

THIS IS A TEST.
TESTING THE CAPTIONING STREAM
FOR THE CSB MEETING.
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TESTING THE CAPTIONING STREAM
FOR THE U.S. CSB PUBLIC MEETING.
PLEASE STAND BY.
THIS IS A CAPTIONING TEST.
TESTING THE CAPTIONING STREAM
FOR THE U.S. CSB PUBLIC MEETING.
>> Host: GOOD MORNING, YOU HAVE
JOINED THE U.S. CHEM SAFETY AND
HAZARD INVESTIGATION BOARD FOR
THE PUBLIC BOARD MEETING.
WE'LL NOW BEGIN WITH MEETING
WITH DR. KATHERINE LEMOS, THE
CHAIRPERSON AND CEO OF THE CSB.
>> Chairman Lemos: THANK YOU.
I WILL NOW CALL THIS MEETING TO
ORDER.
THANK YOU FOR JOINING US AND
WELCOME TO THIS VIRTUAL MEETING
OF THE CHEMICAL SAFETY AND
HAZARD IDENTIFICATION BOARD.
I'M KATHERINE LEMOS AND I'M
HONORED TO SERVE AS THE CHAIRMAN
AND CEO OF THE CSB.
TODAY WE MEET IN OPEN SESSION AS
REQUIRED BY THE GOVERNMENT AND
THE SUNSHINE ACT.
THE BOARD WILL CONSIDER THE
CHEMICAL REACTION HYDROGEN
RELEASE, EXPLOSION, AND FIRE AT
AB SPECIALTY SILICONES, REFERRED
TO AS ABSS, WHICH OCCURRED ON
MAY 3rd, 2019, IN WAUKEGAN,
ILLINOIS.
THE EXPLOSION CLAIMED THE LIVES
OF FOUR EMPLOYEES.
ON BEHALF OF ALL OF US AT THE
CSB, I AM OFFER OUR MOST SINCERE
CONDOLENCES TO THE FAMILIES THAT
LOST THEIR LOVED ONES AND WE
ALSO CANNOT UNDERESTIMATE THE
TRAUMA EXPERIENCED BY OTHER
EMPLOYEES AND THEIR FAMILY.
PLEASE UNDERSTAND THAT THE
REASON FOR OUR INVESTIGATION OF
THIS TRAGEDY, AND THUS TODAY'S
MEETING, IS TO LEARN FROM THIS
INCIDENT TO PREVENT FUTURE SUCH

TRAGEDIES.

IN RESPONSE TO THE CHEMICAL RELEASE, EXPLOSION AND FIRE, THE WAUKEGAN FIRE DEPARTMENT AND LOCAL SUPPORT RESPONDED TO THE INCIDENT.

FORTUNATELY, ALTHOUGH THERE WERE SUBSTANTIAL DESTRUCTION AT THE FACILITY'S PRODUCTION, THEIR BUILDING AND ADJACENT BUSINESSES, NO OTHER LIVES WERE CLAIMED.

TODAY, WE WILL DISCUSS THE INCIDENT, THE EVENTS LEADING UP TO THE INCIDENT, AND THE RESPONSE.

STAFF WILL PRESENT THE BOARD WITH PERTINENT FACTS AND THEIR ANALYSIS FROM THE DRAFT REPORT, FOLLOWED BY THEIR PROPOSED FINDINGS, A PROBABLE CAUSE STATEMENT, AND RECOMMENDATIONS. NOW, IN CONSIDERING ADOPTION OF THE REPORT, THE BOARD WILL ASK QUESTIONS OF STAFF TO ENSURE IT PROVIDES THE BEST OPPORTUNITY TO ENHANCE SAFETY.

IN THE MEETING TODAY, WE'LL DISCUSS THE DANGERS ASSOCIATED WITH HIGHLY REACTIVE CHEMICALS AND THE IMPORTANCE FOR ALL CHEMICAL FACILITIES TO ANTICIPATE THE INTERACTIONS BETWEEN INCOMPATIBLE CHEMICALS, DO RISK ASSESSMENTS AND COMPREHENSIVE PROCESS HAZARD ANALYSES.

WE'LL DISCUSS THE CHALLENGES AND GAPS ASSOCIATED WITH THE DEVELOPMENT OF REGULATORY OVERSIGHT FRAMEWORKS FOR REACTIVE CHEMICALS AND OUR LONG-STANDING RECOMMENDATIONS ON THIS TOPIC TO BOTH THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA, AND THE ENVIRONMENTAL PROTECTION AGENCY, EPA.

ADDRESSING REACTIVE CHEMICALS WILL REQUIRE INGENUITY ON THE PART OF OUR REGULATORS AS THERE'S NO ONE SIZE FITS ALL SOLUTION.

AS BOTH THE EPA AND CSB HAVE

STATED, MANAGING REACTIVE CHEMICALS IS NOT JUST ABOUT THE INDIVIDUAL CHEMICALS THAT MEET THRESHOLD QUANTITIES. IT ALSO INVOLVES ASSESSMENT OF THE STORAGE, HANDLING, THE PRODUCTION ENVIRONMENT, AND THE FINAL PRODUCT APPLICATION. ONLY WHEN TAKEN TOGETHER CAN THE LIKELIHOOD AND CONSEQUENCE OF A NEGATIVE OR UNINTENDED EVENT BE ANTICIPATED AND ESTIMATED, AND THEREFORE MITIGATED. THOUGH WE FIRMLY BELIEVE THAT EPA AND OSHA SHOULD WORK THROUGH THESE REGULATORY CHALLENGES WITHOUT DELAY, WHETHER A COMPANY IS MANDATED TO COMPLY WITH A FORMAL REGULATORY SAFETY MANAGEMENT SYSTEM OR RISK ASSESSMENT DOES NOT PRECLUDE THEIR RESPONSIBILITY TO ADEQUATELY ADDRESS RISKS IN PROTECTING EMPLOYEES, THE ENVIRONMENT, AND THE PUBLIC. DOING THE RIGHT THING SHOULD NOT REQUIRE A MANDATE. COMPANIES HAVE THE RESPONSIBILITY TO PROTECT THEIR WORKERS AND THE COMMUNITY. SO WE'LL TALK TODAY ABOUT A RANGE OF MITIGATIONS ACROSS THE FACILITY AND PRODUCT OPERATIONAL LIFECYCLE THAT CONTRIBUTE TO PREVENTING REACTIVE CHEMICAL CATASTROPHE. SOME KEY ISSUES THAT PLAYED A ROLE IN THIS PARTICULAR INCIDENT INCLUDE FACILITY DESIGN SUCH AS VENTILATION AND DETECTION ALARM SYSTEMS, PROCESS AND PROCEDURE DESIGN AND TRAINING TO INCLUDE STORAGE AND HANDLING OF TOXIC CHEMICALS, BATCH MIXING INSTRUCTIONS AND VERIFICATION, AND EMERGENCY PREPAREDNESS, AND SAFETY MANAGEMENT SYSTEMS. SYSTEMS THAT ADDRESS PROCESS SAFETY, NOT JUST FOR REACTIVE CHEMICALS, BUT ACROSS THE COMPANY'S OPERATION WHICH WILL REINFORCE A CULTURE OF SAFETY. WE WILL EXAMINE WHETHER ABSS ADOPTED A COMPREHENSIVE AND

PURPOSEFUL APPROACH IN
PROTECTING THEIR WORKERS.
WE'LL EXAMINE ACTIONS AND
PRACTICES ON THE PART OF THE
COMPANY AND ITS EMPLOYEES.
REACTIVE CHEMICALS ARE A CONCERN
ACROSS A RANGE OF CHEMICAL
INDUSTRIES.

THE SILICONES IS ONLY ONE OF
THOSE INDUSTRIES.
INFORMATION REGARDING YEARLY
DOMESTIC SILICONE PRODUCTION
DOES NOT BEGIN TO DESCRIBE THE
POTENTIAL NUMBER OF
FATALITIES -- OR FACILITIES AND
WORKERS IMPACTED BY THIS REPORT
AND THESE RECOMMENDATIONS.

ON THAT NOTE, WE SINCERELY
APPRECIATE THE SUPPORT OF OUR
FEDERAL, STATE AND LOCAL
PARTNERS IN ADDITION TO LOCAL
FIRE AND EMERGENCY RESPONSE
ENTITIES, THE CSB WORKS IN
CONJUNCTION WITH EPA, OSHA, AND
THE ILLINOIS EPA, WHICH ALSO
CONDUCTED INVESTIGATIONS.
WE COORDINATED SO AS NOT TO
DUPLICATE OUR EFFORTS AS
RESPONSIBLE AGENTS OF OUR
FUNDING AND MEETING THE
GUIDELINES SET FORTH IN OUR
ENABLING LEGISLATION.

AT THIS TIME, I WILL TURN IT
MEETING OVER TO OUR MANAGING
DIRECTOR, DAVID LaCERTE.

>> LaCerte: THANK YOU, CHAIRMAN.
AS DR. LEMOS STATED, I'M DAVID
LaCERTE, THE SENIOR ADVISOR AND
EXECUTIVE COUNSEL.

I'M ALSO THE ACTING MANAGING
DIRECTOR OF THE CHEMICAL SAFETY
AND HAZARD INVESTIGATION BOARD
WITH THE CSB.

AS WE ARE STILL IN A TELEWORK
STATUS PER OPM GUIDANCE, WE'LL
REMOTELY HEAR FROM STEVE KLEJST,
THE CSB EXECUTIVE DIRECTOR OF
INVESTIGATIONS AND
RECOMMENDATION, WHO WILL
INTRODUCE OUR PRESENTER,
VONZELLA VINCENT.

THE IIC AND THE TECHNICAL STAFF
WHO DID AN OVERVIEW OF THE
INCIDENT BUSINESS AND INTRODUCE

AREAS OF INVESTIGATIVE FOCUS TO INCLUDE ELEMENTS OF FACTUAL ANALYSIS IN NARRATIVE FASHION. AFTER THIS PRESENTATION TO THE BOARD, THE BOARD MAY THEN ASK QUESTIONS OF THE STAFF AND THE INFORMATION THEREIN.

EXECUTIVE DIRECTOR KLEJST WILL THEN DELIVER THE FINDINGS OF THE INVESTIGATION.

THE BOARD MAY THEN ASK QUESTIONS ABOUT THE FINDINGS AND MAY OR MAY NOT PARTICIPATE IN DISCUSSION FOR EACH FINDING FRYER TO ANY MOTION FOR CHANGES OR ANY MOTION TO ACCEPT THE FINDING.

EXECUTIVE DIRECTOR KLEJST WILL THEN PRESENT ANY PROBABLE CAUSE STATEMENT FROM THE INVESTIGATION WITH SIMILAR ROUNDS OF QUESTIONS OR DISCUSSION AS REQUESTED BY THE BOARD, FOLLOWED BY ANY POTENTIAL MOTION OR CHANGES OR ANY MOTIONS TO ACCEPT THE PROBABLE CAUSE.

FINALLY, EXECUTIVE DIRECTOR KLEJST WILL DELIVER ANY RECOMMENDATIONS FROM THE INVESTIGATION, FOLLOWED BY ANOTHER ROUND OF QUESTIONS OR DISCUSSION AS DESIRED.

THE BOARD WILL THEN MAKE ANY MOTIONS FOR CHANGES OR MOTIONS TO ADOPT THE RECOMMENDATION. THE CHAIRMAN MAY THEN CHOOSE TO MAKE A CLOSING STATEMENT OR TAKE RECESS.

I HAVE REVIEWED ALL OF THE PUBLIC COMMENTS PRIOR TO TODAY'S MEETING AND I AM CONFIDENT THAT TODAY'S MEETING AND SUBSEQUENT RELEASE INVESTIGATIVE REPORT WILL SATISFY THOSE COMMENTS. ANY ADDITIONAL COMMENTS OR QUESTIONS MAY BE ADDRESSED TO PUBLIC@CSB.GOV FOR CONSIDERATION AND FOLLOW-UP.

ONE NOTE IS THAT WE WILL NAME THE VICTIMS FROM THIS TRAGEDY IN TODAY'S REPORT AND WE THANK THOSE WHO GAVE PREVIOUS OVERSIGHT.

