ATTACHMENT B

This report is intended to serve as a technical resource for OPS and State pipeline safety inspectors evaluating operators' integrity management (IM) programs. Inspectors consider information from a number of sources in determining the adequacy of each IM program. Development of this report was funded via a Congressional appropriation specifically designated for implementation of IM oversight. This and other similar reports are separate and distinct from the work products associated with and funded via OPS's R&D Program.

HVL Summary Report: 1986 to Jan. 2002

ANHYDROUS AMMONIA

	Total Fatalities	Total Injuries	Property Damage	Barrels lost	Barrels Recovered
'Commodity' =	ANHYDROUS AMMONIA (60 events)				
Avg	0.02	0.23	$60,140	302.8	2.3
Min	0	0	$0	0	0
Max	1	4	$2,000,000	5692	76

BUTANE

	Total Fatalities	Total Injuries	Property Damage	Barrels lost	Barrels Recovered
'Commodity' =	BUTANE (31 events)				
Avg	0.06	0.00	$336,171	533.2	10.2
Min	0	0	$0	0	0
Max	2	0	$9,000,000	5518	164

ETHYLENE

	Total Fatalities	Total Injuries	Property Damage	Barrels lost	Barrels Recovered
'Commodity' =	ETHYLENE (1 event)				
Avg	0.00	0.00	$1,000	15.0	0.0
Min	0	0	$1,000	15	0
Max	0	0	$1,000	15	0

FERTITL.,AMMON.NITR.

	Total Fatalities	Total Injuries	Property Damage	Barrels lost	Barrels Recovered
'Commodity' =	FERTITL.,AMMON.NITR. (1 event)				
Avg	0.00	0.00	$0	1417.0	1000.0
Min	0	0	$0	1417	1000
Max	0	0	$0	1417	1000

L. P. G.

	Total Fatalities	Total Injuries	Property Damage	Barrels lost	Barrels Recovered
'Commodity' =	L. P. G. (174 events)				
Avg	0.06	0.34	$69,133	1880.0	1.6
Min	0	0	$0	0	0
Max	3	22	$1,644,165	122000	148

NATURAL GAS LIQUID

	Total Fatalities	Total Injuries	Property Damage	Barrels lost	Barrels Recovered
'Commodity' =	NATURAL GAS LIQUID (193 events)				
Avg	0.04	0.15	$66,535	1392.1	23.0
Min	0	0	$0	0	0
Max	2	4	$1,836,014	17288	2750

PROPANE

	Total Fatalities	Total Injuries	Property Damage	Barrels lost	Barrels Recovered
'Commodity' =	PROPANE (24 events)				
Avg	0.00	0.17	$103,574	1675.4	242.0
Min	0	0	$0	0	0
Max	0	2	$750,000	13500	5808

HVL Release Summary Report: Jan. to Oct. 2002

ANHYDROUS AMMONIA

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
EQUIPMENT	15	GALLONS	KS	0	0								
EQUIPMENT	17	GALLONS	KS	0	0								
MATERIAL AND/OR WELD FAILURES	38	GALLONS	IA	0	0								
MATERIAL AND/OR WELD FAILURES	2	BARRELS	NE	0	0								
MATERIAL AND/OR WELD FAILURES	15	GALLONS	NE	0	0								
NATURAL FORCES	43	BARRELS	LA	0	0	NO	NO	NO	NO	YES	NO		
OTHER	3	BARRELS	KS	0	0								
OTHER OUTSIDE FORCE DAMAGE	28	BARRELS	AR	0	0	NO	NO	NO	NO	NO	NO		

BUTANE

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
EQUIPMENT	8	BARRELS	IL	0	0	NO	NO	NO	NO	NO	NO		
EQUIPMENT	3	BARRELS	IN	0	0								
EQUIPMENT	4	BARRELS	NE	0	0								
INCORRECT OPERATION	2	BARRELS	OH	0	0								
OTHER	20	BARRELS	PA	0	0								

ETHANE

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
EQUIPMENT	20	GALLONS	TX	0	0								
EQUIPMENT	20	GALLONS	TX	0	0								

ETHANE PROPANE MIX

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
EQUIPMENT	1	BARRELS	KS	0	0								
EQUIPMENT	4	BARRELS	KS	0	0								

ETHYLENE

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
EQUIPMENT	10	GALLONS	TX	0	0	NO	NO	NO	NO	NO	NO		
MATERIAL AND/OR WELD FAILURES	660	BARRELS	LA	0	0	NO	NO	NO	NO	NO	NO		

