOR THE NEXT OCCUPANTS.

WHAT'S THE PROBLEM WITH IDIOSYNCRATIC APPROACH? ONE, IT'S REAL EXPENSIVE TO BUILD, AND IT'S ALMOST AS EXPENSIVE TO RENOVATE OR MORE EXPENSIVE TO BUILD IT AGAIN. EVERYTHING CHANGES. THE ONLY THING WE KNOW FOR SURE IS WHAT WE'RE DOING TODAY ISN'T GOING TO BE WHAT WE'RE DOING IN FIVE YEARS. WE BETTER HAVE FACILITIES THAT ARE AGILE ENOUGH AND ADAPTABLE ENOUGH TO MEET THOSE REQUIREMENTS.

HERE'S UCSF AFTER. HERE'S A GOOD EXAMPLE OF HOW YOU PUT THE SAME FLOOR PLATE, MADE GENERIC LABS, PUT OFFICES IN THE CONFINED LOCATION, PUT SUPPORT SPACE TOGETHER, AND EVEN INTRODUCED A PLACE THAT YOU'VE HEARD TODAY, THIS INTERACTION OR COLLABORATIVE GATHERING

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SPACES. AND THIS CONCEPT WAS SO IMPORTANT THAT UCSF USED IT AS THE DRIVER FOR THEIR WHOLE MISSION BAY CAMPUS. SO RENOVATION OF ONE OF THEIR EXISTING TOWERS BECAME GENERIC, AND THEY FOUND THAT THAT FIT 90 PERCENT OF THE USERS. THEREFORE, THE USERS WOULD GO INTO SPACE THAT WAS NOT DESIGNED FOR THEM, BUT WAS MORE GENERIC AND ADAPTABLE AND USEFUL FOR THE FUNCTIONS.

WHAT'S HAPPENING IN OFFICES? WE KNOW THAT THE AMOUNT'S INCREASING, BOTH GENERAL OFFICE SPACE, COMPUTATIONAL SPACE, AND DRY RESEARCH SPACE. THAT'S REALLY CHANGING THE RATIOS AND HOW WE START TO THINK ABOUT LABS. WE USED TO NOT PUT OFFICES, MANY OFFICES, IN THESE BUILDINGS BECAUSE IT WAS TOO EXPENSIVE. WE DON'T HAVE THAT OPTION ANYMORE. IN A LOW RATIO, IT DOESN'T MATTER WHERE YOU PUT THE OFFICES; BUT AS THE RATIOS GET HIGHER, IT REALLY DOES MATTER. AND YOU GOT TO THINK ABOUT HOW YOU MIGHT ORGANIZE A FACILITY ACCORDINGLY.

IN SUPPORT SPACES, THIS IS A PHENOMENAL THING WHEN YOU TAKE A LOOK AT HOW THE SUPPORT-TO-LAB RATIO IS CHANGING. IF YOU'RE PLANNING NOW, YOU BETTER THINK ABOUT WHERE THIS CURVE IS GOING BECAUSE IF YOU'RE USING TODAY'S STANDARDS, I PROMISE THAT'S NOT GOING TO BE THE SAME IN FIVE, 10, OR 15 YEARS.

WELL, IN 15 SHORT YEARS, WHEN YOU GO FROM

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WHITEHEAD, WHICH HAD 53 PERCENT OF ITS FLOOR PLATE LAB, TO MISSION BAY, THE AMOUNT OF SUPPORT AND LAB ARE EQUAL. AND I THINK THAT'S ONE OF THE PROBLEMS IN PLANNING THIS BUILDING IS HOW WE'RE GOING TO ADDRESS THAT KIND OF ISSUE.

WELL, WHEN YOU HAVE A RACETRACK SCHEME, AND YOU DEFINE HOW MUCH SUPPORT SPACE THERE IS BY THE CORE OF YOUR SYSTEM, THAT'S A PROBLEM. AND THIS IS A PROBLEM FOR WHITEHEAD. SO SOMETHING'S GOT TO GIVE OR THERE'S GOT TO BE ANOTHER WAY TO THINK ABOUT PLANNING THESE BUILDINGS.

WELL, FROM MY CONCLUSIONS THERE'S LESS LAB SPACE, BUT THERE'S MORE SUPPORT SPACE AND THERE'S MORE OFFICE SPACE, BUT THINGS ARE GOING TO CHANGE, AND WHATEVER YOU'RE PLANNING OUGHT TO TAKE THAT INTO ACCOUNT SO IT'S A VIABLE FACILITY BECAUSE YOU REALLY ARE BUILDING 50-YEAR BUILDINGS, NOT 20-YEAR COMMERCIAL BUILDINGS.

WHAT'S DRIVING THIS CHANGE, ESPECIALLY IN THE SUPPORT SPACE, IS CORES, THE KIND OF THING YOU HEARD ABOUT TODAY, SPECIALIZED RESEARCH SUPPORT SERVICES. THEY INCLUDE A WHOLE LOT OF FUNCTIONS, AND NOT EVERY BUILDING CAN AFFORD THEM. IF YOU STARTED OUT ALL THE CORES YOU NEEDED TO SUPPORT A GROUP OF ACTIVITIES, YOU JUST WOULDN'T HAVE ANY RESEARCH SPACE LEFT FOR FACULTY.

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SO I THINK THIS IS GOING TO BE DRIVING WHAT YOU ARE CONSIDERING.

I WANT TO TOUCH BRIEFLY ON THE LABORATORY MODULE, THAT IT'S REALLY CHANGED. WHEN WE SAW LABS IN THE EARLY '80S UP TO THE '80S, EVERY CAMPUS HAD 20- OR 23-FOOT DEEP LABS, 4-FOOT DESKS, 8-FOOT BENCH, 3-FOOT SINK, AND IT TOOK 150 NET SQUARE FEET PER PERSON. WE KNOW THAT THESE BUILDINGS ARE EXPENSIVE, $1,000 A NET SQUARE FOOT AT LEAST. WHERE CAN YOU BE EFFICIENT? WE CAN BE EFFICIENT BY HAVING A DEEPER LAB. YOU CAN GET ABOUT 35 PERCENT MORE EFFICIENCY IN THAT. SO IT'S ONE THING I ENCOURAGE PEOPLE TO MAKE THE BEST OF YOUR MONEY.

IN 30,000 SQUARE FEET WITH SHALLOW BENCHES, YOU WILL GET A HUNDRED BENCHES. WITH THE SAME FOOTPLATE, YOU WILL GET 140 BENCHES BY GOING FROM SHALLOW TO DEEP LABS. AND YOU'RE JUST ELIMINATING CORRIDOR SPACE, BUT YOU'RE ALSO PUTTING PEOPLE MORE COMPACTLY TOGETHER, AND THAT REALLY HELPS IN THE NOTIONS OF COLLABORATION.