THE UNITED STATES CHEMICAL

SAFETY AND HAZARD INVESTIGATION BOARD IS CURRENTLY FREIGHTING WITH A SINGLE BOARD -- OPERATING WITH A SINGLE BOARD MEMBER. THIS SO-CALLED QUORUM OF ONINGS PROVIDED FOR IN OUR OPERATING STATUTE, 3 CFR 1600.5A. UNDER THE LAW, THREE BOARD MEMBERS CONSTITUTE A CSB QUORUM. HOWEVER, PROVISIONS ALSO STATE THAT IF THE NUMBER OF BOARD MEMBERS IN OFFICE IS FEWER THAN THREE, A QUORUM SHALL CONSIST OF THE NUMBER OF MEMBERS IN OFFICE. AS WE HAVE A SINGLE BOARD MEMBER FOR THE DURATION OF TODAY'S BOARD MEETING, WE WILL SUSPEND PARLIAMENTARY PROCEDURES AN ALL VOTES FROM THE BOARD SHALL BE MADE UNDER UNANIMOUS CONSENT. WE WELCOME THE OPPORTUNITY OF FUTURE BOARD MEMBERS AFTER THEY'VE BEEN NOMINATED BY THE PRESIDENT AND CONFIRMED BY THE SENATE.

I WANT TO THANK THE ENTIRE INVESTIGATIVE TEAM TODAY AND NOTE THEIR DEDICATION TO THE JOB.

I'M GRATEFUL TO BE A PART OF THIS GREAT TEAM SO WE CAN ADVANCE ON OTHER RECOMMENDATIONS AND INVESTIGATIONS IN FURTHERANCE OF OUR MISSION.

I'LL NOW HAND IT OVER TO THE EXECUTIVE DIRECTOR OF INVESTIGATIONS AND RECOMMENDATIONS, STEPHEN KLEJST.
>> Dir. Klejst: THANK YOU, MR. LaCERTE.

STAFF FROM THE OFFICE OF INVESTIGATIONS AND RECOMMENDATIONS ARE HERE TODAY TO PRESENT TO THE BOARD THE DRAFT FINAL REPORT FINGERPRINT AB SPECIALTY SILICONES INVESTIGATION.

THIS INVESTIGATION TEAM IDENTIFIED SEVERAL SAFETY ISSUES THAT LED TO THE INCIDENT THAT OCCURRED AT THE AB SPECIALTY SILICONES FACILITIES. YOU WILL HEAR HOW THE LACK OF AN EFFECTIVE HAZARD ANALYSIS

PROGRAM, THE ADEQUACY OF THE VENTILATION AND HYDROGEN GAS DETECTION SYSTEM, AND THE ADEQUACY OF THE CONTROLS USED IN THE BATCH MANUFACTURING PROCESS ALL CONTRIBUTED TO THIS INCIDENT.

THE PREPARATION OF THE SAFETY ISSUES, FINDINGS, CAUSE AND RECOMMENDATIONS WILL BE MADE BY VONZELLA VINCENT, THE INVESTIGATOR IN CHARGE.

ALSO PRESENT WITH ME HERE TODAY ARE SUPERVISORY CHEMICAL INCIDENT INVESTIGATOR LAUREN GRIM AND RECOMMENDATIONS SPECIALIST MARK KASZNIAK.

I WISH TO RECOGNIZE TAMMY QURESHI, CHRIS LINE AND DAN TILLEMA WHO CONTRIBUTED TO THE DEVELOPMENT OF THE DRAFT REPORT. I ALSO WISH TO RECOGNIZE MARK WING GUARD AND STEVE CUTCHEN. MS. VINCENT, PLEASE PROCEED WITH YOUR PRESENTATION.

>> Vincent: THANK YOU, EXECUTIVE DIRECTOR KLEJST.

ON MAY 2nd, 2019, OPERATORS AT THE AB SPECIALTY SILICONES MANUFACTURING FACILITY IN WAUKEGAN, ILLINOIS, WERE PERFORMING A BATCH OPERATION OF TWO BATCHES THAT INVOLVED MANUALLY ADDING AND MIXING CHEMICALS IN A TANK. DURING THE SECOND BATCH, AN OPERATOR ADDED AN INCORRECT SOLUTION INTO THE TANK CONTAINING AN I AM COMPATIBLE CHEMICAL INGREDIENT. THE MIXTURE INSIDE THE TANK REACTED, CAUSING A PROCESS UPSET THAT PRODUCED AND RELEASED HYDROGEN GAS INSIDE THE PRODUCTION BUILDING. THE HYDROGEN GAS IGNITED, CAUSING AN EXPLOSION AND FIRE. FOUR EMPLOYEES WERE FATALLY INJURED.

SEVERAL ENTITIES, INCLUDING THE CHEMICAL SAFETY BOARD, INVESTIGATED THE INCIDENT. THE CHEMICAL SAFETY BOARD INVESTIGATION TEAM IDENTIFIED

TEN SAFETY ISSUES AND PROPOSES SEVERAL RECOMMENDATIONS THAT WILL BE DISCUSSED.

I WILL FIRST GIVE AN OVERVIEW OF THE EMULSIONS COMMERCIALY SOLD AS ANDISIL EM 652.

THE EM 652 BATCH OPERATION WAS IN PROGRESS AT THE AB SPECIALTY SILICONES FACILITY WHEN THE INCIDENT OCCURRED.

SHOWN IN THE FIGURE ON THE RIGHT, THE EM 652 WAS MANUFACTURED INSIDE A PRODUCTION BUILDING KNOWN AS THE EMULSIONS AREA.

USING TANKS THAT WERE LOOSELY SEALED WITH HATCH TYPE LIDS. THE FIRST STEP OF THE EM 652 BATCH OPERATION AS SPECIFIED ON THE BATCH TICKET, THE STEP BY STEP INSTRUCTIONS, INCLUDES MIXING MULTIPLE DRUMS OF A POLYMER BRANDED AS ANDISIL XL 10 WITH A MATERIAL CALLED TD-6/12 BLEND.

AT THE COMPLETION OF THE PROCESS, AB SPECIALTY SILICONES REQUIRED THE OPERATORS TO PROVIDE THE QUALITY CONTROL DEPARTMENT WITH A SAMPLE OF THE FINAL PRODUCT.

IN THE EVENT THE pH OF THE FINAL EM 652 PRODUCT WAS OUT OF SPECIFICATION, AN ORDER WAS ISSUED TO ADJUST THE pH OF THE PRODUCT BY ADDING AN ACID, GLACIAL ACID, AND BASE, 10% POTASSIUM HYDROXIDE TO THE PRODUCT.

THE XL 10 CHEMICAL USED IN THE EM 652 BATCH OPERATION IS AN A TYPE OF SILOXANE COPOLYMER CONTAINING SILICON HYDRIDE, ALSO KNOWN AS SiH BONDS.

THE COMPOUNDS WITH SiH BONDS, INCLUDING XL 10, REACT READILY WITH AQUEOUS BASES, AMONG OTHER SUBSTANCES.

WHEN AQUEOUS BASES SUCH AS THE 10% POTASSIUM HYDROXIDE CONTACTS MOLECULES WITH SiH SiH BONDS, THE POTASSIUM HYDROXIDE CATALYZES A REACTION BETWEEN THE SiH BOND AND WATER.

THIS REACTION RESULTS IN THE RAPID PRODUCTION OF FLAMMABLE HYDROGEN GAS WHICH CAN FORM EXPLOSIVE MIXTURES IN AIR. ON MAY 3rd, 2019, OPERATORS AT THE AB SPECIALTY SILICONES MANUFACTURING FACILITY PACKAGED THE FIRST EM 652 BATCH, AND STARTED THE SECOND USING THE PRINTED BATCH TICKET. PARTIAL LEFTOVER CHEMICAL CONTAINERS WERE LIKELY LEFT FROM THE FIRST BATCH, RESULTING IN UP TO 11 NEARLY IDENTICAL DRUMS CONTAINING INCOMPATIBLE CHEMICALS IN THE IMMEDIATE PROCESS AREA AT THE START OF THE SECOND BATCH. AT SOME POINT WHILE ADDING THE FIRST TWO CHEMICAL INGREDIENTS TO THE SECOND BATCH, INCLUDING MULTIPLE XL 10 DRUMS, AN OPERATOR ALSO ADDED AN INCORRECT CHEMICAL. 10% POTASSIUM HYDROXIDE SOLUTION, TO THE TANK THAT LIKELY REMAINED COLOCATED IN THE AREA. AS MENTIONED, AQUEOUS POTASSIUM HYDROXIDE IS HIGHLY REACTIVE WITH COMPOUNDS CONTAINING SiH BONDS SUCH AS XL 10. THE 10% POTASSIUM HYDROXIDE SOLUTION WAS NOT INCLUDED ON THE EM 652 BATCH TICKET AND NOT INTENDED TO BE INTRODUCED TO THE BATCH AT THIS POINT. THE CHEMICAL MIXTURE INSIDE THE TANK, XL 10, TD-6/12 BLEND, AND 10% POTASSIUM HYDROXIDE, REACTED AND RELEASED HYDROGEN GAS INSIDE THE PRODUCTION BUILDING THAT IGNITED, CAUSING A MASSIVE EXPLOSION AND FIRE. THE EXPLOSION FATALLY INJURED FOUR AB SPECIALTY SILICONES EMPLOYEES. THE INVESTIGATION TEAM IDENTIFIED THE FOLLOWING TEN SAFETY ISSUES IN ITS INVESTIGATION. MIXING OF INCOMPATIBLE MATERIALS, HAZARD ANALYSIS PROGRAM, STORAGE AND HANDLING OF

INCOMPATIBLE MATERIALS, BATCH EQUIPMENT AND VENTILATION SYSTEM DESIGN, GAS DETECTION SYSTEM, EMERGENCY PREPAREDNESS, DOUBLE INITIAL PROCEDURE PROGRAM, PROCESS SAFETY CULTURE, SAFETY MANAGEMENT SYSTEM THAT ADDRESSES PROCESS SAFETY, AND REGULATORY COVERAGE OF REACTIVE HAZARDS. I WILL NOW DISCUSS EACH OF THESE SAFETY ISSUES.

SAFETY ISSUE NUMBER ONE, MIXING OF INCOMPATIBLE MATERIALS. DURING THE EM 652 BATCH OPERATION, PARTIAL CHEMICAL CONTAINERS FROM THE FIRST BATCH, INCLUDING XL 10, TD-6/12 BLEND, AND 10% POTASSIUM HYDROXIDE SOLUTION, WERE LIKELY LEFT STAGED IN THE EMULSIONS AREA FOR POSSIBLE USE IN THE SECOND BATCH.

THIS WAS A NORMAL PRACTICE AT THE SITE WHEN RUNNING BACK-TO-BACK BATCHES WHERE THERE WERE NO WRITTEN PROCEDURES REQUIRING THE REMOVAL OF PARTIAL CONTAINERS.

OF THE MULTIPLE CHEMICAL REACTIVITY TESTS CONDUCTED, ONLY THE ADDITION OF THE 10% POTASSIUM HYDROXIDE TO A MIXTURE OF XL 10 AND TD-6/12 BLEND RESULTED IN LARGE QUANTITY OF FLAMMABLE HYDROGEN GAS AND PRODUCED FOAMING SIMILAR TO WITNESS OBSERVATIONS.

THESE RESULTS ALIGNED WITH THE CHEMICALS KNOWN TO BE IN THE EMULSIONS AREA BEFORE THE INCIDENT.

THE CALCULATED AMOUNT OF HYDROGEN THAT COULD BE PRODUCED BASED ON THE BATCH TICKET QUANTITY AND QUANTITY OF HYDROGEN DETERMINED THROUGH BLAST MODELLING THAT RESULTS IN THE OBSERVED BLAST DAMAGE.

SAFETY ISSUE NUMBER TWO, HAZARD ANALYSIS PROGRAM.

AB SPECIALTY SILICONES DID NOT SUFFICIENTLY ANALYZE THE HAZARDS OF THE EM 652 PROCESS OR IMPLEMENT EFFECTIVE CONTROLS TO

PREVENT THE MIXING OF 10% POTASSIUM HYDROXIDE SOLUTION AND XL 10.

IN 2014, AB SPECIALTY SILICONES CONCLUDED THAT LACK OF A COMPREHENSIVE HAZARD ANALYSIS, AMONG OTHER THINGS, CONTRIBUTED TO AN EM 652 DRUM EXPLOSION. THE COMPANY DID ASSESS PROPOSED PRODUCT MANUFACTURING OPERATIONS THROUGH WHAT IS CALLED TECHNICAL SERVICE REQUEST.

THE EM 652 PRODUCT UNDERWENT THE TECHNICAL SERVICE REQUEST PROCESS IN OCTOBER 2014 AND JUNE 2018.

NO HAZARDS OR SAFEGUARDS WERE DOCUMENTED IN EITHER TECHNICAL SERVICE REQUEST SPREADSHEET.

THE PRIMARY GOAL OF THE AB SPECIALTY SILICONES TECHNICAL SERVICE REQUEST PROGRAM WAS TO ANSWER TWO QUESTIONS.

