



ANSI Z390 HYDROGEN SULFIDE TRAINING

What Good Looks Like...

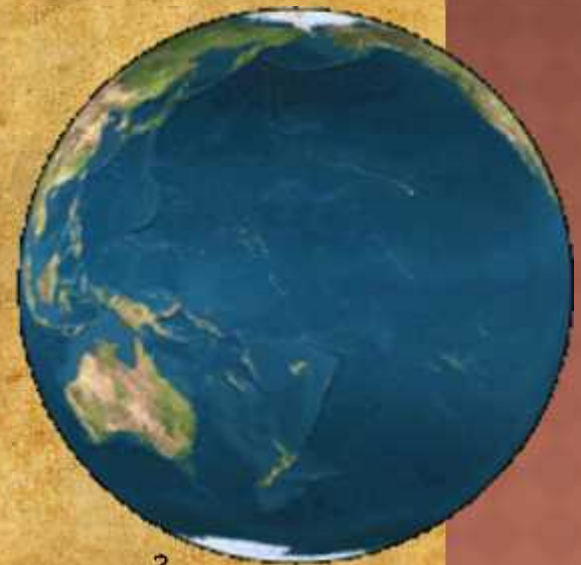
Presented by
Eric Rosemann, CSP

EDUCATIONAL GOALS

- **REVIEW OF TRAINING /
COMPETENCY REQUIREMENTS
FOR H2S WORLD-WIDE**
- **REVIEW OF THE ELEMENTS OF
ANSI Z390**
- **PRESENT THE PROFESSIONAL,
ETHICAL AND LEGAL
ARGUMENTS FOR CONSENSUS
STANDARDS LIKE Z390**

H2S TRAINING / COMPETENCIES WORLD-WIDE

- **OSHA**
- **TEXAS STATEWIDE RULE 36**
- **API RP 55 & 49**
- **CANADIAN “H2S ALIVE”**
- **OPITO**
- **ANSI Z390**



H2S TRAINING / COMPETENCIES - OSHA

- **No specific training /
competencies requirement**
- **“Competent Person” for H2S
training and other training.**
- **General Duty Clause used to
cite H2S-related incidents**

H2S TRAINING / COMPETENCIES - OSHA

- **“Competent Person” for H2S training and other training.**
- **As defined by OSHA construction standards (see 29 CFR 1926.32(f)), a competent person is “one who is capable of identifying existing and**
- **predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and**

H2S TRAINING / COMPETENCIES - OSHA

- **“Competent Person” for H2S training and other training.**
- **who has the authorization to take prompt corrective measures to eliminate them.”**
- **Definitive competency requirements for trenching, but not H2S**

H2S TRAINING / COMPETENCIES - OSHA

- **General Duty Clause used to cite H2S-related incidents**
- **SEC. 5. Duties**
- **(a) Each employer --**
 - **(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;**

H2S TRAINING / COMPETENCIES – TEXAS RULE 36 FOR OIL, GAS OR GEOHERMAL RESOURCE OPERATIONS IN HYDROGEN SULFIDE AREAS

- **Operator shall train its employees working in H2S areas**
- **Operator shall require service companies to utilize trained personnel actually working on H2S system or well and where such work could allow the escape of H2S gas**

H2S TRAINING / COMPETENCIES – TEXAS RULE 36

- **Train all personnel in:**
 - **Hazards and Characteristics of H2S**
 - **Safety Precautions**
 - **Equipment – Safety and Support**

H2S TRAINING / COMPETENCIES – TEXAS RULE 36

- **Train on-site personnel in:**
 - **Effects of H2S on metal**
 - **Corrective actions and shutdown procedures**
 - **Well control – if a drilling operation**
 - **Knowledge of a contingency plan**

H2S TRAINING / COMPETENCIES –

API RP 49 RECOMMENDED PRACTICE FOR DRILLING AND WELL SERVICING OPERATIONS INVOLVING HYDROGEN SULFIDE

- **Detailed and Definitive on the operations sections similar to Rule 36**
- **Defines Minimum Training Requirements similar to ANSI Z390 (§5.2)**
- **Addresses additional training for onsite supervisory personnel (§5.3)**

H2S TRAINING / COMPETENCIES – API RP 49

- **Hydrogen Sulfide Safety Instructors are persons that have (§5.4):**
- **(a) Successfully completed a course in hydrogen sulfide instructor training: or**
- **(b) Received equivalent instruction from a company-designated hydrogen sulfide safety instructor/trainer.**

H2S TRAINING / COMPETENCIES – API RP49

- **A recurring training program shall be implemented to maintain proficiency of all hydrogen sulfide instructors**