SO SHOULD THE LAB BE ADAPTABLE? HERE'S A GOOD EXAMPLE. THIS IS THE FOSTER BUILDING AT STANFORD. IT'S BEAUTIFULLY DONE. THE CASEWORK IS BUILT RIGHT IN AS PART OF THE BUILDING SYSTEM. DOMED VAULTS OVER THESE AISLEWAYS. IF YOU THINK THE LAB IS GOING TO LOOK

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LIKE THIS IN 15 YEARS, YOU SHOULD DO THIS. IF YOU DON'T, YOU BETTER DO SOMETHING THAT'S REALLY MORE ADAPTABLE.

SO IT MAY BECOME EQUIPMENT SPACE, IT MAY BECOME COMPUTATIONAL SPACE, IT MAY CHANGE ITS FUNCTION ENTIRELY, BUT YOU OUGHT TO BE ABLE DO THAT WITHOUT GREAT COST OR TIME CONSTRAINTS. SO THE FUTURE OF THE LAB IS IT'S REALLY NOT JUST A LAB. IT'S GOT TO BECOME OTHER THINGS, AND IT'S GOT TO BE ABLE TO DO THOSE QUICKLY SO YOU DON'T HAVE DOWN SPACE AND SCIENTISTS CAN GET ON TO THE ACTIVITIES THAT THEY REALLY WANT TO DO.

I THINK THE LABS NEED TO BE MORE EFFICIENT AND MORE FLEXIBLE, AND THE KEY TO THAT REALLY GOES BACK TO BENCH WORK. GATHERING SPACES, UCSF HAS A WONDERFUL SPACE IN THE CENTER. YOU SEE IT FROM THE LABS. IT'S A PLACE WHERE YOU CAN GO AND HAVE COFFEE, MEET WITH PEOPLE. YOU CAN'T MEET WITH PEOPLE ON A 4-FOOT DESK IN A LAB. IT WOULD BE DISRUPTIVE. BUT THIS CONCEPT REALLY WORKS BECAUSE IT'S OPEN AND IT'S PART OF THE LAB. IT'S NOT A PLACE YOU HAVE TO GO AWAY TO GET TO.

COLLABORATION SPACE ACTUALLY CAN BE MORE THAN THIS, AND IT ISN'T JUST A SPACE. IT'S THE WHOLE WAY YOU START TO THINK ABOUT DESIGNING BUILDINGS, EXPOSING ACTIVITIES TO EACH OTHER, OTHER SOCIAL SPACES. IT'S A BUILDINGWIDE SYSTEM.

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I'M GOING TO TALK A LITTLE ABOUT USING THOSE CONCEPTS, AND THEN END UP BY WHAT I THINK IS THE ISSUE FOR STEM CELLS. WELL, THIS IS A CAMPUS THAT I OVERSAW THE DESIGN OF. THIS IS JANELIA FARMS. IT'S IN ASHBURN, VIRGINIA. IT'S A LARGE CAMPUS, HAS ABOUT 740,000 GROSS SQUARE FEET IN IT. WE KNEW WE HAD TO ADDRESS THE ISSUES OF CHANGING RATIOS, ADAPTABILITY, BUT PRIMARILY WE'RE TRYING TO MAKE A GOOD WORK SPACE. A GOOD WORK SPACE IS ONE THAT MEETS THE NEEDS OF THE PEOPLE WHO WORK THERE.

WE HAVE A GENERALLY SLOPING SITE, AND INSTEAD OF HAVING THE BUILDING ON THE SITE, THIS BUILDING IS BUILT INTO THE SITE. AND YOU ACTUALLY GO UP THROUGH THE BUILDING AS IF YOU WERE WALKING UP THROUGH THE HILL. SO IT'S JUST YOU WALK UP THIS WAY, AND EVERY FLOOR IS AT GROUND LEVEL BECAUSE IT'S A GREEN ROOF YOU CAN GO DIRECTLY OUT ONTO. THIS IS NOT A MODEL I'M ESPECIALLY SUGGESTING. IT WILL JUST EXPLAIN THE PLANS WHEN I COME TO THEM IN A SECOND.

SO THAT'S THE ROOF. IT'S ONE OF THE LARGEST GREEN ROOF BUILDINGS IN THE COUNTRY, AND SO SOME SLIDES. SO WHAT DID WE START OUT? WE STARTED OUT THINKING ABOUT THE OFFICES. AND WHEN I WROTE THE PROGRAM, I KNEW WE NEEDED A HIGHER RATIO. AND SO I SAID LET'S GET OFFICES TOGETHER IN A WAY THAT'S REALLY

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COLLABORATIVE. THERE'S BOTH SPACE FOR SOME OF THE PEOPLE FROM THE LABS TO BE OUT THERE, SENIOR POST DOCS, GATHERING WORK SPACES AT THE END OF HERE -- AT THE ENDS HERE AND OFFICES AROUND THE SIDES.

AND THIS IS THE WAY THEY TOOK A PROGRAM DIAGRAM AND CONVERTED. THIS IS ACTUALLY OUR OFFICE BUILDINGS THAT SIT ON THE ROOF. IT'S THE WAY YOU BREAK DOWN THE SCALE OF A GIANT BUILDING AND HAVE SOMETHING THAT'S COMFORTABLE ENOUGH FOR PEOPLE TO FEEL LIKE THEY'RE WORKING IN AN ENVIRONMENT WITH PEOPLE ALL IN A GROUP THEY'RE WORKING ON SIMILAR PROBLEMS WITH. AND THAT'S WHAT THAT LOOKS LIKE FROM THE CORRIDOR. IT'S OPEN AND INVITING FROM THE CORRIDOR. AND THE MEETING SPACE AT THE END REALLY LET'S YOU KNOW WHAT'S HAPPENING, SO YOU CAN SEE PEOPLE AND JOIN THEM IF YOU WISH.

ANOTHER THING THAT CONTRIBUTES TO COLLABORATION AND INTERACTION IS CORRIDOR SYSTEMS. THE OLD SINGLE CORRIDOR BUILDINGS WERE PLACES WHERE YOU RAN INTO PEOPLE, NOT LIKE A RACETRACK SCHEME WHERE YOU ALMOST NEVER FIND PEOPLE BECAUSE THEY'RE ON THE OTHER SIDE. THAT'S JUST COMMON. HAVING A MAIN STREET IS BETTER THAN HAVING A WHOLE GRID WHERE PEOPLE ARE LOST.

HERE'S AN EXAMPLE OF A MAIN STREET BUILDING WHERE YOU HAVE OFFICES ON ONE SIDE AND SUPPORT AND LABS

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VERY DEEP. BUT IN THIS CASE, THIS BUILDING'S REALLY FLIPPED SO THAT THE OFFICES ARE ACROSS THE CORRIDOR FROM THE LAB WITH VISUAL CONNECTION, AND IT GETS ALMOST BACK TO THAT CONNECTION OF LABORATORY AND OFFICES TO BEGIN WITH. AND THAT'S HOW THAT SYSTEM WORKS. THERE ARE GREEN ROOFS OUT THERE, LABS, A ZONE OF SUPPORT SPACE, BUT REALLY AN INTIMATE CONNECTION TO THE OFFICES. I'M COMING BACK TO THIS IN A SECOND.