FIRST, CAN WE DO IT THROUGH ASSESSING EXISTING PROCEDURES AND DETERMINING REGULATORY REQUIREMENTS.

AND SECOND, SHOULD WE DO IT THROUGH ASSESSMENT OF THE MARKET AND REVENUE PROJECTIONS.

THE TECHNICAL SERVICE REQUEST ALSO DETERMINED WHETHER THE FACILITY HAD THE NECESSARY EQUIPMENT TO PERFORM THE PROPOSED OPERATION OR IF NEW EQUIPMENT NEEDED TO BE PURCHASED.

THE AB SPECIALTY SILICONES TECHNICAL SERVICE PROGRAM DID NOT AND WAS NOT INTENDED TO ASSESS PROCESS OPERATION HAZARD AND ESTABLISH SAFEGUARDS TO REDUCE RISK.

SAFETY ISSUE NUMBER THREE, STORAGE AND HANDLING OF INCOMPATIBLE MATERIALS.

AT LEAST THREE EM 652 CHEMICAL INGREDIENTS, INCLUDING XL 10 AND 10% POTASSIUM HYDROXIDE SOLUTION, WERE STORED IN SIMILAR 55-GALLON BLUE PLASTIC DRUMS AS SHOWN TO THE RIGHT.

THE XL 10 AND 10 POTASSIUM HYDROXIDE STORAGE DRUMS WERE

DIFFERENTIATED BY A SMALL LABEL AND BUNG CAP.

THE XL 10 DRUMS TYPICALLY HAD ONE WHITE AND ONE YELLOW BUNG CAP AND THE 10% POTASSIUM HYDROXIDE DRUMS USUALLY HAD TWO WHITE BUNG CAPS.

ONCE THESE BUNG CAPS WERE REMOVED, THE DRUMS LOOKED NEARLY IDENTICAL.

AB SPECIALTY SILICONES DID NOT HAVE A WRITTEN PROCEDURE REQUIRING EMPLOYEES TO SEGREGATE THE 10% POTASSIUM HYDROXIDE SOLUTION AND THE XL 10 DRUMS IN THE PROCESS AREA OR TO REMOVE CHEMICAL INGREDIENT CONTAINERS FROM THE AREA AFTER USE, CONTRIBUTING TO THE COLOCATION OF INCOMPATIBLE MATERIALS.

INDUSTRY GUIDANCE AND STRATEGIES ARE AVAILABLE FOR REDUCING THE LIKELIHOOD OF MIXING INCOMPATIBLE MATERIALS.

SAFETY ISSUE NUMBER FOUR, BATCH EQUIPMENT AND VENTILATION SYSTEM DESIGN.

AB SPECIALTY SILICONES USED TANKS AND HATCH-TYPE LIDS THAT DID NOT SEAL TO CHARGE AND MIX CHEMICAL INGREDIENTS DURING THE EM 652 BATCH OPERATION.

THE TANKS USED AT THE TIME OF THE INCIDENT WERE NOT EQUIPPED WITH VENT PIPES TO DIVERT ANY PRODUCED GASES OUTSIDE THE BUILDING, TO A PROCESS VENTILATION SYSTEM, OR OTHER SAFE LOCATION.

THE AB SPECIALTY SILICONES PRODUCTION BUILDING'S MAIN AIR MOVER, ALSO KNOWN AS THE MAKEUP AIR UNIT, WAS POSITIONED IN THE EMULSIONS AREA NEAR TANKS USED TO MANUFACTURE EM 652, AND MAY HAVE HELPED DISTRIBUTE THE RELEASED HYDROGEN IN THE AREA AND MIX IT WITH AIR.

THIS MANUALLY OPERATED UNIT WAS DESIGNED TO INTRODUCE OUTSIDE AIR INTO THE BUILDING.

SAFETY ISSUES NUMBER FIVE, GAS DETECTION SYSTEM.

THE AB SPECIALTY SILICONES

PRODUCTION BUILDING DID NOT HAVE A HYDROGEN GAS OR FLAMMABLE GAS DETECTION AND ALARM SYSTEM TO WARN EMPLOYEES OF HAZARDOUS ATMOSPHERE.

CONTRIBUTING TO ITS PERSONNEL REMAINING INSIDE THE PRODUCTION BUILDING BETWEEN THE START OF THE HYDROGEN RELEASE AND THE TIME OF IGNITION.

AROUND 2018, AB SPECIALTY SILICONES INSTALLED TWO LOWER EXPLOSIVE LIMIT, LEL, GAS DETECTOR SYSTEMS IN THE PRODUCTION BUILDING FOR A TRIAL EVALUATION.

THESE DETECTORS WERE NOT SPECIFICALLY INSTALLED IN THE EMULSIONS AREA TO DETECT HYDROGEN PRODUCED FROM THE EM 652 PROCESS AND HAD NOT BEEN APPROVED FOR PARTICULAR USE.

AROUND MARCH 2019, AB SPECIALTY SILICONES FOUND BOTH DETECTORS FAILED DUE TO UNRESPONSIVE SENSORS AND CONCLUDED THE SENSORS' EXPOSURE TO SILICON IN THE PRODUCTION ENVIRONMENT CAUSED THE FAILURE.

BY THE MAY 3rd INCIDENT, AB SPECIALTY SILICONES HAD NOT REPLACED EITHER DETECTOR, ESTABLISHED A SENSOR MAINTENANCE PROGRAM, OR IMPLEMENTED DESIGN CHANGES TO PREVENT SILICONE CONTACT WITH THE SENSORS.

AB SPECIALTY SILICONES -- AN AB SPECIALTY SILICONES MANAGER ESTIMATED THE SENSOR LIFECYCLE TO BE ABOUT TWO MONTHS, WHILE ANOTHER ASSERTED NO HYDROGEN GAS DETECTION SYSTEM WILL WORK IN A SILICONE ENVIRONMENT.

OTHERS IN INDUSTRY WITH SIMILAR MANUFACTURING APPLICATIONS TOLD THE CHEMICAL SAFETY BOARD THEIR FACILITY CONTAINS AUTOMATIC ALARMING DETECTORS TO WARN OF HAZARDOUS ATMOSPHERES.

THERE ARE NUMEROUS GAS DETECTION TECHNOLOGIES, EACH WITH ADVANTAGES AND DISADVANTAGES.

NOT ALL GAS DETECTION TECHNOLOGIES WILL WORK WITH ALL

MATERIALS, SUCH AS HYDROGEN GAS, SILICONE, ETCETERA.

FACILITIES MUST COMMUNICATE THE PLANNED APPLICATION AND THEIR OPERATING ENVIRONMENT WITH THE GAS DETECTOR MANUFACTURER TO HELP ENSURE THE CORRECT TECHNOLOGY IS SELECTED, IT'S PROPERLY INSTALLED, AND ADEQUATELY MAINTAINED.

THE STAFF PROPOSES A RECOMMENDATION TO AB SPECIALTY SILICONES IN THIS AREA FOR THE BOARD'S CONSIDERATION.

SAFETY ISSUE NUMBER SIX, EMERGENCY PREPAREDNESS.

AB SPECIALTY SILICONES' WORKERS WERE TRAINED ON WHAT TO DO DURING A PROCESS EMERGENCY AND WERE ABLE TO RECOGNIZE THAT A PROCESS UPSET HAD OCCURRED FROM THE OVERFLOWING TANK, FOAM, AND FOG.

AN EXCERPT FROM THEIR EMERGENCY TRAINING IS SHOWN TO THE RIGHT. HOWEVER, THEY DID NOT RECOGNIZE THE IMMEDIATE HYDROGEN HAZARD CREATED BY THE PROCESS UPSET OR THE NECESSITY TO EVACUATE.

WITHOUT GAS DETECTORS AND ALARMS ALERTING OF THE HAZARDOUS CONDITION.

HYDROGEN IS A COLORLESS AND ODORLESS GAS, INDISTINGUISHABLE FROM AIR WITHOUT THE USE OF ADDITIONAL TECHNOLOGY SUCH AS A GAS DETECTOR.

THE EM 652 BATCH TICKET WARNS THAT XL 10 IS REACTIVE WITH ACIDS AND BASES AND COULD GENERATE HYDROGEN.

SAFETY ISSUE NUMBER SEVEN, DOUBLE INITIAL PROCEDURE PROGRAM.

IN 2014, AB SPECIALTY SILICONES UTILIZED A DOUBLE INITIAL, TWO-PERSON VERIFICATION PRACTICE TO, ONE, PREVENT EMPLOYEES FROM CHARGING THE WRONG MATERIALS TO BATCH PROCESSES AND, TWO, AS PART OF THE FDA'S COSMETIC GOOD MANUFACTURING PRACTICE COMPLIANCE REQUIREMENT.

IN MARCH 2019, ABOUT TWO MONTHS

PRIOR TO THE INCIDENT, AB SPECIALTY SILICONES EXPERIENCED A NEAR-MISS EVENT INVOLVING TWO CHEMICALS STORED IN SIMILAR 55-GALLON BLUE METAL DRUMS. AS A RESULT, IN APRIL 2019, THE COMPANY PROCEDURALIZED ITS DOUBLE INITIAL PRACTICE AND RETRAINED ALL PRODUCTION EMPLOYEES.

PROCEDURE CONTROLS, HOWEVER, USED IN INDUSTRY SUCH AS THE DOUBLE INITIAL PROCEDURE, ARE LOW ON THE HIERARCHY OF CONTROLS, MORE LIKELY TO FAIL THAN ARE ENGINEERING CONTROLS AND SAFEGUARDS.

THERE WAS INSUFFICIENT EVIDENCE FOR THE CHEMICAL SAFETY BOARD TO DETERMINE THE SPECIFIC REASON FOR THE PROGRAM FAILURE ON MAY 3rd, 2019, THE DAY OF THE INCIDENT DUE TO, ONE, THE OPERATOR PERFORMING THE OPERATION WAS FATALLY INJURED AND, TWO, THE BATCH TICKET IN USE AT THE TIME OF THE INCIDENT, WHICH WOULD HAVE INCLUDED THE EMPLOYEES' INITIALS IN THE EVENT THE DOUBLE INITIAL PROCEDURE WAS FOLLOWED, WAS NEVER RECOVERED. SAFETY ISSUE NUMBER EIGHT, PROCESS SAFETY CULTURE.

AN ORGANIZATION'S SAFETY CULTURE IS DETERMINED BY BOTH THE QUALITY AND IMPLEMENTATION OF SAFETY MANAGEMENT PROGRAMS. IMPROVING AN ORGANIZATION'S PROCESS SAFETY CULTURE ONLY STARTS WITH MANAGEMENT.

IT ALSO REQUIRES COOPERATION AND INVOLVEMENT OF ALL EMPLOYEES RANGING FROM TOP-LEVEL MANAGEMENT TO THE OPERATOR.

IN THE YEAR LEADING UP -- IN THE YEARS LEADING UP TO THE INCIDENT, AB SPECIALTY SILICONES EXHIBITED CHARACTERISTICS OF A WEAK PROCESS SAFETY CULTURE SPECIFIC TO THE EM 652 PRODUCT, INCLUDING, ONE, THE LACK OF ENGINEERING CONTROLS TO MINIMIZE EMPLOYEE EXPOSURE TO KNOWN HYDROGEN RISK.

TWO, NOT PERFORMING A THOROUGH HAZARD ANALYSIS OF THE PROCESS FOLLOWING ITS 2014 DRUM EXPLOSION.

AND THREE, HEAVY RELIANCE ON PROCEDURAL CONTROLS AS PRIMARY SAFEGUARDS.

SAFETY ISSUE NUMBER NINE, SAFETY MANAGEMENT SYSTEM.

EFFECTIVE PROCESS SAFETY MANAGEMENT SYSTEMS, PRIMARILY FOCUSED ON PROCESS SAFETY, ARE CRITICAL TO PREVENT REACTIVE CHEMICAL INCIDENTS.

AB SPECIALTY SILICONES DID NOT HAVE A SAFETY MANAGEMENT SYSTEM THAT ADDRESSED PROCESS SAFETY IN PLACE AT THE TIME OF THE INCIDENT TO CONTROL REACTIVE HAZARDS.

INDUSTRY PUBLICATIONS, INCLUDING OSHA'S PROCESS SAFETY MANAGEMENT STANDARD AND ITS MINIMUM ELEMENTS, THE EPA'S RISK MANAGEMENT RULE, AND THE CENTER FOR CHEMICAL PROCESS SAFETY, EACH PROVIDE GUIDANCE ON DEVELOPING PROCESS SAFETY MANAGEMENT SYSTEMS TO CONTROL REACTIVE HAZARDS.

THE STAFF PROPOSES TWO RECOMMENDATIONS TO AB SPECIALTY SILICONES IN THIS AREA FOR THE BOARD'S CONSIDERATION.