H2S TRAINING / COMPETENCIES –

API RP 55 RECOMMENDED PRACTICE FOR OIL AND GAS PRODUCING AND GAS PROCESSING PLANT OPERATIONS INVOLVING HYDROGEN SULFIDE

- **Detailed and Definitive on the operations sections similar to API RP 49**
- **Defines Minimum Training Requirements similar to ANSI Z390 in §5.2**
- **Addresses additional training for onsite supervisory personnel (§5.3)**

H2S TRAINING / COMPETENCIES – API RP 55

- **Hydrogen Sulfide Safety Instructors are persons that have (§5.4):**
- **(a) Successfully completed a course in hydrogen sulfide instructor training: or**
- **(b) Received equivalent instruction from a company-designated hydrogen sulfide safety instructor/trainer.**

H2S TRAINING / COMPETENCIES – API RP55

- **A recurring training program shall be implemented to maintain proficiency of all hydrogen sulfide instructors**



CANADIAN H2S ALIVE

- **H2S Alive Training**
- **The required training course “H2S Alive” covers everything from understanding the basic properties of hydrogen sulfide gas,**
- **to responding and ultimately resolving any potential situations that could develop from an accident or other potentially dangerous incident.**

CANADIAN H2S ALIVE

- **H2S Alive Training**
- **In the Canadian petroleum industry the course is not only required, but it is only valid for up to three years before individuals must take the course again.**

CANADIAN H2S ALIVE

- **H2S Alive Training**
- **There are numerous organizations out there offering H2S Alive training courses, and as long as they offer industry certified training (ENFORM- The safety association for Canada's upstream oil & gas industry offers such “certification”)**

OPITO OFFSHORE PETROLEUM INDUSTRY TRAINING ORGANISATION

- **Established in 1991**
- **OPITO is an Industry owned not for profit organization that exists solely to service the needs of the Oil and Gas Industry.**
- **Provides training for upstream oil and gas extraction**
- **Is the training standard for most of the UK, Asia, Middle East and Americas not specified by local regulations**

OPITO OFFSHORE PETROLEUM INDUSTRY TRAINING ORGANISATION

- **Develops its own training standards on H2S**
- **“The aims and objectives of the Basic H2S Training are to ensure that the delegate gains the required knowledge and understanding of the particular hazards and properties of H2S, and appropriate emergency response actions to take should a H2S related incident arise”.**

OPITO OFFSHORE PETROLEUM INDUSTRY TRAINING ORGANISATION

§C.1 Staff

- **Training staff must be:**
 - **(a) Qualified or experienced in emergency response roles in the event of H₂S release**
 - **(b) Trained in instructional techniques and/or have proven training or instructing experience**

OPITO OFFSHORE PETROLEUM INDUSTRY TRAINING ORGANISATION

§C.1 Staff

- **Training staff must be:**
 - **(c) Included in an ongoing staff training and development programme to enable them to maintain and update skills and knowledge.**

OPITO OFFSHORE PETROLEUM INDUSTRY TRAINING ORGANISATION

- **Assessors will be discipline experts trained and qualified in assessment techniques.**
- **All staff will have the appropriate competencies to conduct/assist with the element of training being undertaken.**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

- **Establishes Comprehensive Training Criteria in greater detail than any other Standard:**
 - **3.1 Physical and Chemical Properties of H₂S**
 - **3.2 Sources of H₂S**
 - **3.3 Human Physiology and Medical Evaluation**
 - **3.4 Work Procedures**
 - **3.5 Personal Protective Equipment**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

- **Establishes Comprehensive Training Criteria in greater detail than any other Standard:**
 - **3.6 Use of Contingency Plans and Emergency Response**
 - **3.7 Burning, Flaring and Venting of H₂S**
 - **3.8 State and Federal Regulatory Requirements**
 - **3.9 H₂S Release Dispersion Models**
 - **3.10 Rescue Techniques, First Aid and Post-Exposure Evaluation**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

- **Establishes Comprehensive Training Criteria in greater detail than any other Standard:**
 - **3.11 Methods of Detection and Monitoring**
 - **3.12 Engineering Controls**
 - **3.13 Transportation of H₂S Cargoes**
 - **3.14 Emerging Technology**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

INSTRUCTOR QUALIFICATION AND PROFICIENCY

- **4.1 H₂S training
instructors/administrators shall have
successfully completed an appropriate
H₂S train-the-trainer development
course;**
- **they shall also be deemed qualified if
they possess significant past
experience in instructing in this field.**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

INSTRUCTOR QUALIFICATION AND PROFICIENCY

- **4.1.1 The instructor/administrator shall**
- **be able to demonstrate his/her knowledge of the technical aspects of H₂S training and proficiency in training techniques relating to H₂S. Training credentials or certification from a recognized or accredited training authority constitutes qualification under this section.**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