THAT'S A GLASS CORRIDOR SYSTEM AND WHAT IT'S LIKE, BUT YOU SEE EVERYBODY WHEN YOU GO AROUND THIS BUILDING. IT REALLY HAS A GREAT CONNECTING QUALITY TO IT. IT'S NOT A GOOD PLACE FOR PEOPLE WHO WANT TO DO WORK BY THEMSELVES AND NOT BE EXPOSED TO THEIR NEIGHBORS.

WE DID DEEP LABS. YEARS AGO WE MOVED A LOT WET SERVICES OFF THE BENCHTOP, AND THAT ALLOWS LABS TO BECOME MORE FLEXIBLE. SO WE HAVE DEEP LABORATORIES HERE. THEY'RE 35 FEET DEEP AND THEY'RE PRETTY EFFICIENT. THEN WE WANTED TO ADDRESS THE BENCH WORK, SO INSTEAD OF DOING IT LIKE THIS, WE DEVISED A SYSTEM TO FEED FROM THE FLOOR, NOT JUST BECAUSE THAT WAS UNIQUE, ALTHOUGH THAT WAS INTERESTING ENOUGH IN ITSELF, BUT BECAUSE IF YOU CAN MAKE A SPACE WHERE THE CEILINGS ARE UNCLUTTERED, THE LABS ACTUALLY LOOK NICER AND THEY FEEL MORE GRACIOUS. AND LABS THAT LOOK BETTER, LOOK

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BETTER 15 YEARS DOWN THE ROAD TOO.

SO YOU PLUG THESE BOLLARDS INTO THE FLOOR, AND THEY CAN BE UNPLUGGED, SO YOU CAN CHANGE FROM ONE FUNCTION TO ANOTHER, TABLES BACKED UP TO THEM, BOXES PUT BELOW THEM, AND IT LOOKS LIKE BENCH WORK, BUT YOU CAN CHANGE IT. YOU CAN CHANGE THE CONFIGURATION. YOU CAN TAKE THE BOLLARDS OUT. AND, IN FACT, HERE'S WHAT IT LOOKS LIKE AS A BASE SYSTEM, AS A BENCH SYSTEM, AND YOU CAN SEE THE DISCONNECT WITH THE CEILING AND HOW THAT CREATES A NICE PLACE TO WORK. AND REALLY WE OUGHT TO CREATE NICE PLACES FOR PEOPLE TO WORK. IT DOESN'T COST ANY MORE.

BUT IN THIS CASE, WE NEVER PLANNED ON ALL THOSE LABS BEING USED FOR LABS, SO WE BOUGHT BENCH WORK FOR TWO-THIRDS OF THEM. AND SOME OF THE SPACES, WE JUST TOOK THE BOLLARDS OUT AND PUT IN COMPUTATIONAL STATIONS. SOME PLACES WE'LL PUT IN PHYSIOLOGY RACKS, BUT WE THOUGHT ABOUT HOW THE LABORATORY COULD BE ADAPTABLE, BUT ADAPTABLE WITHOUT CHANGE, WITHOUT SPENDING A LOT OF MONEY, AND WE'LL HAVE CARPENTERS, ELECTRICIANS, AND PLUMBERS.

SO WHAT HAPPENED IN THESE SUPPORT SPACES? WELL, INSTEAD OF PREDICTING THIS ONE-TO-ONE RATIO THAT MISSION BAY HAD, WHEN I WROTE THE PROGRAM, I SAID THERE SHOULD BE ONE AND A HALF TIMES AS MUCH SUPPORT AS LAB

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SPACE. IN ACTUALITY WE'RE USING ALMOST TWO TIMES AT THE END. AND THAT'S A VERY INTERESTING STATISTIC. AND IT'S DRIVEN REALLY BY A CORE SERVICE SPACE.

YOU ALSO NOTICE THAT THE OFFICE SPACE IS ALMOST EQUAL TO THE LAB SPACE. YOU ALMOST COULDN'T CALL THESE BUILDINGS. YOU COULD CALL THEM SUPPORT BUILDINGS AT SOME POINT.

WELL, YOU WANT TO PROVIDE FLEXIBLE SUPPORT SPACE, SO INSTEAD OF DOING A RACETRACK SCHEME, IF YOU MARRY UP THE LABS, AT LEAST YOU CAN CHANGE IT FROM ONE FUNCTION TO ANOTHER BY JUST CHANGING THE OUTFITTING OF THESE SPACES. AND THAT'S WHAT WE DID HERE. THERE'S SUPPORT SPACE BACKED UP TO HERE. THERE'S A LONG EQUIPMENT CORRIDOR BEHIND THERE THAT'S A SERVICE AND EQUIPMENT CORRIDOR. AND THAT'S JUST WHERE YOU PUT ALL YOUR FREEZERS AND CENTRIFUGES AND SO ON, BUT YOU CAN ACTUALLY GET TO THEM WITHOUT GOING THROUGH DOORS FROM THE LABS THEMSELVES. SO YOU'VE GOT A FLEXIBLE LAB, SUPPORT SPACE DIVIDED UP TO MEET THE GENERAL TISSUE CULTURE, DARKROOM, COLD ROOM REQUIREMENTS, BUT NOT ALL THOSE SPECIAL FUNCTIONS.

SO WHAT ARE THOSE, AND WHERE SHOULD THOSE GO? THAT WAS A QUESTION I KNEW WE NEEDED. I DIDN'T KNOW WHAT IT WAS OR WHERE IT SHOULD GO. AT FIRST I THOUGHT IT MIGHT BE PLACES LIKE MRI'S AND STUFF THAT NEEDED LOW

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VIBRATION SITUATIONS, AND VERY LITTLE OF IT TURNED OUT TO BE LIKE THAT. SO INSTEAD OF DOING THIS, WE MOVED FROM A CONCEPT TO PUTTING A LOT OF THAT ON ONE OF THE RESEARCH FLOORS. AND, INDEED, THAT JUST GAVE A WHOLE NOTHER SUPPORT.

SO IN THIS BUILDING, YOU WILL SEE A DIAGRAM OF DRY OFFICES, FAIRLY DRY LABS, FAIRLY WET SUPPORT SPACE, AND VERY INTENSIVE SUPPORT SPACE THAT COULD MEET REQUIREMENTS THAT WE DIDN'T KNOW WHEN I WROTE THE PROGRAM IN 2000, BUT WE SURE NEEDED WHEN WE MOVED IN IN 2007.