SAFETY ISSUE NUMBER TEN, REGULATORY COVERAGE OF REACTIVE HAZARDS.

IN 1992, OSHA PROMULGATED THE PSM STANDARD, 29 CFR 1910.119, TO MANAGE CHEMICAL PROCESS SAFETY AND HELP PREVENT MAJOR INCIDENTS.

AND IN 1996, THE EPA PROMULGATED ITS RISK MANAGEMENT PLAN RULE 40 CFR 68.

THE AB SPECIALTY SILICONES EM 652 OPERATION IS NOT REGULATED BY OSHA'S PSM STANDARD NOR THE EPA'S RMP RULE BECAUSE THE CHEMICALS USED AT THE FACILITY ARE NOT LISTED FOR COVERAGE BY EITHER REGULATION.

IN 2002, THE CHEMICAL SAFETY BOARD PUBLISH A REACTIVE HAZARD

STUDY THAT FOUND MANY REACTIVE CHEMICALS THAT COULD CONTRIBUTE TO CATASTROPHIC INCIDENTS ARE NOT COVERED BY THE OSHA PSM STANDARD OR EPA RMP RULE BASED ON THEIR RESPECTIVE EXISTING SELECTION CRITERIA.

THE STAFF PROPOSES A REITERATION OF TWO PREVIOUS RECOMMENDATIONS, ONE TO OSHA AND THE OTHER TO THE EPA, IN THIS AREA FOR THE BOARD'S CONSIDERATION.

CHAIRMAN, THIS CONCLUDES THE STAFF PRESENTATION OF THE INCIDENT.

>> LaCerte: THANK YOU, VONZELLA. WE'LL GIVE THE CHAIRMAN ONE MORE SECOND HERE TO DOUBLE SHOOT A TECHNICAL DIFFICULTY.

>> Chairman Lemos: I HAVE IT ON. I CLOSED MY CAMERA JUST IN CASE.

>> LaCerte: YOU BET.

>> Chairman Lemos: GREAT.

SO THIS IS THE TIME AT WHICH I'M GOING TO ASK QUESTIONS ABOUT THE FACTUAL SECTION, CORRECT?

>> LaCerte: YES.

>> Chairman Lemos: OKAY, EXCELLENT.

I JUST WANTED TO MAKE SURE WE WEREN'T IN ANY PART OF THE QUESTIONING.

THIS PART OF THE QUESTIONING IS GOING TO COVER THE FACTUAL ONLY. THANK YOU, INVESTIGATOR VINCENT. THAT WAS AN EXCELLENT PRESENTATION.

I LEARNED A LOT FROM YOU, NOT JUST TODAY, BUT OVER THE PAST MONTH OR SO.

SO IN THE FACTUAL SECTION, WE TALK ABOUT THE COMPLETENESS OF -- OR THE PROCEDURES FOR THE EM BATCH 652 PROCESS.

WAS THERE -- DID YOU AND ANY OF YOUR COLLEAGUES CONDUCT A COMPREHENSIVE ANALYSIS OF THE ENTIRE PROCEDURE TO SEE IF THERE WERE GAPS THAT COULD HAVE LED TO SOME OF THE OMISSIONS OR COMMISSIONS THAT YOU IDENTIFIED?

>> Vincent: IN OUR INVESTIGATION, WE DID SPEAK TO SEVERAL EMPLOYEES AND HAD THEM

TO EXPLAIN TO US THE PROCESS IN WHICH THEY UNDERTAKE WHAT THEY ARE DOING, THE EM 652 BATCH OPERATION.

AND IT APPEARS THAT THE WRITTEN PROCEDURES OF THE SITE WERE FOLLOWED SUCH AS THEY OBTAINED A CURRENT BATCH TICKET, WHICH IS THE STEP-BY-STEP INSTRUCTIONS TO PERFORM THE OPERATION.

THE INGREDIENTS THAT WERE LISTED ON THE BATCH TICKET TO MANUFACTURE THE PROCESS WERE OBTAINED, AND THEY FOLLOWED THE STEPS IN CHARGING THE MATERIAL. WHERE THERE ARE GAPS, AS I MENTIONED, THAT THERE IS NOT A WRITTEN PROCEDURE THAT REQUIRES PARTIAL CONTAINERS -- CHEMICAL CONTAINERS TO BE REMOVED FROM THE AREA, WHICH LIKELY HEAD TO INCOMPATIBLE MATERIALS BEING IN THE AREA AND ALSO THERE'S NO REQUIREMENT THAT THE INCOMPATIBLE MATERIAL HAD TO BE STORED IN CONTAINERS THAT WERE EASIER VISIBLE FROM THE EYE.

>> Chairman Lemos: OKAY, SO ONE QUESTION.

IS THE DOUBLE INITIAL PROCEDURE ALIGNED WITH ACSS GUIDANCE.

>> A DOUBLE INITIAL PROCEDURE IS A PRACTICE THAT IS USED IN INDUSTRY.

HOWEVER, AS MENTIONED, WHEN YOU LOOK AT THE HIERARCHY OF CONTROLS, PROCEDURAL CONTROLS WHICH THE DOUBLE INITIAL PROGRAM WOULD HAVE FALLEN UNDER ARE LOWER, SO WE ENCOURAGE AND WE DEFINITELY SUGGEST TRYING TO USE ONE OF THE CONTROLS THAT ARE HIGHER IN THE HIERARCHY SUCH AS ENGINEERING CONTROLS, AND THAT WAY, THAT MINIMIZES OR IT REDUCES THE RELIANCE ON THE HUMAN FACTOR.

>> Chairman Lemos: SO JUST THE DOUBLE INITIAL PROCEDURE THAT ABSS EMPLOYED, IT DID ALIGN -- WAS IT CONSISTENT WITH THE GUIDANCE?

I DON'T KNOW HOW SPECIFIC THE GUIDANCE IS, BUT WAS IT

CONSISTENT WITH THE GUIDANCE?

>> Vincent: AS FAR AS THE INDUSTRY GUIDANCE, IT JUST ASKS FOR A SECOND VERIFICATION, LOOKING TO ENSURE THAT THE CORRECT MATERIAL -- THE MATERIAL HAS THE CORRECT, WHETHER IT'S THE NAME, WHETHER IT'S THE LOT NUMBER.

SO FROM THAT PERSPECTIVE, IT DOES, BUT AGAIN, IT IS LOWER ON THE HIERARCHY OF CONTROLS THAT SHOULD BE UTILIZED.

YOU SHOULD DEFINITELY TRY TO USE MORE OF YOUR ENGINEERING CONTROLS THAT ARE HIGHER THAT WILL MINIMIZE SOME OF THAT RISK OF HUMAN ERROR.

>> Chairman Lemos: SO I'M A FIRM BELIEVER OF THE HIERARCHY CONTROLS AND THE SYSTEM SAFETY ORDER OF PRECEDENCE IN ENGINEERING, AND DEFINITELY YOU WANT TO ENGINEER THINGS OUT -- ERRORS OUT OF THE SYSTEM.

I WAS JUST -- SO WHAT YOU'RE SAYING IS THE GUIDANCE OUT THERE TODAY IS NOT SPECIFIC, IT ASKS FOR A DOUBLE VERIFICATION BY TWO PEOPLE.

DOES IT SAY WITHIN A TIMEFRAME THAT THEY WOULD HAVE TO EXECUTE MIXING A BATCH OR DISCHARGING IT, OR SIT JUST THAT YOU NEED -- IS IT JUST THAT YOU NEED A SIGNATURE?

COULD THEY HAVE GONE TO LUNCH BETWEEN?

COULD SOMETHING HAVE HAPPENED THAT CAUSED THE GAP IN CONTROL?

>> Vincent: I CAN'T SAY WHETHER OR NOT THE PROCEDURE -- THE GUIDANCE GIVES THOSE SPECIFIC DETAILS, BUT ANOTHER GUIDANCE THAT IS ALSO GIVEN AS A SUGGESTION IS TO TRY TO ONLY BRING YOUR INGREDIENTS OR MATERIALS IN JUST BEFORE YOU NEED THEM.

SO MINIMIZING THAT TIME THAT THEY COULD BE STAGED.

SO LIKE USING JUST-IN-TIME PROCESS, SO THAT'S A SEPARATE GUIDANCE THAT'S OUT THERE FROM

JUST THE DOUBLE -- TWO-PERSON
INITIAL.

SO A SEPARATE GUIDANCE IS
JUST-IN-TIME PHILOSOPHY.

>> Chairman Lemos: THAT SOUNDS
GREAT.

WHO PRODUCES THAT?

>> Vincent: YOUR SAME TYPE OF
INDUSTRY, WHETHER IT'S -- THE
SAME TYPE OF CPCS AND THOSE OF
THAT NATURE, THEY GIVE THOSE
SAME TYPES OF INFORMATION AND I
DON'T HAVE THE EXACT REFERENCE
IN FRONT OF ME.

>> Chairman Lemos: OKAY, THAT
WOULD BE HELPFUL.

IF -- SO WE -- YOUR REVIEW OF
THE DOUBLE INITIAL PROCEDURE
THAT ABSS DID CREATE, DO WE HAVE
REASON TO BELIEVE THAT IF THE
OPERATORS FOLLOWED THAT, BECAUSE
ONE HAD TO BE THE FIRST OPERATOR
AND THEN THE SECOND THE
VERIFIER, DO WE HAVE TO REASON
TO BELIEVE THAT IF IT WAS
FOLLOWED, THE OUTCOME WOULD HAVE
RESULTED IN MINIMUM ROOM FOR
ERROR?

>> Vincent: THE PROCEDURE AS
WRITTEN COULD DEFINITELY BE
ENHANCED WITH SOME ADDITIONAL
DETAILS, BUT I CAN'T SAY WHETHER
OR NOT, JUST FOLLOWING THOSE
PROCEDURES EXACTLY, WHETHER THE
INCIDENT COULD HAVE BEEN
AVOIDED.

LIKE I SAID, THEY'RE THERE, YOU
SIGN ON THE BATCH SHEET.
ALL YOUR DRUMS ARE THERE, SO I
CAN'T MAKE THAT ASSUMPTION IF
THEY HAD FOLLOWED EVERYTHING ON
THE BATCH SHEET, COULD THE
INCIDENT HAVE BEEN AVOIDED.
I CAN SAY THAT THE EXISTING
BATCH SHEET COULD BE ENHANCED
WITH ADDITIONAL INSTRUCTIONS AND
BASED ON INFORMATION THAT I WAS
TOLD, THEY WERE LOOKING AT
MAKING A REVISION AND HAD
DRAFTED PUTTING SOME MORE DETAIL
AND CONTENT IN THE PROCEDURE.

>> Chairman Lemos: I APPRECIATE
THAT AND THAT'S EXACTLY WHAT I'M
TRYING TO GET AT IS THAT WHETHER

OR NOT THE DOUBLE INITIAL
PROCEDURE FOLLOWED ACC'S GENERAL
GUIDANCE, IT APPARENTLY DID NOT
PREVENT THIS PARTICULAR
INCIDENT.

ALONG WITH OTHER THINGS THAT YOU
MENTIONED, STORAGE, LABELING,
BUT IT DID NOT -- IT WASN'T
SUFFICIENT TO PREVENT THIS,
CORRECT?

>> Vincent: WE DO NOT HAVE THE
ACTUAL DOCUMENT THAT THEY -- IF
THEY DID FOLLOW IT, THAT WAS
DONE.

SO THAT WOULD BE MAKING AN
ASSUMPTION.

>> Grim: IF I CAN JUMP IN, TOO.
THIS IS LAUREN GRIM.

THE DOUBLE INITIAL PROCEDURE IS
AN ADMINISTRATIVE CONTROL, SO AS
VONZELLA SAID PREVIOUSLY, THAT
IS THE LOWEST ON YOUR HIERARCHY
OF CONTROLS.

SO WHILE THE INDUSTRY DOES --
SCHE IN PARTICULAR AS MENTIONED,
THE DOUBLE PROCEDURE CONTROL AS
A METHOD THAT COMPANIES CAN USE
TO HELP PREVENT A REACTIVE
INCIDENT, THE CSB FOUND THAT
THAT KIND OF CONTROL ON ITS OWN
IS NOT EFFECTIVE AND GOING BACK
HISTORICALLY TO MANY OF THE
INCIDENTS WE'VE INVESTIGATED IN
THE PAST, PROCEDURES ONLY CAN
FAIL, AND WE SEE THAT HERE
AGAIN.

AND THERE'S A WIDE VARIETY OF
REASONS WHY PROCEDURES CAN FAIL.
IT CAN BE ERRORS WITHIN THE
PROCEDURE ITSELF.