LPG MIX

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
NATURAL FORCES	0	BARRELS	TX	0	0	NO	YES	NO	NO	NO	NO		

NORMAL BUTANE

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
EQUIPMENT	4	BARRELS	IA	0	0								
EQUIPMENT	4	BARRELS	NE	0	0								
EQUIPMENT	7	BARRELS	TX	0	0	NO		NO	NO	NO	NO		

PROPANE

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
CORROSION	1	BARRELS	TX	0	0								
EQUIPMENT	23	BARRELS	GA	0	0	NO	NO	NO	NO	NO	NO		
EQUIPMENT	4	BARRELS	GA	0	0								
EQUIPMENT	4	BARRELS	IA	0	0								
EQUIPMENT	5	BARRELS	IL	0	0	NO	NO	NO	NO	NO	NO		
EQUIPMENT	2	BARRELS	KS	0	0								
EQUIPMENT	47	BARRELS	LA	0	0	NO	NO	NO	NO	NO	NO		
EQUIPMENT	10	GALLONS	MO	0	0								
EQUIPMENT	4	BARRELS	NE	0	0								
EQUIPMENT	4	BARRELS	NE	0	0								
EQUIPMENT	26	GALLONS	OK	0	0								
EQUIPMENT	10	GALLONS	OK	0	0								
EQUIPMENT	42	BARRELS	SC	0	0	YES	NO	NO	NO	NO	NO		
EQUIPMENT	4	BARRELS	TX	0	0								
EXCAVATION DAMAGE	7500	BARRELS	IL	0	0	YES	NO	NO	NO	NO	NO		
EXCAVATION DAMAGE	3210	BARRELS	IL	0	0	YES	NO	NO	NO	NO	NO		
MATERIAL AND/OR WELD FAILURES	3	BARRELS	KS	0	0								
NATURAL FORCES	1	BARRELS	KS	0	0	NO	NO	NO	NO	NO	NO		

PROPANE - ETHANE MIX

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
OTHER	6	BARRELS	KS	0	0	NO							

RAW LPG

GENERAL CAUSE	LOSS	UNIT	STATE	FATAL	INJ	EVAC	IMPACT	FISH	BIRDS	SOIL	WATER - AMT	G/W	DRINK
EQUIPMENT	2	BARRELS	TX	0	0								
MATERIAL AND/OR WELD FAILURES	21	GALLONS	TX	0	0								

RiskWORLD

Abstract of Meeting Paper

Society for Risk Analysis - Europe 1998 Annual Meeting

The Methodology of the Prediction of Hazardous Zones Resulting from Liquefied Gases Accidental Releases. *A. S. Yedigarov, Senior Researcher of the Research Institute of Natural Gases & Gas Technology; and G. E. Odisharia, Head of the Laboratory of the Research Institute of Natural Gases & Gas Technology, 142717, Russia, Moskovskaya obl., Leninsky raion, p. Razvilka, VNIIGAS, fax 7-095-399-16-77, e-mail edigarov@nv.vniigaz.gazprom.ru, andrew@yedigarov.msk.ru*

One of the main stages of industrial safety and risk analysis procedure is the consequences prediction of probable accidents. The successful solution of this problem is inseparably associated with the creation and practical usage of the approved mathematical models and methods for computations of unsteady hydrodynamics and heat-mass exchange processes that describe different stages of an accident pass. The developed in Gas Research Institute Methodic for prediction of hazardous zones and consequences resulting from accidental releases of liquefied gases from industrial facilities is based on representation of an accident as a set of the certain physical processes and on mathematical modeling of these processes. The algorithm is constructed in such a way that the results of computations of one process are used as boundary conditions or input information for calculating the others, bearing in mind their mutual time-space connections and thus providing continuity of the whole computation process. The introduction of the experimentally verified mathematical models of liquefied gas discharge, evaporation, vapor dispersion and burning makes it possible to simulate close to reality accident scenarios taking into account specific features of industrial facility operation and its siting. Special attention was paid to the correct simulation of heavy gas dispersion and the three-dimensional hydrodynamic computer code was developed for the turbulent flow and vapor cloud propagation modeling.