GATHERING SPACES, IN JANELIA IT'S NOT A SPACE. IT'S THE WAY WE TALK ABOUT THE BUILDINGS. IT'S EVERYPLACE. BUT IT IS THOSE SPACES THAT ARE RIGHT OUTSIDE THE LABORATORIES. SO AS YOU GO FROM THE OFFICE TO THE LABORATORIES, YOU GO BY THOSE SPACES. THEY'RE EXPOSED TO THE CIRCULATION. YOU CAN'T MISS, AND THAT'S WHERE YOU HAVE TO HAVE COFFEE THAT CAN'T BE DONE IN THE LAB, BUT YOU DON'T HAVE TO LEAVE THE LABORATORY ENVIRONMENT. THAT'S PART OF THE KEY.

AND THOSE ARE JUST ALONG THE CORRIDOR, AND THEY'RE LIKE THAT AND THEY HAVE WHITEBOARDS ON THEM AND PANTRIES AND SO ON. YOU WILL SEE MANY EXAMPLES OF THESE AT OTHER SITES.

ANOTHER THING IS HOW YOU CONNECT TO OTHER

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PEOPLE ALWAYS IN THIS BUILDING, AND THAT'S WHAT THE GLASS CORRIDORS ARE ABOUT. IT'S WHAT THE STAIRS WERE ABOUT. IT'S THE KIND OF DINING ROOM THAT ONLY HAS ROUND TABLES, SO YOU CAN'T SIT BY YOURSELF. SO IT HAS LIMITED HOURS. YOU CAN SIT WITH PEOPLE, AND YOU DON'T HAVE A CHOICE TO SIT BY YOURSELF. THIS IS THE BAR, AND ACTUALLY THE BAR WAS NAMED BOB'S IN HONOR OF ME. I'M NOT SURE WHAT THAT MEANT, BUT IT'S A LIVELY SOCIAL PLACE AND IT BRINGS PEOPLE TOGETHER.

AND THE NOTION I'M JUST TRYING TO CONVEY IS THE WHOLE NOTION OF COLLABORATION. IT REALLY GOES BEYOND THE BUILDING. WELL, THAT'S THE SUM OF THOSE PARTS, AS YOU CAN SEE. SORT OF A VERY STANDARD AND VERY ORDERED ARRAY OF A BUILDING, AND WE DO HAVE A HOTEL ON-SITE AND HOUSING AND OTHER THINGS TO PROMOTE THE NOTION OF ACTIVITY IN THIS BUILDING, MEETING AND BRINGING PEOPLE TO THE BUILDING AS A CONCEPT.

AND THAT'S A SIDE SHOT. THE THIRD FLOOR HAS A GARAGE, BUT HAS A REALLY ORDERLY SENSE TO IT. THE SECOND FLOOR HAS THIS WHOLE ZONE, 45,000 SQUARE FEET OF SUPPORT SPACE, IN ADDITION TO THE STANDARD SUPPORT SPACE. AND I DIDN'T KNOW WHAT IT'D BE USED FOR WHEN WE PLANNED IT, BUT WE KNEW WE'D NEED IT. I'LL GO INTO THAT IN A MINUTE.

AND THEN THE FIRST FLOOR, WHICH HAS ANOTHER

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30,000 SQUARE FEET, BUT ALSO HAS ADMINISTRATIVE MEETING FUNCTIONS AND SO ON, THE PHYSICAL PLANTS, THAT GRAY STUFF IN THE BACKGROUND. SO THIS BUILDING IS 900 FEET LONG, 270 FEET DEEP AT THE BASE, BUT IT'S A BUILDING WHERE YOU ALWAYS FEEL LIKE YOU'RE OUTSIDE BECAUSE ALL THE ACTIVITIES REALLY HAPPEN NEXT TO THE WINDOW. THAT'S THAT.

THE HOTEL, WHICH HAS REALLY TURNED OUT TO BE A GREAT THING FOR, NOT JUST PEOPLE VISITING, FOR SCIENTISTS WHO WANT TO STAY OVERNIGHT WHEN THEY'VE GOT SOMETHING GOING. THEY DON'T HAVE TO LEAVE THE CAMPUS, BUT IT BRINGS A LOT OF INTELLECTUAL ACTIVITY TO THE CAMPUS.

WHAT DO THE USERS HERE LIKE? WELL, THEY LIKE IT'S A COOL BUILDING. AND IT'S COOL BECAUSE IT'S A NICE PLACE TO WORK. IT HAS SOME INTERESTING ARCHITECTURE TO IT. HAS SOME REALLY TERRIFIC SPACES, BUT THE LABS ARE GREAT PLACES TO BE IN, AND PEOPLE ENJOY THAT. IT HAS ALL THE SUPPORT SPACE. WE DID A VIVARIUM WITH MOSTLY HOLDING ROOMS, BUT WE GAVE IT DOUBLE SPACE TO EXPAND TO, AND THAT'S ALL GOING TO BE PROCEDURE ROOMS. WE DON'T NEED ANY MORE HOLDING. IT'S AN ISSUE THAT ALL THE STEM CELL PEOPLE NEED IS MORE OF THAT KIND OF SPACE WORKING WITH ANIMALS BECAUSE YOU'VE GOT TO START THERE BEFORE YOU GO TO HUMANS.

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SO BUILDING VIVARIUM CORES IS GOING TO BE CRITICAL. WE HAD ALL THIS BLANK SPACE, AND FIVE YEARS AGO WE DIDN'T KNOW WHAT IT WAS FOR. AND WE'RE USING MICROSCOPY, OPTICS, PHYSIOLOGY, LASER, FLY BEHAVIOR ROOMS. IN YOUR CASE I'LL GO THROUGH A LIST OF DIFFERENT ACTIVITIES WHICH YOU'LL PROBABLY HAVE, BUT THEY'RE THE SAME KIND OF THINGS, AND THEY'RE DRIVING THIS BUILDING TYPE.

WELL, THEY LIKE THE LAB FLEXIBILITY, THE SOCIAL SPACES. THERE'S REALLY SOME NICE MEETING SPACES HERE. AND WHEREVER YOU'RE BUILDING THESE ACTIVITIES, THE CHANCE TO BRING PEOPLE TOGETHER AND PROMOTE COLLABORATIONS AMONG INSTITUTIONS, I THINK, IS AN INTERESTING CONCEPT.

WHAT NEEDED FIXING? I WANT TO BRING UP ONE THING. AND THE NOTION OF HOW PEOPLE WORK IN LABS AND THE NOTION THAT 4-FOOT DESKS WORK ANYMORE JUST DOESN'T ACKNOWLEDGE THAT PEOPLE ARE SPENDING 75 PERCENT OF THEIR TIME AT THEIR DESK AND 25 PERCENT OF THEIR TIME DOING OTHER THINGS BECAUSE THERE'S EQUIPMENT THAT DOES OTHER THINGS. THAT COMES FROM JUST SURVEYING AND WATCHING PEOPLE.