IT COULD BE OVERSIGHT IN THE
MOMENT OF SPECIFIC STEPS.

IT COULD BE, IN THIS CASE, WHAT
WE BELIEVE IS JUST

MISIDENTIFYING ONE KEM CAL FOR
ANOTHER BECAUSE OF THE WAY THE
CHEMICALS WERE STORED IN THE
PRODUCTION FACILITY.

SO ON ITS OWN, PARTICULAR
CONTROLS LIKE THAT ARE A VERY
WEAK CONTROL, AND SO THEREFORE,
HAVING MORE ROBUST SAFEGUARDS
LIKE STORING INCOMPATIBLE
MATERIALS IN DIFFERENT

CONTAINERS THAT LOOK DISSIMILAR,
THAT'S VERY CLEAR TO THE NAKED
EYE THAT THESE ARE TWO SEPARATE
INCOMPATIBLE MATERIALS, THAT CAN
SIGNIFICANTLY HELP PREVENT THIS
KIND OF INCIDENT.

IN ADDITION, OTHER CONTROLS LIKE
HARD PIPING, FOR EXAMPLE, SO YOU
DON'T HAVE TO BRING THE
CHEMICALS INTO THE PRODUCTION
FACILITY IN THE FIRST PLACE,
THAT'S A SOLUTION.

WE KNOW THERE ARE BARCODE
SCANNING SYSTEMS, TOO, THAT WILL
PREVENTED A -- PREVENT ADDITION
OF CHEMICALS.

THERE'S A MULTITUDE OF WAYS
BEYOND JUST THE USE OF PROCEDURE
TO PREVENT THIS TYPE OF
INCOMPATIBLE MIXING INCIDENT.

>> Chairman Lemos: THANK YOU SO
MUCH, LAUREN.

AND I AGREE WITH YOU.

I THINK THE POINT WE'RE GETTING
AT HERE IS THAT THERE WERE
POTENTIALLY A MULTITUDE OF
FACTORS THAT CONTRIBUTED TO THIS
PARTICULAR OUTCOME.

HOWEVER IT WAS ACHIEVED, THE
OUTCOME IS CERTAIN.

WE'RE AWARE OF WHAT THE OUTCOME
WAS.

I AT FIRST WAS FOCUSING ON THE
LABELING, YOU KNOW, IF YOU HAVE
A DOUBLE INITIAL VERIFICATION,
YOU HAVE TO ACTUALLY LOOK AT THE
LABEL, DESPITE HOW SMALL THE
LETTERS, BIG THE LETTERS ARE,
THE FACT THE CONTAINERS ARE BOTH
BLUE, YOU WOULD HAVE TO STRIVE
THAT THIS IS ONE CLEM -- TO
VERIFY THAT THIS IS ONE CHEMICAL
VERSUS ANOTHER AND WHEN I LOOK
AT THE LABELS ALONE, THEY SEEM
PRETTY CLEAR TO ME THAT YOU
WOULD HAVE TO HAVE A NUMBER OF
OTHER THINGS IN PLACE TO ENSURE
THAT YOU'VE IDENTIFIED AND
SEPARATED AND COUNTED AND
WEIGHED ALL OF THE CHEMICALS
THAT ARE GOING TO GO INTO THE
BATCH.

OTHERWISE, WE WOULDN'T END UP
WITH THREE CHEMICALS, WE'D END

UP WITH ONLY TWO CHEMICALS,
WHICH THE OPERATOR BELIEVE THEY
DID, CORRECT?

>> Grim: CORRECT.

THE EXISTENCE OF THE CHEMICALS
IN THE AREA, IN THE SIMILAR
CONTAINERS, CONTRIBUTED TO THEM
BEING ADDED TO THE PROCESS.

>> Chairman Lemos: SO THAT WOULD
SAY THEY DIDN'T FOLLOW THE
DOUBLE INITIAL PROCEDURE OR IF
THEY DID, THEN THEY DIDN'T --
THERE WAS SOMETHING MISSING FROM
IT THAT -- BECAUSE THE LABELS
WERE DIFFERENT AND ONE SAYS
XL 10 AND ONE SAYS KOH,
SOMETHING WOULD HAVE TO HAVE
HAPPENED AFTER THEY VERIFIED
THAT, ASSUMING THEY DID, FOR
SOMETHING TO GO WRONG, CORRECT?
NOT JUST JUST BOTH ARE BLUE,
BECAUSE THERE ARE A LOT OF BLUE
CONTAINERS.

>> Vincent: RIGHT, THEY COULD
HAVE POSSIBLY NOT HAVE FOLLOWED
IT OR MULTIPLE PEOPLE COULD HAVE
MISIDENTIFIED.

>> Chairman Lemos: WHICH MEANS,
THEY WEREN'T VERIFYING ACCORDING
TO PROCEDURE, RIGHT?

>> Vincent: THE PROCEDURE DOES
REQUIRE THEM TO LOOK AT LOT
NUMBERS AND THE CHEMICAL ITSELF,
YES, IT DOES REQUIRE THAT.

>> Chairman Lemos: OKAY.
ALL RIGHT.

SO I BELIEVE THAT WE CAPTURE IN
THE FACTUALS AN AMOUNT OF
UNCERTAINTY OF WHAT EXACTLY
HAPPENED IN THIS EVENT, BUT WE
DO KNOW THE OUTCOME, AND THE
OUTCOME WAS VERY UNFORTUNATE AND
UNNECESSARY.

IF WE HAD A MORE COMPREHENSIVE
AND SYSTEMIC SYSTEM TO ADDRESS
THIS HAZARD, RIGHT?

>> Vincent: YES.

>> Chairman Lemos: SO I'D LIKE
TO TALK A LITTLE BIT ABOUT THE
COMPANY, WHAT YOU THINK THE
COMPANY'S KNOWLEDGE OF THE
HAZARDS OF HYDROGEN ARE.
THERE WAS A 2014 EVENT AND MAYBE
YOU CAN WALK ME THROUGH THAT,

BUT THERE WAS AN EVENT THAT PROMPTED THE COMPANY TO PUT A LABEL ON THE BATCH TICKET FOR EM 652 THAT SAYS THAT HYDROGEN COULD BE PRODUCED.

SO WHAT CONCERNS ME IS I'M NOT REALLY SURE THAT THAT COMMUNICATED TO THE EMPLOYEE WHAT THE RISK OF HYDROGEN IS, OTHER THAN HYDROGEN COULD BE PRODUCED.

CAN YOU TELL ME MORE ABOUT WHAT THEY LEARNED FROM THAT EVENT AND WHAT ACTION THEY TOOK?

>> Vincent: I CAN DEFINITELY TELL YOU, AS I MENTIONED, ONE OF THE THINGS THAT WERE CONCLUDED, THEY DID A NEAR-MISS EVENT INVESTIGATION, AND ONE OF THE CONCLUSIONS OF THAT WAS DUE TO THE LACK OF A PROCESS HAZARD ANALYSIS.

SO IT WAS LEARNED THAT THEY NEEDED TO DO THAT.

NOW, WHY THAT HAD NOT BEEN DONE AT THE TIME OF THIS INCIDENT, I CANNOT EXPLAIN THE REASON FOR THAT, BUT IT WAS CLEARLY DOCUMENTED THAT THAT WAS ONE OF THE CONCLUSIONS FROM THAT EVENT. AT LEAST SOME THAT WE SPOKE TO WERE VERY FAMILIAR THAT HYDROGEN GAS COULD BE PRODUCED, GENERATED FROM THE PRODUCT.

SOME WERE NOT AS AWARE FROM THAT PERSPECTIVE, BUT IT'S ALSO CLEAR THAT IN THIS PARTICULAR INCIDENT, WHEN IT HAPPENED, THEY DIDN'T RECOGNIZE THE HAZARDS THAT WAS ASSOCIATED WITH THE HYDROGEN WHEN THE INCIDENT IN MAY OCCURRED.

>> Chairman Lemos: SO THAT'S HITTING RIGHT ON THE -- RIGHT WHERE I'M GOING, IS THAT I'M NOT SURE THAT I SAW NA ANY OF THE FACTUAL INFORMATION -- SAW IN ANY OF THE FACTUAL INFORMATION OR THE UNDERLYING INTERVIEWS THAT ABSS ACTUALLY COMMUNICATED TO EMPLOYEES WHAT THE IMPACT OF HYDROGEN IS.

MAYBE I HAD A SKULL OR CROSSBONES AS THEY DO ON FENCE

LINES, IT WOULD BE EASIER TO RECOGNIZE THAT THE FACT THAT HYDROGEN COULD BE PRODUCED OR RESULT FROM X, Y AND Z, I'M NOT REALLY SURE THAT TELLS ME WHAT MY RISK IS AND WHAT I SHOULD DO IN THAT EVENT.

AND SOME OF THE INTERVIEWS THAT WERE CONDUCTED, THE EMPLOYEES MENTIONED THAT THEY DID NOT KNOW.

WAS THAT YOUR CONCLUSION?

>> Vincent: YES.

WE ACTUALLY HAD SOME WHO WERE NOT AWARE, ONE, OF THE HYDROGEN AND THAT SUCH AN EXPLOSION COULD EVEN OCCUR.

WE HAD INTERVIEWS WHERE EMPLOYEES DID SHARE THAT.

>> Chairman Lemos: THANK YOU SO MUCH.

ANOTHER QUESTION ON THAT, WAS IT THE 2019 EVENT SEVERAL MONTHS PRIOR TO THIS INCIDENT THAT WE'RE DISCUSSING TODAY, THAT PROMPTED ABSS TO FORMALIZE THEIR DOUBLE INITIAL PROCEDURE?

BECAUSE IT SEEMS LIKE IN 2014 FOLLOWING AN EVENT WHICH I'M NOT SURE THAT IT WAS RELATED TO EM 652, BUT IT WAS AROUND THE SAME TIMEFRAME, THEY INITIATED A DOUBLE INITIAL PROCEDURE, BUT THEN IT -- CAN YOU CONFIRM, WAS IT NOT FORMALIZED IN WRITING AND TRAINED UNTIL TWO MONTHS PRIOR TO THE INCIDENT?

>> Vincent: YES.

SO IT WAS A PRACTICE AND I BELIEVE IT WAS 2014 THEY INTRODUCED THE PRACTICE OF THE DOUBLE INITIAL PROCEDURE, AND AS I SAID, IT WAS A TWOFOLD PRACTICE.

IT WAS ONE FOR -- TO MINIMIZE THE WRONG MATERIAL BEING CHARGED, AND THE SECOND WAS BASED ON THE BUSINESS THAT AB SPECIALTY IS IN BECAUSE THEY DO MORE THAN THE EM 652. THEY ALSO HAVE COSMETICS AND OTHER THINGS THAT THE FDA REQUIRED THEM TO HAVE THE DOUBLE INITIAL.

SO IT WAS A PRACTICE.
HOWEVER, YOU ARE CORRECT.
WITH THE INCIDENT THAT OCCURRED
IN MARCH WHERE IT WAS THE TWO
MATERIALS THAT WERE IN SIMILAR
BLUE METAL DRUMS, AFTER THAT
INCIDENT WAS WHEN THEY ACTUALLY
PROCEDURALIZED THE PRACTICE AND
RETRAINED THE EMPLOYEES.
>> Chairman Lemos: OKAY, THANKS
FOR CLARIFYING THAT.
MOVING ON TO GAS DETECTION AND
ALARM SYSTEMS WHICH YOU COVERED.
CAN YOU TELL ME THE SIGNIFICANCE
OF THE, QUOTE-UNQUOTE, TWO-MONTH
LIFECYCLE FOR THE SENSORS THAT
WERE INSTALLED?
>> Vincent: YES.
THE SENSORS THAT WAS INSTALLED
WAS USED IN A TYPE OF CATALYTIC
BEAD SENSOR AND IN PUBLISHED
LITERATURE, IT'S READILY
AVAILABLE THAT SILICONE CAN
SHORTEN THE LIFE OF THOSE
SENSORS.
THEY USE THE TERM POISON THE
SENSOR.
SO IT'S NOTHING WRONG WITH THE
TECHNOLOGY THEY CHOOSE -- THEY
CHOSE.
HOWEVER, IN CHOOSING THAT
TECHNOLOGY, THERE'S ALSO
RESPONSIBILITY TO MAINTAIN THAT.
SO WHERE IN SOME SCENARIOS YOU
MAY HAVE SENSORS THAT, IF
THEY'RE PROPERLY MAINTAINED,
THEY'RE CALIBRATED, THEY'RE
INSPECTED, THEY MAY LAST FOR,
HYPOTHETICALLY, A YEAR, TWO
YEARS, WHATEVER THE CASE MAY BE.
BUT IN THIS PARTICULAR CASE,
BECAUSE THE TECHNOLOGY THAT WAS
BEING EVALUATED HAD A KNOWN RISK
TO BE POISONED, THEN IT WAS
KNOWN THAT THEY WOULD HAVE TO
CHANGE IT.
ONE MANAGER SHARED THAT HE
ESTIMATED THE LIFECYCLE TO BE
ABOUT TWO MONTHS AND WHICH THAT
MEANT THAT IF YOU HAD THAT IN
YOUR FACILITY AND YOU KNOW
THAT'S THE SITUATION, THEN YOUR
ROBUST MAINTENANCE PROGRAM NEEDS
TO BE ADEQUATELY DEVELOPED AND

FOLLOWED SO THAT YOU ARE MAKING THE APPROPRIATE REPLACEMENT IN A TIMELY MANNER, WHICH MAY HAVE A FINANCIAL IMPACT TO IT IF YOU DECIDE TO GO WITH THAT TYPE OF TECHNOLOGY.