As an illustration of the methodic and software practical usage several case studies are presented in the paper including modeling of the rupture of the LPG pipeline, accidental discharge from LPG pressurized storage tanks and LNG terminal. The results of the computations made it obvious that hazardous zones depend to a great extent not only on discharge rates and meteorological conditions of dispersion but also on time required for accident identification and decision making.

The proposed Methodic may be useful for accident and risk management issues as it allows to reproduce real accident scenarios, to study an accident going on and to elaborate rational measures for consequences reduction.

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Abstract of Meeting Paper

Society for Risk Analysis 1996 Annual Meeting

Consequences Computations of LPG Pipeline Rupture. *A. S. Yedigarov, Research Institute of Natural Gases & Gas Technology, 142717, Russia, Moskovskaya obl., Leninsky raion, p. Razvilka, VNIIGAS*

Some results of the safety assessment of LPG main pipeline under design are presented. The study is devoted to computer simulations of liquefied petroleum gas (LPG) accidental releases, evaporation, vapour cloud propagation and dispersion for a number of different accident scenarios including hypothetical ones -- complete rupture of the main pipeline. As it is well known, the most dangerous accidents at LPG facilities are accompanied by the formation and evolution of the dense vapour clouds. The explosive or toxic cloud can travel over a long distance producing large hazardous zone and severe consequences. To solve this problem, the original three-dimensional hydrodynamic numerical model was used for the simulation of the turbulent flow and explosive vapour cloud evolution in the atmospheric boundary layer. The model is based on numerical integration of a complete set of unsteady non-linear Navier-Stokes equations of mass, momentum and energy balances within the scope of algebraic turbulent viscosity submodel. The following accident scenarios were examined: complete or partial rupture of the pipeline without pumping shut-down, stop pumping in a certain period of time (after leakage identification) and isolation of the pipeline damaged section by means of shut-off valves. Computations made it clear that the maximum hazardous zone and probable consequences depend to a great extent not only on the atmospheric stability conditions and wind speed but also on the time required for the accident identification and decision making. The performed numerical study also demonstrates the advantages and possibilities of mathematical modeling (accident imitations) in risk management issues for the correct reproduction of variable emergency situations on the LPG pipeline, elaboration of protective measures for consequences limitation and checking their efficiency.

Areas Unusually Sensitive to Environmental Damage

[Federal Register: January 4, 1996 (Volume 61, Number 3)]
[Proposed Rules]

[Page 342-344]

DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Part 195

[Docket PS-140(b), Notice 4]

RIN 2137-AC34

Areas Unusually Sensitive to Environmental Damage

AGENCY: Research and Special Programs Administration (RSPA), DOT.

ACTION: Public workshop.

SUMMARY: RSPA invites industry, government representatives, and th public to a third workshop on unusually sensitive areas (USAs). Th workshop's purpose is to openly discuss the guiding principles for determining areas unusually sensitive to environmental damage from hazardous liquid pipeline release. This workshop is a continuation the June 15-16, 1995 and October 17, 1995 workshops on USAs.

categories and viewed as distinct entities. or

4b. Consider cultural resources and Indian tribal concerns when defining USAs.

3. Only areas in the trajectory of a potential spill, e.g. down gradient, should be considered when determining USAs.
4. It is expected that no pipeline operator is required to collect natural resources field data to determine USAs.
5. Highly volatile liquid (HVL) pipelines should not be included.

Process

1. The standards and criteria for resource sensitivity should be uniform on a national basis such that equivalent resources receive equivalent sensitivity assessments regardless of regionally based priorities.

2. The government agencies should describe and identify USAs so that the data will not be subject to various interpretations and will be applied consistently.

3. USAs should be subject to a systematic review process since USAs may change through time as species migrate, change location, or for other reasons. The USA definition should be explicit and practical in application.

4. The USA definition should be pilot tested, complete, and fully defined before OPS uses the definition in rulemaking. Each part of the USA definition should be pilot tested for validity, practicability, and workability.

5. Sources of USA data should be readily available to the public and uniform in criteria and standards.

6. Data quality objectives should include consistency, accuracy, and extent of coverage.

7. The extent of how much additional geographic area a criterion adds should be considered.

8. Risk elements mandated in 49 U.S.C. Sec. 60109 to NOAA's Guidance for Facility and Vessel Response Plans (59 FR 14714; March 29,
9. should be applied when determining USAs.
10. OPS should exempt operators that take proactive measures to minimize the potential for spills from additional requirements to protect USAs.