SO WE'RE CHANGING ALL THE SMALL DESKS AT THE OUTSIDE AND GIVING PEOPLE 7-FOOT, 4-INCH DESKS AND GIVING THEM A SORT OF AN EQUAL ALLOCATION OF BENCH AND

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DESK. AND THAT IN ITSELF IS SOMETHING TO THINK ABOUT. AND WHERE THOSE SPACES ARE, THEY ALL DON'T HAVE TO BE IN THE LABS AND EXPENSIVELY CONSTRUCTED SPACE. THEY CAN BE IN OTHER SPACES; BUT ON THE OTHER HAND, GETTING THESE PEOPLE TOGETHER AND PUTTING THEM IN PLACES WHERE THEY DO INTERACT IS SOMETHING OUR SCIENTISTS REALLY ENJOY.

WELL, HOW WILL THIS DRIVE STEM CELL RESEARCH? AND I'M NOT A SCIENTIST. I'M AN ARCHITECT, BUT I SPECIALIZE IN TRYING TO THINK ABOUT BUILDINGS. AND I THINK THE SOPHISTICATED CORE RESEARCH SPACES ARE THE KINDS OF THINGS THAT EVERYONE NEEDS ACCESS TO. HERE'S JUST A SMATTERING OF THEM. I DIDN'T TRY TO LIST THEM ALL. THE ISSUES, THAT'S NOT THE SAME LIST THAT YOU'LL SEE IN FIVE YEARS. SO WHATEVER YOU ARE DOING WILL HAVE TO BE THOUGHTFUL IN HOW IT MIGHT ADAPT TO SOMETHING ELSE. AND BY ADAPT, I DON'T THINK EVERYTHING SHOULD BE ABLE TO BE SOMETHING ELSE. I THINK SOME SPACES CAN BE EASILY ADAPTED TO A NUMBER OF OTHER FUNCTIONS; BUT IF YOU TRY TO MAKE EVERYTHING CHANGEABLE TO EVERYTHING ELSE, IT'S A VERY EXPENSIVE BUILDING.

WELL, THESE CORE SERVICES, THEY'RE EXPENSIVE TO BUILD, THEY'RE EXPENSIVE TO KEEP UPDATED. EQUIPMENT WILL CHANGE. THEY CAN'T BE EVERYWHERE. DIFFERENT INSTITUTIONS HAVE DIFFERENT STRENGTHS. SOME

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INSTITUTIONS MIGHT BE GREAT AT IMAGING, AND THAT'S WHERE MAYBE IMAGING RESOURCES OUGHT TO BE ALLOCATED. MOST CAN BE SHARED. AND THE ISSUE REALLY WE'RE DEALING WITH ALL ACROSS THE COUNTRY IS A PLACE IS REALLY NOT A PLACE ANYMORE IN RESEARCH. THE NOTION OF COLLABORATION IS NOT ABOUT A FACILITY. IT'S ABOUT HOW YOU CONNECT WITH OTHER PEOPLE. AND THEY'RE NOT EVEN ALL IN CALIFORNIA, BUT THEY'RE ALL ACROSS THE COUNTRY AND ACROSS THE WORLD.

SO WHEN YOU START TO THINK ABOUT COLLABORATION, YOU THINK ABOUT BOTH PHYSICALLY, BUT THEN ELECTRONICALLY AND OTHER WAYS. YOU HAVE THE SAME BUILDING, THE SAME INSTITUTIONS WITH OTHER BUILDING, VIDEO, AND DATA. RIGHT NOW WE HAVE SOME VERY IMPRESSIVE THINGS LIKE OMNI PRESENCE FROM CISCO WHERE YOU HAVE THE SENSE OF A CONFERENCE ROOM. ON THE OTHER SIDE IT'S JUST LIKE BEING THERE. BUT THOSE FACILITIES YOU HAVE TO BOOK. AND UNTIL VIDEOCONFERENCING GETS TO BE A 42-INCH LCD IN YOUR OFFICE, AND THAT'S WHAT I HAVE IN MINE, THAT'S WHERE IT'S REALLY GOING TO WORK WHERE YOU ARE EASILY CONNECTED TO OTHER PEOPLE.

SO I THINK THAT'S GOING TO HAPPEN, AND I THINK THE SHARED CORE RESOURCE FACILITIES, BOTH THE NOTION OF BRINGING PEOPLE TO THEM, BUT CONNECTING THEM ELECTRONICALLY AND CONNECTING THEM PHYSICALLY TO OTHER

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PLACES ARE GOING TO MAKE THEM MORE VIABLE AND MORE SHARED. IT SEEMS LIKE YOU'VE GOT A GREAT NOTION TO REALLY INCREASE COLLABORATION THROUGH THIS FUNDING EFFORT.

SO THAT'S THE END. AND THAT'S THE END OF THE BUILDING TOO. I DON'T KNOW IF THERE'S ANY QUESTIONS.

CHAIRMAN LICHTENGER: FIRST OF ALL, I WANT TO THANK YOU VERY MUCH FOR COMING AND GIVING YOUR PRESENTATION TODAY. THAT WAS VERY, VERY INTERESTING AND INFORMATIVE. I DO HAVE SOME QUESTIONS. I'LL DEFER TO MY COLLEAGUES.

MR. KASHIAN: I HAVE A VERY SIMPLE QUESTION. WHAT DO SUPPORT AREAS CONSIST OF?

MR. MC GHEE: LET'S TALK ABOUT WHAT IS A LAB? A LAB IS A PLACE WHERE YOU USE GENERAL WET BIOCHEMISTRY EXPERIMENTS THAT DON'T NEED A SEPARATED ENVIRONMENT. THEY DON'T NEED LIGHT CONTROL. THEY DON'T NEED -- THEY'RE REALLY DEPENDENT ON SMALL EQUIPMENT THAT FITS ON THE BENCHTOP. A SUPPORT ROOM IS A ROOM LIKE A DARKROOM OR A COLD ROOM THAT YOU COULDN'T HAVE THAT FUNCTION OUT IN THE LABORATORY, A TISSUE CULTURE ROOM WHERE YOU WANT TO KEEP IT SEPARATED WHERE YOU HAVE DIFFERENT ENVIRONMENTAL CHARACTERISTICS, OR JUST A SET OF INSTRUMENTS THAT REALLY NEED TO NOT BE ALL OUT IN THE OPEN. SO IT'S REALLY DRIVEN BY SPECIALIZED

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RESEARCH REQUIREMENTS THAT ARE NOT -- THAT ARE NOT WELL-SUITED TO BE OUT IN THE GENERAL LABORATORY ENVIRONMENT.