>> Chairman Lemos: THAT'S HELPFUL, THANK YOU.

IN THE FACTUAL, IT STATES THAT THE SYSTEMS, THE TWO THEY WERE TESTING, WERE NOT DESIGNED TO ADDRESS HYDROGEN.

HOW -- I MEAN, IF THEY WERE NOT INSTALLED FOR HYDROGEN, THEN HOW IS IT RELEVANT HERE?

>> Vincent: THEY WERE NOT INSTALLED FOR THE HYDROGEN PRODUCED FROM THE EM 652 PROCESS.

SO WHERE THEY WERE INSTALLED AT WAS NOT IN THE AREA WHERE THIS PROCESS WAS TAKING PLACE.

SO THEY WEREN'T SPECIFICALLY INSTALLED FOR THE EM 652 PROCESS.

>> Chairman Lemos: AND SO THEY WERE INSTALLED IN A DIFFERENT LOCATION, THEY WERE NOT INSTALLED SPECIFICALLY FOR HYDROGEN, THEY WERE INSTALLED FOR SEVERAL OTHER CHEMICALS DETECTING.

IF THEY WERE WORKING AND THE SENSORS WERE NOT, I GUESS, CLOGGED FOR LACK OF A BETTER WORD.

I BELIEVE THAT'S ONE OF THE WORDS THAT WERE USED.

IF THE SENSORS WERE FUNCTIONING, COULD IT HAVE DETECTED THE HYDROGEN?

>> Vincent: THEY WERE CALIBRATED FOR MULTIPLE GASES AND IF THE DEVICES WERE PROPERLY OPERATING AND THE EXPLOSIVE LIMITS WERE REACHED, YES, THE UNIT WAS DESIGNED FOR, IT WOULD HAVE DEFINITELY WARNED THE EMPLOYEES OF A HAZARDOUS CONDITION OF THE PARTICULAR GAS THAT IT WAS CALIBRATED TO GIVE OFF AN ALARM FOR, YES.

>> Chairman Lemos: OKAY.

SO LET'S TALK ABOUT THE LOCATION

WHERE THE SENSORS WERE PLACED AND WHERE THE EVENTS AND THE EMULSIONS PRODUCTION FOR EM 652. WERE THE SENSORS IN A LOCATION THAT WOULD HAVE DETECTED, THAT COULD HAVE DETECTED?

>> Vincent: IF THE GAS WAS RELEASED INSIDE THE PRODUCTION BUILDING, IF YOU RECALL WHEN I WAS SHOWING WHERE THE EMULSIONS AREA WAS AT, THAT'S THE AREA OF THE BUILDING WHERE EM 652 WAS MANUFACTURED AT.

THE SENSORS WERE STILL INSIDE THE BIG PRODUCTION BUILDING, BUT IT WASN'T IN THOSE MANUFACTURING AREAS.

SO IF THERE WAS A RELEASE THAT TRAVELED THROUGH THE BUILDING TO THE OTHER AREAS WHERE THEY WERE INSTALLED AND THEY WERE PROPERLY FUNCTIONING, IT WAS A GAS THAT WAS CALIBRATED -- THAT THE DETECTORS WAS CALIBRATED FOR, YES, IT WOULD HAVE PICKED IT UP IF ALL THOSE CONDITIONS I JUST MENTIONED WERE MET.

>> Chairman Lemos: OKAY, SO IT WOULD HAVE TAKEN LONGER TIME PERIOD, SO IT WOULD NOT HAVE BEEN IMMEDIATELY BECAUSE THEY WERE MUCH FURTHER AWAY FROM THE ACTUAL AREA --

>> Vincent: THE RELEASE WOULD HAVE HAD TO MOVE FROM THE EMULSIONS AREA TO THE AREAS WHERE THEY WERE INSTALLED, STILL WITHIN THAT LOW BAY PRODUCTION BUILDING, BUT OUTSIDE THE EMULSIONS AREA.

>> Chairman Lemos: OKAY. SO WE DON'T KNOW HOW MUCH TIME IT WOULD HAVE TAKEN, BUT WE DO KNOW FROM THE VENTILATION DISCUSSION THAT YOU PRESENTED THAT THE AIR WAS IN MORE OR LESS ONE LARGE ROOM.

IT MIGHT HAVE TAKEN LONGER, BUT WE DON'T KNOW HOW MUCH LONGER, BUT CERTAINLY IT WASN'T -- THE DETECTION SYSTEM WASN'T DESIGNED FOR THAT CHEMICAL RELEASE OR FOR THAT BATCH, CORRECT?

>> Vincent: CORRECT.

THE LELs THAT WAS INSTALLED WERE NOT SPECIFIC FOR THE EM 652 PROCESS.

>> Chairman Lemos: OKAY. SO WAS THERE ANY CONSIDERATION, DO YOU KNOW, OF PLACING THIS PROCESS OUTSIDE?

I DON'T KNOW IF IT'S EVEN REASONABLE OR POSSIBLE TO HAVE THIS TYPE OF PROCESS OUTSIDE, ESPECIALLY IN A NORTHERN ENVIRONMENT, BUT DO YOU KNOW ANYTHING ABOUT WHETHER THAT'S EVEN POSSIBLE OR IT SHOULD HAVE BEEN CONSIDERED?

>> Vincent: THAT IS DEFINITELY A CONSIDERATION.

AGAIN, IT GOES BACK, WHEN A COMPANY IS DOING A THOROUGH ANALYSIS OF THEIR PROCESS AND UNDERSTANDING RISK, THAT'S DEFINITELY AN OPTION THEY COULD HAVE LOOKED AT.

BUT IT'S A BUSINESS RISK ASSESSMENT AND PROCESS ANALYSIS THAT THE COMPANY NEEDS TO DO TO DETERMINE, IS AN OUTSIDE OPERATION SOMETHING THAT WILL WORK FOR THEM.

AND IF IT IS, THEN THEY NEED TO DESIGN ACCORDINGLY, AND WE ALL KNOW IN CHICAGO AND THE WEATHER AND THE TEMPERATURES THERE, IS THAT ADEQUATE FOR THIS PROCESS? THAT'S NOT FOR US TO DETERMINE. THAT'S THEM -- THE COMPANY AS PART OF THEIR ANALYSIS TO MAKE THOSE TYPES OF DECISIONS, AND IF THEY DETERMINE THAT'S NOT AN ADEQUATE SOLUTION AND THEY WANT TO DO IT INSIDE, THEN THE PROPER DETECTIONS AND OTHER ENGINEERING EQUIPMENT NEEDS TO BE IN PLACE TO PROPERLY MITIGATE ANY RISK THERE AS WELL, OR EVEN THIRDLY, A COMPANY MAY DECIDE WHEN THEY'RE DOING THE ASSESSMENT THAT THEY JUST DON'T WANT TO BE IN THAT BUSINESS, WHETHER IT'S A FINANCIAL REASON OR NOT BEING ABLE TO MITIGATE THE RISK IN AN APPROPRIATE MANNER.

SO THAT'S ALL TIED INTO WHEN YOU ARE THOROUGHLY ANALYZING YOUR

PARTICULAR PROCESS FOR THE ENVIRONMENT THAT'S UNIQUE TO YOUR FACILITY AND YOUR PRODUCT.

>> Chairman Lemos: VERY WELL SAID.

THAT SPEAKS TO THE NEED FOR A COMPREHENSIVE SAFETY MANAGEMENT SYSTEM, WHICH LOOKS AT ALL THESE DIFFERENT FACTORS, NOT JUST ONE, BECAUSE YOU CAN INTRODUCE MORE SAFETY IN ONE ELEMENT AND HAVE UNINTENDED NEGATIVE CONSEQUENCES BY IMPLEMENTING THAT, CORRECT?

>> Vincent: CORRECT.

>> Chairman Lemos: ONE THING THAT WASN'T MENTIONED, WAS THERE AN ALARM ELEMENT -- SO IF THE SENSORS WERE THERE, THEY DETECTED THE HYDROGEN, I MEAN, MEANING VERY CLOSE TO THE EM 652 BATCH PROCESSING EMULSIONS AREA AND THE DETECTION SYSTEM WAS FUNCTIONING, WHAT SORT OF INDICATION WOULD THE OPERATOR HAVE RECEIVED OR SOMEBODY HAVE RECEIVED OF THIS HIGH LEVEL OF HYDROGEN?

>> Vincent: WE WERE TOLD IN OUR INTERVIEW THAT THE PARTICULAR DEVICES THAT WERE BEING EVALUATED DID -- WHEN THEY ARE WORKING AND FUNCTIONING, HAD AUDIBLE AND VISUAL INDICATORS ON THEM.

>> Chairman Lemos: OKAY. AUDIBLE AND VISUAL, BUT THEY WEREN'T AUTOMATIC, CORRECT? THEY WOULD NOT HAVE SHUT DOWN OR ENGAGED --

>> Vincent: THEY WOULD NOT HAVE SHUT DOWN THE PROCESS EQUIPMENT, BUT IT WOULD HAVE GIVEN THEM SOME TYPE OF SOUND, HORNS, INDICATION AS WELL AS A LIGHT -- COLORED LIGHT WOULD HAVE BEEN VISUAL.

IT WOULD HAVE BEEN VISUAL AND AUDIBLE, NOT SHUTTING DOWN YOUR PROCESS, STOPPING YOU FROM CONTINUING FROM A PROCESS PERSPECTIVE.

>> Chairman Lemos: OKAY, ALL RIGHT.

THANKS FOR CLARIFYING THAT.

SO IN ESSENCE, WE KNOW THAT THE SYSTEMS THAT WERE UNDER -- THAT WERE NOT CONFIRMED OR CERTIFIED FOR THIS USE WEREN'T FUNCTIONING, IF THEY WERE CLOSE AND FUNCTIONING, THEY COVER DETECTED AND ALERTED -- THEY COULD HAVE DETECTED AND ALERTED OPERATORS TO MANUALLY TAKE ACTION, BUT THEY WEREN'T AND I BELIEVE YOU SAID THERE IS TECHNOLOGY OUT IN THE UNIVERSE TODAY THAT WOULD ADDRESS, WOULD DETECT AND WITHOUT MAYBE THE ISSUE -- I THINK THE ISSUE WITH THIS PARTICULAR SYSTEM IS THAT IT REQUIRED A FAST MAINTENANCE CYCLE, WHICH, I BELIEVE YOU SAID THEY DIDN'T HAVE A MAINTENANCE CYCLE.

>> Vincent: CORRECT.
WE'VE SPOKEN TO OTHER -- ANOTHER COMPANY IN A -- THAT MANUFACTURES SIMILAR APPLICATIONS AND ENVIRONMENTS ARE SIMILAR, THAT SAYS THEY HAVE A ROBUST PROGRAM AND THEY DO HAVE DETECTORS WITH ALARMING SYSTEMS TO NOTIFY OF HAZARDOUS ATMOSPHERES.
NOW, I DON'T KNOW HOW FREQUENTLY THEY HAVE TO CHANGE OR WHAT THEIR FREQUENCY OF INSPECTING, BUT AGAIN, THAT GOES BACK TO WHEN YOU SELECT WHATEVER TECHNOLOGY WITH THE MANUFACTURER, YOU ESTABLISH ALL THOSE.

BUT WE HAVE BEEN TOLD THAT TODAY, A FACILITY DOES HAVE FUNCTIONING DETECTORS THAT ALARM AND NOTIFY EMPLOYEES THAT THE CONDITIONS HAVE CHANGED IN THE FACILITY WHERE IT'S A HAZARDOUS CONDITION.

ALONG WITH THEIR ROBUST MAINTENANCE PROGRAM.

>> Chairman Lemos: TO INCLUDE HYDROGEN IN A SILICONE ENVIRONMENT?