INSTRUCTOR QUALIFICATION AND PROFICIENCY

- **4.2 Qualified H₂S instructors should ensure that the comprehensive outline for their individual course of instruction includes all of the topics covered in this standard.**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

INSTRUCTOR QUALIFICATION AND PROFICIENCY

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ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

INSTRUCTOR QUALIFICATION AND PROFICIENCY

- **4.3 H₂S instructors/administrators should conduct a minimum of two H₂S training classes each year or more if there is a demonstrated need for additional training.**
- **Documentation should be maintained to substantiate evidence of these sessions.**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

INSTRUCTOR QUALIFICATION AND PROFICIENCY

- **Every three years, instructors should attend an H₂S instructor re-fresher course.**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

INSTRUCTOR QUALIFICATION AND PROFICIENCY

- **4.3.1 The requirements I
recommendations in 4.3 permits the
instructor to receive the most recent
technical information, regulatory
changes, and updated data on
technology advancements, including
but not limited to personal protective
equipment,**

ANSI Z390.1 - 2006 ACCEPTED PRACTICES FOR HYDROGEN SULFIDE (H₂S) TRAINING PROGRAMS

INSTRUCTOR QUALIFICATION AND PROFICIENCY

- **monitoring or detection devices,
medical**
- **advancements and instructional
techniques.**

							WELL-DEFINED INSTRUCTOR COMPETENCY
							DEFINED INSTRUCTION PROGRAM RQRMT
							MINIMUM TRAINER TRAINING RQRMT
					●	●	LEGALLY ENFORCEABLE CONDITIONS
	●	●			●	●	HAZARDS & CHARACTERISTICS
	●	●			●	●	SAFETY PRECAUTIONS
	●	●			●	●	EQUIPMENT - SAFETY & SUPPORT
	●	●			●		EFFECTS ON METAL
	●						SOURCES OF H2S
	●						HUMAN PHYSIOLOGY
	●						MEDICAL EVALUATION
	●						WORK PROCEDURES
	●						PPE
	●						BURNING & FLARING
	●						STATE AND FEDERAL REGULATIONS
	●						DISPERSION MODELS
	●						RESCUE TECHNIQUES