AND THESE CORE SERVICES, LIKE GMP PRODUCTION, PROTEOMICS, AND SO ON, SOME OF THEM FIT IN LAB SPACES, BUT A LOT OF THEM DON'T FIT IN LAB SPACES. SOME OF THEM WOULD FIT IN ADAPTABLE LAB SPACES, BUT THEY CAN ONLY FIT IN THERE, LET'S SAY, IF YOU'VE GOT A BIG OPEN LAB, THAT MAY NOT BE THE RIGHT THING. SO YOU'VE GOT TO THINK WHEN YOU PLAN A BUILDING, THAT YOU PLAN MODULES THAT ARE TRANSLATABLE ENOUGH FROM ONE FUNCTION TO ANOTHER.

MR. KASHIAN: WHEN YOU START DEALING WITH LAB WORK AND THAT KIND OF FUNCTION, NATURAL LIGHT IS IMPORTANT. AND I SAW A LOT OF GLASS IN THAT BUILDING. HOW DO YOU DEAL WITH ENERGY EFFICIENCY AND TEMPERATURE CONTROLS AND THAT KIND OF THING WITH THAT MUCH GLASS?

MR. MC GHEE: THERE'S NO HEAT LOAD IN THERE, AND ALL THE ROOFS ARE UNDER GREEN ROOFS. THIS IS REALLY THERMAL EFFICIENT. THIS BUILDING ONLY HAS GLASS ON ONE SIDE. THERE'S NO GLASS ON FOUR SIDES IN THIS, SO THIS IS THERMALLY EFFICIENT.

LET ME ANSWER THE QUESTION A DIFFERENT WAY. WE ARE APPROACHING SOME BUILDING CONTROL SYSTEMS THAT REALLY CAN LET LAB AIR BE RECIRCULATED IF IT'S NOT

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CONTAMINATED. AND THERE ARE SENSORS THAT WILL ALLOW THAT TO HAPPEN. AND WHEN THAT HAPPENS, IT'S GOING TO GREATLY REDUCE BOTH THE PLANT SIZE AND THE OPERATING COST OF THESE BUILDINGS. MAYBE YOU DON'T DO THAT EVERY PLACE, BUT IF YOU TAKE A LOOK AT OUR GENERAL LABS, THERE'S NOTHING NOXIOUS THAT HAPPENS IN THEM ANYWAY. SO ESPECIALLY WHEN YOU CHANGE THEM FROM ONE FUNCTION TO ANOTHER, YOU OUGHT TO BE ABLE TO REUSE THAT AIR TO BEGIN WITH.

SO I THINK THINKING HOW LABS ARE GOING TO BE USED, THAT THERE'S TECHNOLOGIES THAT ARE AVAILABLE THAT ARE GOING TO HELP REDUCE THOSE COSTS THAT ARE VERY IMPORTANT.

MR. KASHIAN: BASICALLY YOU DISTRIBUTED THE INFRASTRUCTURE IN THE FLOOR; IS THAT CORRECT?

MR. MC GHEE: WE'VE DISTRIBUTED PART OF THE INFRASTRUCTURE IN THE FLOOR, AND THAT'S MOSTLY ELECTRICAL AND DATA.

CHAIRMAN LICHTENGER: SO, BOB, THAT WAS ACTUALLY ONE OF MY QUESTIONS. SO PROCESS PIPING NOT THROUGH THE -- YOU HAD A RACE COURSE SYSTEM OR NOT?

MR. MC GHEE: DIDN'T HAVE A -- HAD A RACE COURSE SYSTEM ONLY ON THE OFFICES. SO WE ACTUALLY PREPLUMBED WHERE WE WANTED SERVICES BELOW THAT. THAT IS NOT FOR VERY INTENSIVE ACTIVITIES, BUT THOSE

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ACTIVITIES HAVE TO BE FOR THE BUILDING. JUST AS A CERTAIN LEVEL OF LESS INTENSIVE ACTIVITIES HAPPEN HERE, THE NEXT SET HAPPEN IN THE NEXT SPACE AND NEXT STEP HAPPENED HERE.

CHAIRMAN LICHTENGER: SO THE BENCH WORK THAT YOU WERE SAYING WAS FLEXIBLE, IT'S JUST YOU HAD DATA AND ELECTRIC IN THE FLOOR. YOU DIDN'T HAVE PROCESS PIPING AND PLUMBING?

MR. MC GHEE: WE HAD SOME PROCESS PIPING. WE HAD PROCESS PIPING FOR AT LEAST ONE SERVICE AT EACH BOLLARD.

CHAIRMAN LICHTENGER: BUT IF YOU MOVE THE BOLLARD, HOW WOULD YOU GET THOSE -- DID YOU HAVE OTHER CONNECTIONS SPREAD THROUGHOUT THE FLOOR AT CERTAIN LOCATIONS?

MR. MC GHEE: ABSOLUTELY. WE HAD SERVICE SYSTEMS THAT RUN THROUGH THAT EQUIPMENT CORRIDOR SPACE, SO YOU CAN GET ANY SERVICE TO ANYPLACE IF YOU WANT TO. YOU JUST DON'T PIPE IT ALL BECAUSE WE DON'T USE IT ALL, BUT YOU HAVE ACCESS TO IT ALL. ALL THE END WALLS AND LABS HAVE FULL SERVICES, ALL THE BACK WALLS HAVE FULL SERVICES. WHEN YOU THINK ABOUT MAYBE MAKING MODULES THAT ARE SMALLER, THEN YOU'VE GOT A LOT OF ACCESS TO SERVICES.

CHAIRMAN LICHTENGER: DID YOU DO -- WHEN YOU

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WERE IN YOUR DESIGN STAGE OR BIDDING, DID YOU KIND OF PRICE OUT THE KIND OF COST COMPARISON FOR THE MORE TRADITIONAL KIND OF MEP STRUCTURE FOR LABS VERSUS THE ONE YOU ACTUALLY WENT WITH, THIS FLEXIBLE, WHAT THAT COST DIFFERENCE WAS?

MR. MC GHEE: IT TURNED OUT THAT WE DID TRY TO PRICE THAT, AND IT'S HARD FOR APPLES AND APPLES, BUT WE BELIEVE THAT THIS IS NO MORE EXPENSIVE THAN TRADITIONAL BENCH WORK BECAUSE -- IN THE FIRST COSTS, BUT WHERE IT REALLY SAVES YOU MONEY IS IN THE LATER COSTS. SO WE HAD VERY SIMPLE SERVICES THAT WERE STANDARD THAT DIDN'T HAVE TO WAIT TILL THE FLOOR WAS DONE TO INSTALL THEM AND DISTRIBUTE THEM IN THE BENCH WORK. IT SHORTENED THE TIMEFRAME, BUT OUR BEST COSTS SAY IT'S ABOUT THE SAME AS ANY OTHER READILY USABLE SYSTEM, MAYBE NOT THE SAME AS THE CHEAPEST SYSTEM.