>> Vincent: YES, MM-HMM.

>> Chairman Lemos: OKAY.

SO I'LL NOW MOVE ON TO THEIR SAFETY MANAGEMENT SYSTEMS, OR

SAFETY MANAGEMENT.

YOU ADDRESSED THEIR TSR, BUT IN ESSENCE, WHAT DID YOU LEARN ABOUT THE COMPANY'S SAFETY MANAGEMENT SYSTEM AND WHAT IT DID ADDRESS?

>> Vincent: SO AS WE'RE TALKING ABOUT THEIR TECHNICAL SERVICE REQUEST, THAT -- WHAT I'VE LEARNED FROM THAT PROCESS IS THAT'S USED MORE FROM A BUSINESS PERSPECTIVE, NOT NECESSARILY A PROCESS RISK HAZARDOUS ASSESSMENT.

IT'S LOOKING AT, YOU KNOW, SHOULD YOU -- SHOULD WE DO THIS, THIS IS A NEW PRODUCT, DOES IT MAKE SENSE FOR US TO DO IT FROM A REVENUE PERSPECTIVE, FROM THE EQUIPMENT WE CURRENTLY HAVE, WHAT TYPE OF INVESTMENTS WILL BE NEEDED, VERSUS WHAT ARE THE TRUE PROCESS OPERATION RISKS THAT MAY BE ASSOCIATED WITH THAT.

THAT IS WHAT I WAS ABLE TO GATHER FROM THE PROCESS THAT WAS PROVIDED AS WELL AS LOOKING AT THE TWO SPREADSHEETS THAT -- ON THE PROCESS REVIEWS GOING FORWARD FOR EM 652, NEITHER OF THOSE DOCUMENTED HAZARDOUS OR RISKS FROM THE TSR SPREADSHEET THAT WAS SHARED WITH ME.

SO I ASSUME IT'S PERSPECTIVE IN HAVING TO MAKE A DECISION ON WHETHER OR NOT THEY SHOULD BRING A NEW PRODUCT OR PROJECT INTO THE FACILITY, BUT IT WAS NOT INTENDED OR WASN'T EFFECTIVE IN DOING A PROCESS OPERATION HAZARD ANALYSIS.

>> Chairman Lemos: AND SO I CAN APPRECIATE THAT.

IT STRUCK ME THAT THERE WERE NO HAZARDS IDENTIFIED ON THAT TSR CHECKLIST OR PROCESS SHEET.

WHAT CONFUSES ME, MAYBE YOU CAN EXPLAIN, YOU MENTIONED IN YOUR PRESENTATION WHAT IT DID ADDRESS, BUT SPECIFICALLY FROM THE FACTUAL, IT SAYS THE TSR PROCEDURE ALSO TASKED DECISION MAKERS TO ANSWER SAFETY-RELATED QUESTIONS, INCLUDING IS THE

PRODUCT HAZARDOUS.

AND WOULDN'T "IS THE PRODUCT HAZARDOUS" BE RELATED TO SAFETY?

>> Vincent: YES, IT DOES ACTUALLY MENTION SOME OF THE -- SOME SAFETY ASPECTS, BUT SAFETY IS ALSO MORE THAN SPECIFIC PROCESS ITSELF.

SO, YOU KNOW, MAYBE LOOKING AT AN SDS SHEET OR LOOKING AT DO THEY HAVE EQUIPMENT TO ACTUALLY DO THE PROCESS, BUT IT'S NOT LOOKING AT WHAT REACTIONS COULD HAPPEN.

SHOULD WE DO AN INHERENT SAFER DESIGN.

IT'S NOT GOING INTO THOSE TYPES OF PROCESS SAFETY ITEMS WHEN THEY'RE LOOKING AT IT.

>> Chairman Lemos: OKAY, BECAUSE HAZARDOUS TO ME SOUNDS VERY SAFETY-RELATED.

NOW, THE FACT THAT THEY DIDN'T IDENTIFY ANY HAZARDS IS THE OUTCOME, RIGHT?

NO HAZARDS IDENTIFIED, BUT THE PROCESS ITSELF SEEMS TO WANT TO GO IN THAT DIRECTION OF SAFETY. WERE YOU ABLE TO PUT YOUR EYES ON ANY OTHER TSRs FOR OTHER BATCHES THAT HAD HAZARDS IDENTIFIED AND WHAT WOULD THOSE HAVE LOOKED LIKE?

>> Vincent: THERE WAS A SPREADSHEET THAT -- AND IT'S CALLED THEIR TSR SPREADSHEET, BUT I DO NOT RECALL ANY SPECIFIC HAZARDS THAT WAS UP THERE. THE EARLY STAGES OF EM 652 DID USE A DIFFERENT INGREDIENT VERSUS XL 10, AND THAT WAS MENTIONED ON ONE OF IT, BUT IT WAS JUST USED IN THAT PARTICULAR PRODUCT.

IT DID MAKE SURE, LIKE YOU HAD A SAFETY DATA SHEET, BUT JUST HAVING A SAFETY DATA SHEET DOES NOT MEAN YOU'RE LOOKING TO WHAT THE HAZARDS ARE AND HOW YOU NEED TO MITIGATE THOSE HAZARDS.

SO I WAS JUST TRYING TO CLARIFY A LITTLE BIT ON THE SAFETY WE JUST TALKED ABOUT, BUT I DON'T RECALL OTHER THAN THE SWITCHING

OF THE INGREDIENT FOR THE EARLY EM 652 SPECIFIC, IF ANY OTHER HAZARD INFORMATION WAS NOTED ON THAT SPREADSHEET.

>> Chairman Lemos: SO I DO BELIEVE THERE WERE TWO DIFFERENT DATES THAT THEY PRODUCED TSRs FOR EM 652 BASED ON YOUR FACTUAL, AND NEITHER OF THEM HAD HAZARDS, AND I DO -- I AM AWARE THAT THEY CHANGED THEIR EM 652 BATCH AFTER THE 2014 INCIDENT TO -- I'M GOING TO PARAPHRASE AND CORRECT ME HERE -- TO DECREASE THE REACTIVITY OF THE BATCH?

>> Vincent: THE OTHER -- ONE OF THE OTHER INGREDIENTS HAD ADDITIONAL REACTIVITY ASSOCIATED WITH IT THAT WAS MORE HAZARDOUS THAN WHAT THE XL 10 IS.

>> Chairman Lemos: OKAY, ALL RIGHT.

SO WHAT I'M SEEING HERE IS THAT NO -- EVEN WITH THE 2014 EVENT AND THEN THEY CHANGED THE BATCH COMPOSITION, THEN WE HAVE AN EVENT TWO MONTHS PRIOR -- A NEAR-MISS, I'D SAY A NEAR-HIT BECAUSE A NEAR-MISS WOULD MEAN YOU ACTUALLY HIT, BUT THERE WAS NO CHANGE IN COMMUNICATION TO THE OPERATORS REGARDING THE HAZARDOUS ELEMENTS OF -- OR THE HAZARDOUS CONSEQUENCES OF HYDROGEN.

>> Vincent: CORRECT. THERE WAS NO EVIDENCE OF THAT.

>> Chairman Lemos: GOT IT, THANK YOU.

AND IT SEEMS LIKE -- NOT SEEMS LIKE.

YOU ACTUALLY STATED THAT THEY THEMSELVES MENTIONED THAT THEY DIDN'T HAVE A COMPREHENSIVE SAFETY MANAGEMENT SYSTEM OR IT WASN'T COMPREHENSIVE ENOUGH AFTER 2014.

IS THERE ANY EVIDENCE THAT YOU FOUND THAT WOULD HAVE LED YOU TO BELIEVE THAT THEY TOOK ACTION ANYWHERE IN THE COMPANY AS A RESULT OF THAT?

>> Vincent: AS FAR AS THE

OFFICIAL HAZARD ANALYSIS, THAT WAS ASKED IN INTERVIEWS AND WE WERE TOLD, IF WE WERE LOOKING FOR LIKE AN HAZWOP OR OFFICIAL DOCUMENTED PHA THAT, THE COMPANY DID NOT HAVE THAT.

IF ANYTHING WAS KNOWN OR CAME UP, IT WOULD HAVE BEEN DOCUMENTED IN THE TSR.

OR IN THE MINUTES FROM THEIR MEETING FOR THE TSR.

>> Chairman Lemos: GOT IT.

AND GOING BACK TO SOME OF THOSE INTERVIEWS, WHICH I READ SOME OF THOSE, THE OPERATORS INDICATE THAT THEY -- SOME OF THE OPERATORS INDICATED THAT IT WASN'T IMPRESSED UPON THEM THE DANGERS OF HYDROGEN OR WHAT TO DO ABOUT IT IF IT WAS RELEASED, IT WAS SIMPLY ON THE BATCH TICKET.

>> Vincent: CORRECT.

AND SOME OF THE INTERVIEWS WAS CLEARLY THAT, YOU KNOW, IT WASN'T COMMUNICATED OR UNDERSTOOD THE DANGERS AND HAZARDS ASSOCIATED WITH IT.

>> Chairman Lemos: WHAT EVIDENCE DO YOU HAVE, INVESTIGATOR VINCENT, THAT THE COMPANY WAS AWARE OF THE HAZARDS OF HYDROGEN?

>> Vincent: I WOULD SAY, ONE, DURING SOME OF THE INTERVIEWS, IT WAS READILY KNOWN FROM MANAGEMENT THAT HYDROGEN COULD BE PRODUCED FROM THE PROCESS. LIKE I SAID, IT'S LISTED ON THE BATCH TICKET, SO YOUR OPERATOR LEVEL DON'T ACTUALLY WRITE BATCH SHEETS.

SO THEY DEFINITELY KNOW IT FROM THAT PERSPECTIVE, AND WHEN YOU LOOK AT THE CALIBER OF THE PEOPLE THAT WORK WITH THE COMPANY, HYDROGEN IS NOT A COMPLEX COMPOUND.

IT'S A PRETTY STANDARD ON A PERIODIC TABLE TO UNDERSTAND, SO I WOULD NOT UNDERMINE ANY OF THE TECHNICAL CHEMISTS AND MANAGERS TO HAVE DEFINITELY KNOWN ABOUT HYDROGEN.

NOW, IT'S A DIFFERENT DISCUSSION WHEN WE'RE TALKING ABOUT YOUR OPERATOR LEVEL AND SOME OF THEM MAY HAVE KNOWN FROM THEIR EXPERIENCE, BUT DEFINITELY YOUR CHEMISTS AND ALL, THAT THAT'S NOT SOMETHING THAT'S ROCKET SCIENCE FOR THEM.

>> Chairman Lemos: BUT WE -- IS IT FAIR TO SAY THAT BECAUSE THEY PUT ON THE BATCH SHEET, THAT IS AN INDICATION OF THEIR AWARENESS OF ITS HAZARDOUS ELEMENTS?

>> Vincent: I WOULDN'T SAY JUST BECAUSE IT'S ON THE BATCH SHEET OF THAT, BUT BASED ON THEIR EXPERIENCE IN THE CHEMISTRY OR CHEMICAL ENGINEERING FIELD, THEN SOME OF THAT EXPERIENCE WOULD DEFINITELY WEIGH IN ON KNOWING BASIC CHEMISTRY AND IF NOT, THEN I WOULD HAVE THINK SOME OF THE DUE DILIGENCE RESPONSIBILITY IS THAT YOU RESEARCH THAT AND INCLUDE THAT BEFORE YOU PUT ON IT A BATCH SHEET FOR IT TO BE USED IN THE FACILITY.

>> Chairman Lemos: SO WHAT I'M SAYING IS THE WARNING ON THE BATCH SHEET, ISN'T THAT SOME INDICATION THAT THE COMPANY MANAGEMENT WAS AWARE THAT THAT CHEMICAL WAS HAZARDOUS, EVEN WHEN THEY DON'T STATE WHAT THE SPECK HAZARDS ARE, THEY DON'T STATE THAT YOU CAN'T SMELL IT, YOU CAN'T SEE IT, AND YOU NEED DETECTION SYSTEMS AND ITS POTENTIAL OUTCOME, BUT THERE'S A REASON THEY PUT THAT WARNING LABEL ON THE BATCH SHEET, CORRECT?

>> Vincent: IT'S REASONABLY TO ASSUME THAT, YES, MANAGEMENT IS AWARE.

I WOULD ABSOLUTELY SAY IT'S A REASONABLE ASSUMPTION THAT THEY WAS AWARE OF THAT.

>> Chairman Lemos: OKAY. ONE LAST THING. EMERGENCY PREPAREDNESS TRAINING. THE FACTUAL TALKS ABOUT THE EMPLOYEES BEING TRAINED WITH SOME FREQUENCY.