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10. Consultation with land or resource managers may be necessary when operators consider a range of preventative measures in significant environmental resource areas.

11. The process should clarify how sensitive areas are protected under the Pipeline Safety Act of 1992 separate and apart from protection under the Oil Pollution Act of 1990.

Several recommendations were made that RSPA has determined are

acceptable but are not guiding principles. These are:

1. Workshops for each phase of developing a USA definition should include appropriate technical experts, representatives, and field personnel with appropriate experience from agencies as well as industry.

2. Public workshops should be used to gather information on the criteria that will determine USAs. The USA definition should be complete before its use in a rulemaking. The implementation of resou assessment and protection under the USA definition could be phasec
3. All terms used in the USA definition should be defined.
4. National consistency in interpreting all definitions should be the goal.

The following are the additional workshops that were recommende during the October 17 workshop:

5. Guiding Principles Workshop.

6. Definitions of Terms Workshop.

7. Source Water Supply Workshop (Surface and Subsurface).
8. Biological Resources Workshop.

9. Cultural Resources and Indian Tribal Concerns Workshop.
10. Pilot Testing Process Workshop.

Persons interested in receiving a transcript of the first workshop or the summary of the second workshop, material presented at the fi or second workshop, or comments submitted on the material present the first or second public workshop notice should contact the Dockets Unit at (202) 366-5046 and reference docket PS-140(b).

Issued in Washington, DC, on December 28, 1995.
Cesar DeLeon,

Deputy Associate Administrator for Pipeline Safety.
[FR Doc. 96-107 Filed 1-3-96; 8:45 am]

BILLING CODE 4910-60-P

Two Phase Clean-up Plan Developed for Derailment Site Minot North Dakota

January 21, 2002
Minot, North Dakota

Working in co-ordination with local and state officials, Canadian Pacific Railway (CPI developed a two-phase clean-up plan to accelerate the end of an evacuation under the site of a Jan. 18 derailment in Minot, North Dakota.

Under the first phase of the clean-up, CPR crews are removing the 31 derailed cars site and loads of anhydrous ammonia that are being recovered from damaged railw cars. At the same time, CPR will apply a neutralizing agent to soil at the derailment contain vapors.

Those steps are designed to reduce vapors to safe levels and minimize public expos CPR removes derailed cars from the site. The evacuation of about 20 homes in a ha radius immediately east of the derailment site remains in place and under the auth the Minot Rural Fire Department.

Crews have already moved about half of the cars away from the tracks. It is not ye how much longer Phase 1 will take.

After the completion of Phase 1 of the plan, crews will repair track and begin a long remediation designed to remove soil that has absorbed spilled anhydrous ammonia derailment site.

Last night, CPR suspended clean-up operations when vapor levels increased in the immediate vicinity of the derailed cars while they were being moved. Air monitorinç continued overnight to ensure the safety of workers and the public. The increased v concentrations were contained to the site and the area where clean-up workers are equipment.

Vapor levels have dissipated overnight and clean-up crews are expecting to resume operations today.

Air monitoring will continue throughout the clean-up efforts and crews are working with local and state officials, including the Minot Rural Fire Department, police and l and environment officials. (It is expected that some odors will be periodically detect community even after vapor concentrations have been reduced to safe levels.)

The derailment occurred at 1:40 a.m. CST Jan. 18 on the western outskirts of Mino resulting in an anhydrous ammonia leak.The train that derailed carried a total of 11 originated in Edmonton, Alberta and was destined for St. Paul, Minn. A total of 31 c including 15 containing anhydrous ammonia, derailed.

Inspections of the site have determined that 7 of the 15 anhydrous ammonia cars l their contents at the site, releasing an estimated 200,000 gallons of anhydrous amı Leaks were detected in some of the remaining 8 cars, but it is not yet known how n

anhydrous ammonia was released. The spilled anhydrous ammonia either vaporizec time of the derailment, was removed by CPR crews, or remains to be absorbed on t ground adjacent to the tracks.

Anhydrous ammonia is a common nitrogen-based product used in fertilizers, refrige and household detergents. It is a colorless liquid at temperatures below -33C and f gas at higher temperatures.

CPR is working closely with the National Transportation Safety Board, which is cond investigation into the cause of the derailment.

CPR operations in the Minot area will be restored to normal soon after the clean-up completed during the coming days. During the track closure, the railway is reroutin to and from the Midwest U.S.

For more information, please contact:

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