CHAIRMAN LICHTENGER: SO SPEAKING OF COSTS, SO, YOU KNOW, ON THE LAB PART OF THE BUILDING, I KNOW THIS IS NOT A CALIFORNIA BUILDING, BUT I'M CURIOUS WHAT DID THAT COME IN ON A GROSS OR NET BASIS? I GUESS IF YOU EXCLUDE THE GARAGE PORTION AND --

MR. MC GHEE: THE BEST WE CAN TELL IT'S BETWEEN 425 AND 450.

CHAIRMAN LICHTENGER: GROSS OR NET?

MR. MC GHEE: GROSS.

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MR. KASHIAN: BASICALLY I HEAR --

CHAIRMAN LICHTENGER: I LIKE THAT NUMBER.

MR. MC GHEE: IT'S A BIG BUILDING. IT'S A HUGE PROJECT, AND THERE'S SOME ECONOMIES OFF A BUILDING THAT SCALE. THERE'S CERTAINLY ECONOMIES OFF OF DOING SOMETHING SPECIAL AT THAT SCALE.

CHAIRMAN LICHTENGER: EXCELLENT. I HAVE ONE MORE QUESTION. GO AHEAD, ED, PLEASE.

MR. KASHIAN: BASICALLY YOU'RE ADVOCATING SPENDING A LOT OF CAPITAL AT THE FRONT END SO THAT YOU HAVE A LONGER LASTING MORE VERSATILE BUILDING.

MR. MC GHEE: I'M REALLY ADVOCATING NOT SPENDING MORE CAPITAL. I'M ADVOCATING SPENDING IT THE RIGHT WAY, TO MAKE BUILDINGS, LIKE THE CLARK CENTER, WHICH HAPPENS TO BE ONE OF THE MOST EXPENSIVE BUILDINGS. YOU CAN DO EVERYTHING ANYPLACE IN THAT BUILDING; BUT IF YOU LOOK AT THE BENCH WORK, IT'S ALL ELECTRICAL. THERE ARE NO SERVICES DISTRIBUTED OUT OR VERY LITTLE SERVICES. AND SO THEY SPEND AN ENORMOUS AMOUNT OF DOLLARS TAKING STUFF TO PLACES THAT DIDN'T NEED IT TAKEN TO.

SO I THINK YOU JUST HAVE TO THINK ABOUT WHAT YOU WANT THESE SPACES TO BECOME IN THE FUTURE AND WHAT YOU WANT OTHER SPACES. IF WE HAVE COMPLEX ACTIVITIES, THEY JUST SIMPLY GO IN A HIGHER SERVICE SPACE THAN

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TRYING TO TAKE THEM TO LAB SPACE. AND THAT JUST SAYS THE LAB SPACE IN THESE BUILDINGS IS PUBLIC AND INTERACTIVE SPACE, AND THE OTHER SPACES REALLY MIGRATE TO THE BACK. AND SO WE SPENT MORE MONEY ON THOSE AND LESS MONEY OUT FRONT, AND SO IT PROBABLY AVERAGES OUT. I THINK FOR YOU ALL, YOU'RE GOING TO BE SPENDING A LOT OF -- DOING A LOT OF VERY COMPLEX CORE FACILITIES. AND THEY'RE NOT GOING TO BE AT THE LOW END OF THE RANGE, BUT THEY'RE GOING TO BE THINGS THAT ARE CRITICAL FOR SERVING BOTH THE INSTITUTIONS THAT ASK FOR THEM, BUT OTHER INSTITUTIONS TOO.

MR. KASHIAN: YOU DID A GREAT JOB. THANK YOU.

CHAIRMAN LICHTENGER: BOB, I HAVE ONE MORE QUESTION. SO EARLIER IN YOUR PRESENTATION, YOU BROUGHT UP A POINT THAT'S VERY NEAR AND DEAR TO MY HEART. SO THE EFFICIENCY HAVING TO DO WITH THE LAYOUT OF WE'VE ALL SEEN REALLY GOOD LAYOUTS AND WE'VE ALL SEEN BAD LAYOUTS THAT DON'T ALLOW THE SAME NUMBER OF RESEARCHERS IN A FACILITY. I DON'T NEED AN ANSWER NOW. WE CAN HAVE RICK FOLLOW UP WITH YOU LATER. WHAT DO YOU THINK THE MOST IMPORTANT METRICS OF MEASURING IF WE WERE GOING -- IN TERMS OF HOW EFFICIENTLY LAID OUT A BUILDING IS?

MR. MC GHEE: WELL, FIRST, I CAN TELL YOU

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THAT ALL OF THE NUMBERS YOU WILL GET, WHETHER A BUILDING'S 52, 55, 60 PERCENT EFFICIENT, YOU SHOULDN'T BELIEVE. BECAUSE EVERY INSTITUTION HAS THEIR OWN UNIQUE WAYS OF CALCULATING THAT AND TO THEIR OWN BENEFIT. BUT I THINK YOU CAN TAKE A LOOK AT THE KIND OF CORRIDOR SYSTEM, THE DEPTH OF LABS WILL GET YOU EFFICIENCY. I THINK MORE IMPORTANT IS ARE YOU PUTTING THE RIGHT RESOURCES IN THE RIGHT PLACE IN THE BUILDING? ARE THESE BUILDINGS -- I THINK THESE BUILDINGS IN SOME SENSE, I ADVOCATE GENERIC STUFF, BUT YOU ARE GOING TO BUILD NONGENERIC STUFF TO A LARGE DEGREE. SO DO YOU HAVE ENOUGH OF IT? HAVE YOU THOUGHT ABOUT IT BEING ADAPTABLE? WHAT OTHER FUNCTIONS CAN IT BECOME OVER ITS TIMEFRAME?

CHAIRMAN LICHTENGER: BUT YOU THINK THE SINGLE MOST IMPORTANT THING IS A DEEPER LAB MAKES A MORE EFFICIENT --

MR. MC GHEE: THAT'S AN EXAMPLE OF THAT. LESS CORRIDOR SPACE. BUT ON THE OTHER HAND, IF CORRIDORS ARE PART OF YOUR COLLABORATIVE AND INTERACTIVE SYSTEM, IT'S BETTER TO MAKE THEM A FOOT WIDER THAN A FOOT NARROWER. I THINK YOU WANT TO PUT THIS IN THE CORRIDORS NOT ESPECIALLY EXPENSIVE TO BUILD. SO I THINK YOU JUST WANT TO PUT THE RIGHT PLACES -- YOU PUT YOUR DOLLARS IN THE RIGHT PLACES. IN

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THE END, YOU WANT TO BUILD SPACES THAT DO TWO THINGS. THEY ACCOMMODATE THE RESEARCH -- THREE THINGS. THEY CAN CHANGE TO ACCOMMODATE SOME OTHER KIND OF RESEARCH AND THEY'RE GOOD PLACES TO WORK IN. I THINK THAT'S THE GOAL HERE.