THEY HAD SCENARIO-BASED TRAINING, ETCETERA. WHAT IS YOUR ASSESSMENT OF THEIR EMERGENCY PREPAREDNESS TRAINING IN RELATIONSHIP TO THIS PARTICULAR EVENT?

>> Vincent: I WOULD SAY FROM A FACTUAL PERSPECTIVE, BEING THAT THEIR EMERGENCY -- PROCESS EMERGENCY SPECIFICALLY SAYS FROM DOCUMENTING THE EXCERPT THAT I SHOWED, SPECIFICALLY SAYS IF IT'S A PROCESS EMERGENCY, THEY SHOULD EVACUATE AND THEY DIDN'T. EITHER WAS A MISUNDERSTANDING ON THE TRAINING OR IT WASN'T CLEARLY COMMUNICATED BECAUSE THEY DID NOT EVACUATE. SO THERE'S DEFINITELY A GAP IN THE TRAINING AND ACTUAL EXECUTION.

>> Chairman Lemos: THANK YOU, INVESTIGATOR VINCENT. MR. LaCERTE OR EXECUTIVE DIRECTOR KLEJST, I'M DONE WITH MY QUESTION ON THE FACTUAL SECTION. THANK YOU SO MUCH. PLEASE STATE YOUR NEXT STEPS.

>> LaCerte: SURE. THANK YOU, CHAIRMAN. WE DID RECEIVE TWO PUBLIC COMMENTS WHICH MIGHT BE VALUABLE TO ADDRESS HERE. MS. VINCENT, SINCE HYDROGEN IS LIGHTER THAN AIR AND WOULD ACCUMULATE AT THE CEILING, WERE THE SENSORS IN PLACE LOCATED AT THE CEILING LEVEL OR WERE THEY INSTALLED FOR OTHER CHEMICALS THAT WOULD BE HEAVIER IN THE AIR AND WERE THEY INSTALLED AT THE GROUND LEVEL?

>> Vincent: BASED ON THE INFORMATION WE RECEIVED IN THE INTERVIEWS, THEY WERE INSTALLED UP HIGH. IF I'M NOT MISTAKEN, THE EXACT DESCRIPTION WAS -- THE QUESTION WAS ASKED, COULD YOU REACH THEM BY STANDING ON THE FLOOR AND THE RESPONSE WAS, NO, THEY'RE DEFINITELY HIGHER. SO THEY WERE INSTALLED UP HIGH.

>> LaCerte: THANK YOU.
AND THE SECOND QUESTION IS WAS
FOAM OBSERVED -- I THINK THIS IS
A LITTLE MISPHRASED.
DID FOAM OBSERVED TRAPPED AND
HOLD THE HYDROGEN CLOSER TO
GROUND LEVEL AROUND THE REACTOR,
THUS PRESENTING AN ADDITIONAL
HAZARD?

>> Vincent: I'M SORRY --

>> LaCerte: A LITTLE MISSTATED
THERE, ON I DON'T WANT TO TRIP
YOU UP.

WAS THERE ANY FOAM DETECTED?

>> Vincent: YES, WITNESSES TOLD
US THEY DID SEE FOAM AND THEY
SAW FOG.

>> LaCerte: OKAY, GREAT.
I THINK THAT EXHAUSTS THE PUBLIC
COMMENTS AND QUESTIONS WE
RECEIVED.

I BELIEVE WE ARE READY TO MOVE
ON TO EXECUTIVE DIRECTOR KLEJST.

>> Dir. Klejst: THANK YOU,
MR. LaCERTE.

STAFF HAS DEVELOPED 49
CONCLUSIONS AND FINDINGS IN
CONNECTION WITH THE
INVESTIGATION.

NUMBER ONE, WEATHER WAS NOT A
FACTOR FROM THE INCIDENT.
NUMBER TWO, THERE IS SUFFICIENT
EVIDENCE TO DETERMINE THAT THE
COMBINATION OF THE THREE
CHEMICALS, XL 10, TD-6/12 BLEND,
AND 10% POTASSIUM HYDROXIDE,
CAUSED THE CHEMICAL REACTION
LEADING TO AN EXPLOSION AT AB
SPECIALTY ON MAY 3rd OF 2019.
NUMBER THREE, OPERATOR ONE ADDED
10% POTASSIUM HYDROXIDE TO THE
TANK WITH XL 10 AND TD-6/12
BLEND, WHICH REACTED TO PRODUCE
HYDROGEN GAS THAT SUBSEQUENTLY
IGNITED TO CAUSE AN EXPLOSION.
THE BATCH TICKET DID NOT INCLUDE
THE 10% POTASSIUM HYDROXIDE AND
10% POTASSIUM HYDROXIDE WAS NOT
INTENDED TO BE INTRODUCED TO THE
BATCH AT THIS POINT IN THE
PROCESS.

NUMBER FIVE, THE PROCESS UPSET
PRODUCED HYDROGEN GAS THROUGH
SECONDARY REACTIONS AND

ASSOCIATED REACTION PRODUCTS WERE ALSO PRODUCED, BUT WERE NOT CONSIDERED CAUSAL TO THE EXPLOSION.

NUMBER SIX, OPERATOR ONE WAS AN EXPERIENCED OPERATOR WHO HAD PREVIOUSLY PERFORMED BATCH OPERATIONS AT AB SPECIALTY.

NUMBER SEVEN, BECAUSE OPERATOR ONE WAS FATALLY INJURED IN THE INCIDENT, THE CSB INVESTIGATION TEAM COULD NOT OBTAIN HIS ACCOUNT OF THE EVENTS LEADING TO THE INCIDENT.

HOWEVER, BASED ON INTERVIEWS WITH SURVIVING PERSONNEL, THE CSB INVESTIGATION TEAM CONCLUDED THAT OPERATOR ONE DID NOT KNOW WHAT HAD CAUSED THE PROCESS UPSET.

NUMBER EIGHT, NUMEROUS PROXIMATE SAFETY GAPS COULD HAVE CAUSED OR CONTRIBUTED TO THE INTRODUCTION OF XL 10, TD-6/12 BLEND, AND THE 10% POTASSIUM HYDROXIDE IN THE QUANTITIES REQUIRED TO PRODUCE THE REACTION AND SUBSEQUENT EXPLOSION, INCLUDING DEFICIENCIES IN THE METHODS AB SPECIALTY STORED AND HANDLED INCOMPATIBLE MATERIALS, SUCH AS ALLOWING INCOMPATIBLE MATERIALS TO BE STORED NEAR EACH OTHER IN NEARLY IDENTICAL BLUE 55-GALLON DRUMS AND FAILURES WITH AB SPECIALTY'S PROCEDURAL CONTROLS, INCLUDING OPERATOR AND SUPERVISOR NONADHERENCE TO COMPANY'S DOUBLE INITIAL PROCEDURE.

NUMBER NINE, THERE IS INSUFFICIENT EVIDENCE TO DETERMINE THE DEGREE TO WHICH ANY ONE COMPANY-LEVEL GAP OR FAILURE CONTRIBUTED TO THE INTRODUCTION OF THE 10% POTASSIUM HYDROXIDE TO THE BATCH PROCESS.

RATHER, THIS INCIDENT DEMONSTRATES THERE WERE MULTIPLE SAFETY GAPS LEADING TO THE INCIDENT AND ALL SHOULD BE CORRECTED TO PREVENT FUTURE SIMILAR INCIDENTS.

NUMBER TEN, AB SPECIALTY'S TECHNICAL SERVICE REQUEST PROCESS DID NOT AND WAS NOT INTENDED TO ASSESS THE HAZARDS OF PERFORMING A PROCESS OPERATION OR TO ESTABLISH SAFEGUARDS TO REDUCE RISK.

NUMBER 11, AB SPECIALTY DID NOT TAKE SUFFICIENT ACTION TO IMPROVE ITS HAZARD ANALYSIS PROGRAM AFTER MINDING A LACK OF A COMPREHENSIVE HAZARD ANALYSIS CONTRIBUTED TO ITS 2014 DRUM EXPLOSION.

NUMBER 12, AB SPECIALTY DID NOT PERFORM A THOROUGH HAZARD ANALYSIS OF THE EM 652 BATCH PROCESS DESPITE KNOWN ASSOCIATED HAZARDED AND LIKELIHOOD FOR THE PRODUCT AND INDIVIDUAL CHEMICAL COMPONENTS TO PRODUCE HYDROGEN.

NUMBER 13, DUE TO THE LACK OF AN EFFECTIVE HAZARD ANALYSIS PROGRAM, AB SPECIALTY DID NOT IDENTIFY THE HAZARDS ASSOCIATED WITH SORING REACTIVE CHEMICALS IN SIMILAR CONTAINERS, THE PRACTICE OF ALLOWING INCOMPATIBLE MATERIALS TO BE STORED NEAR EACH OTHER, THE VENTILATION SYSTEM AND BATCH TANK DESIGN, THE LACK OF A GAS DETECTION SYSTEM, OR ITS INSUFFICIENT EMERGENCY PREPAREDNESS.

NUMBER 14, USING PUBLIC RESOURCES SUCH AS THE CHEMICAL REACTIVITY WORKSHEET TO IDENTIFY REACTIVE HAZARDS IN A WAY COMPANIES CAN GATHER PROCESS SAFETY INFORMATION FOR USE IN PROCESS HAZARD ANALYSES TO IDENTIFY PROCESS HAZARDS AND ESTABLISH SAFEGUARDS TO PROTECT FROM THOSE HAZARDS.

GATHERING PSI AND PERFORMING PHAs ARE ELEMENTS OF A PROCESS SAFETY MANAGEMENT SYSTEM.

NUMBER 14 -- I'M SORRY, NUMBER 15, ALL CHEMICALS THAT COULD BE ADDED TO A BATCH MUST BE LISTED ON THE BATCH TICKET.

DURING THE PROCESS HAZARD ANALYSIS, THIS PRACTICE WILL

PROVIDE THE OPPORTUNITY FOR INDIVIDUALS WHO ARE KNOWLEDGEABLE OF THE REACTIVITY HAZARD TO IDENTIFY WAYS TO PREVENT HAZARDOUS CHEMICAL REACTIONS.

NUMBER 16, UP TO 11 NEARLY IDENTICAL DRUMS CONTAINING INCOMPATIBLE CHEMICALS WERE IN THE IMMEDIATE PROCESS AREA AT THE START OF THE SECOND BATCH. NUMBER 17, AB SPECIALTY'S LACK OF PROCEDURES LIKELY LEAD TO THE INCOMPATIBLE 10% POTASSIUM HYDROXIDE AND XL 10 REMAINING IN THE EMULSIONS AREA AFTER THEIR USE IN THE FIRST BATCH, CONTRIBUTING TO THE MIXING OF THESE TWO CHEMICALS ON THE NIGHT OF THE INCIDENT.

NUMBER 18, ONCE THE DRUM BUNG CAPS WERE REMOVED, THE DRUMS THAT STORED THE 10% POTASSIUM HYDROXIDE AND XL 10 LOOKED NEARLY IDENTICAL.

THE SIMILAR APPEARANCE OF THE XL 10 AND 10% POTASSIUM HYDROXIDE DRUMS LIKELY CONTRIBUTED TO OPERATOR ONE ADDING THE INCORRECT CHEMICAL TO THE EM 652 BATCH PROCESS.

NUMBER 20, IN BATCH OPERATIONS THAT RELY ON THE OPERATORS TO GATHER AND MIX CHEMICALS, IT IS CRITICAL THAT BATCH PROCESSING FACILITIES REDUCE THE RISK OF HUMAN ERROR BY MAKING IT EASY TO DO THE JOB RIGHT AND HARD TO DO THE JOB WRONG.

NUMBER 21, AS A RESULT OF THE TANK HAVING AN OPEN HATCH-TYPE LID AND NO VENT PIPE TO EVENT GASES TO A SAFE LOCATION, THE HYDROGEN GAS PRODUCED DURING THE INCIDENT VENTED DIRECTLY INTO THE PRODUCTION BUILDING WHERE WORKERS WERE LOCATED.

NUMBER 22, THE VENTILATION SYSTEM, WHICH INCLUDED A MANUALLY OPERATED AIR MOVER DESIGNED TO INTRODUCE OUTSIDE AIR TO THE BUILDING AND WAS POSITIONED NEAR THE LOCATION WHERE THE EM 652 WAS BEING

MANUFACTURED, MAY HAVE HELPED
DISTRIBUTE THE HYDROGEN IN THE
PRODUCTION BUILDING AND MIX IT
WITH AIR, CREATING A LARGE AND
EXPLOSIVE GAS CLOUD.

[CAPTIONING WILL RESUME
SHORTLY]