Z390

OPITO

H2S ALIVE

API 49

API 55

STATE RULES

OSHA

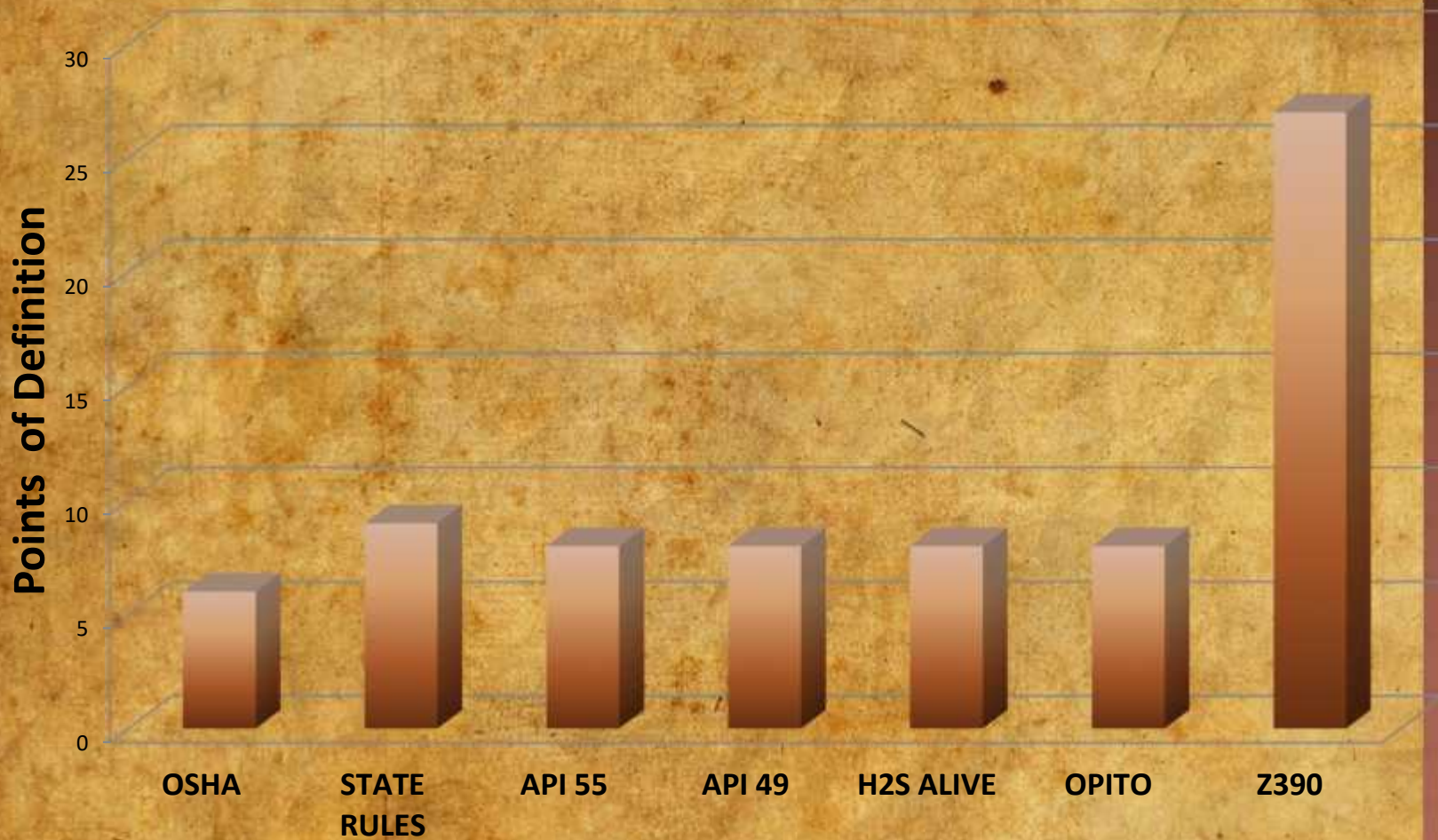
●							MEDICAL EVALUATION
●							WORK PROCEDURES
●							PPE
●							BURNING & FLARING
●							STATE AND FEDERAL REGULATIONS
●							DISPERSION MODELS
●							RESCUE TECHNIQUES
●							FIRST AID
●							POST-EXPOSURE EVALUATION
●							METHODS OF DETECTION & MONITORING
●							ENGINEERING CONTROLS
●							TRANSPORTATION OF H2S CARGO
●							EMERGING TECHNOLOGIES
●							INSTRUCTIONAL TECHNIQUES
●			●	●	●	●	CORRECTIVE ACTIONS & SHUTDOWN
			●	●	●		WELL CONTROL - DRILLING
			●	●	●		WELL CONTROL - WORKOVER
●	●	●	●	●	●	●	CONTINGENCY PLANNING
●	●	●	●	●			DEFINES MINIMUM TRAINING
			●	●			DEFINES ONSITE SUPERVISOR TRAINING
●	●	●	●	●			WELL DEFINED RECURRING TRAINING

SUMMING UP...

	WELL-DEFINED INSTRUCTOR COMPETENCY	DEFINED INSTRUCTION PROGRAM RQRMT	MINIMUM TRAINER TRAINING RQRMT	LEGALLY ENFORCEABLE CONDITIONS	HAZARDS & CHARACTERISTICS	SAFETY PRECAUTIONS	EQUIPMENT - SAFETY & SUPPORT	EFFECTS ON METAL	SOURCES OF H2S	HUMAN PHYSIOLOGY	MEDICAL EVALUATION	WORK PROCEDURES	PPE	BURNING & FLARING	STATE AND FEDERAL REGULATIONS	DISPERSION MODELS	RESCUE TECHNIQUES	FIRST AID	POST-EXPOSURE EVALUATION	METHODS OF DETECTION & MONITORING	ENGINEERING CONTROLS	TRANSPORTATION OF H2S CARGO	EMERGING TECHNOLOGIES	INSTRUCTIONAL TECHNIQUES	CORRECTIVE ACTIONS & SHUTDOWN	WELL CONTROL - DRILLING	WELL CONTROL - WORKOVER	CONTINGENCY PLANNING	DEFINES MINIMUM TRAINING	DEFINES ONSITE SUPERVISOR TRAINING	WELL DEFINED RECURRING TRAINING		
OSHA				●	●	●	●																		●			●					
STATE RULES				●	●	●	●	●																		●	●	●	●				
API 55	●																									●	●	●	●	●	●	●	
API 49	●																									●	●	●	●	●	●	●	
H2S ALIVE	●				●	●	●	●																				●	●	●	●		
OPITO	●				●	●	●	●																				●	●	●	●		
Z390	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●		●	

SUMMING UP...

H2S Training Quality Factors



THE PROFESSIONAL, ETHICAL AND LEGAL ARGUMENTS FOR CONSENSUS STANDARDS LIKE Z390

- **If you have them, why not use the consensus standards?**
- **Civil Case Law will eventually override OSHA lack of specific definition**
- **Quality of Instruction Defined in ANSI Z390**
- **Covers the bases the other standards do not.**

WHAT WILL YOU DO?