AND YOU ARE GOING TO SPEND A LOT OF MONEY, AND I SURE HOPE YOU SPEND IT MAKING NOT JUST SPACES THAT WORK, BUT SPACES THAT ARE ADAPTABLE AND SPACES THAT ARE GOOD THAT PEOPLE WANT TO WORK IN.

CHAIRMAN LICHTENGER: AGAIN, THANK YOU VERY MUCH FOR COMING TODAY AND GIVING THE PRESENTATION. SO NOW WE'RE GOING TO THE SECOND PART OF THE MEETING WHERE WE'RE GOING OPEN UP THE FLOOR FOR PUBLIC COMMENTS. FOR THOSE OF YOU WHO HAVE NOT BEEN TO ONE OF THESE MEETINGS BEFORE, WE LIMIT PUBLIC COMMENTS TO THREE MINUTES. MR. KELLER WILL INDICATE WHEN YOUR TIME IS UP, AND I WOULD ASK YOU AT THAT POINT TO WRAP UP YOUR COMMENTS. GENERALLY PEOPLE DON'T GO OVER AND I APPRECIATE THAT. AND WE MAY ACTUALLY ASK SOME QUESTIONS.

SO I'D LIKE TO INVITE THE PUBLIC NOW TO SPEAK, AND ALSO PLEASE IDENTIFY YOUR NAME AND AFFILIATION, IF ANY. ANY PUBLIC MEMBERS?

MR. SIMPSON: I DON'T WANT TO BE FIRST.

CHAIRMAN LICHTENGER: JOHN, PLEASE STEP UP.

MR. SIMPSON: AT THE FEAR OF THIS BECOMING A

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TRADITION OF THE FOUNDATION OF TAXPAYER AND CONSUMER RIGHTS SPEAKING FIRST, WE DEFER TO ANYONE ELSE IN THE PUBLIC WHO HAS A COMMENT.

I JUST -- I WANT TO ONCE AGAIN THANK THE WORKING GROUP FOR DOING THESE HEARINGS. I THINK IT WAS CRITICAL THAT THEY WERE DONE. AND I KNOW THAT A LOT OF PEOPLE'S VALUABLE TIME HAS GONE INTO IT, BUT I THINK THAT YOU ARE GETTING VERY BENEFICIAL RESULTS.

I THINK IT'S PARTICULARLY APPROPRIATE THAT YOU ARE DOING THIS LAST HEARING IN SAN DIEGO BECAUSE I'M NOT ENTIRELY SURE WHY, BUT THE CONSORTIUM HERE THAT HAS EMERGED, I THINK, AND I DON'T KNOW WHY IT HAS EMERGED, BUT THE FACT THAT IT HAS IS PRECISELY ONE OF THE THINGS THAT PROP 71, I THINK, ENVISIONED. AND ANYTHING THAT CAN BE DONE TO FOSTER COLLABORATION ANYWHERE IN THE STATE SHOULD BE PART OF THE RFA'S THAT YOU ARE DRAWING UP.

AND I THINK YOU SHOULD PUT TREMENDOUS REWARDS ON COLLABORATION, NOT ONLY WITHIN THE BUILDING, BUT BETWEEN INSTITUTIONS, BE IT ON THE SCALE OF WHAT'S BEEN DONE HERE IN SAN DIEGO, OR WHAT THE GENTLEMAN FROM RIVERSIDE SUGGESTED.

THE OTHER THING I WOULD SAY QUICKLY IS THAT IN MOST OF THE PRESENTATIONS, I'VE HEARD THE NOTION SORT OF WE'RE TALKING ABOUT HOW TO BUILD NEW, I GUESS

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THE TERM IS, WET LABORATORIES. AND I WOULD ASK THAT YOU CONSIDER AGAIN ABOUT THE FACILITIES THAT YOU THINK ABOUT WHAT IS IT THAT THE STATE OF CALIFORNIA NEEDS FOR THIS BUILDING THAT IS -- FOR THIS PROJECT THAT IS A FACILITY THAT WOULD NOT OTHERWISE BE BUILT. AND THAT MIGHT NOT BE A LABORATORY. THERE MIGHT BE OTHER THINGS TO BE THINKING ABOUT HERE, STEM CELL BANKS AND THOSE KINDS OF THINGS. AND I THINK NOW AND THEN YOU NEED TO STEP BACK, TAKE THE BIG PICTURE, AND SAY IS IT REALLY LABORATORIES? AND I DON'T HAVE THE ANSWER TO THAT QUESTION, BUT I WOULD SUGGEST THAT YOU PONDER THAT. THANK YOU VERY MUCH.

CHAIRMAN LICHTENGER: THANK YOU, JOHN, FOR YOUR COMMENTS. ANY OTHER MEMBERS OF THE PUBLIC? WOW. WE DON'T HAVE ANY OTHER COMMENTS. SO I WANT TO THANK EVERYONE FOR COMING TODAY. OUR NEXT MEETING WILL BE ON JULY 12TH WHEN THE WORKING GROUP WILL REVIEW THE COMMENTS AND INFORMATION THAT WE'VE RECEIVED AT THESE PUBLIC MEETINGS. AND THEN WE WILL RECOMMEND THE PROCEDURES AND CRITERIA AND STANDARDS FOR THE LARGE FACILITIES GRANTS.

WITH THAT, WE STAND ADJOURNED.

(THE MEETING WAS THEN CONCLUDED AT 03:00 P.M.)

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REPORTER'S CERTIFICATE

I, BETH C. DRAIN, A CERTIFIED SHORTHAND REPORTER IN AND FOR THE STATE OF CALIFORNIA, HEREBY CERTIFY THAT THE FOREGOING TRANSCRIPT OF THE PROCEEDINGS BEFORE THE SCIENTIFIC AND MEDICAL FACILITIES WORKING GROUP OF THE INDEPENDENT CITIZEN'S OVERSIGHT COMMITTEE OF THE CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE IN THE MATTER OF ITS REGULAR MEETING HELD AT THE LOCATION INDICATED BELOW

SHERATON SAN DIEGO HOTEL & MARINA
WEST TOWER, 1380 HARBOR ISLAND DRIVE
SAN DIEGO, CALIFORNIA
ON
JUNE 19, 2007

WAS HELD AS HEREIN APPEARS AND THAT THIS IS THE ORIGINAL TRANSCRIPT THEREOF AND THAT THE STATEMENTS THAT APPEAR IN THIS TRANSCRIPT WERE REPORTED STENOGRAPHICALLY BY ME AND TRANSCRIBED BY ME. I ALSO CERTIFY THAT THIS TRANSCRIPT IS A TRUE AND ACCURATE RECORD OF THE PROCEEDING.

BETH C. DRAIN, CSR 7152
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