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Proposal for amendments to RID/ADR: new proposals

Inclusion of Emergency Action Code Marking on RID/ADR placards

Transmitted by the International Association of File and Rescue Service CTIF[1, 2]

[1] In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.7 (c)).

[2] Circulated by the Intergovernmental Organisation for International Carriage by Rail (OTIF) under the symbol OTIF/RID/RC/2010/55.

Summary

Explanatory summary: Emergency responders see that there is a need to enhance the marking of road tankers, rail tank wagons and tank containers to enable them to take immediate action to bring incidents under control as quickly as possible without endangering themselves or others.

The suggested emergency action code (EAC) would be clearly on display and provides simple and quick initial guidance on the first actions to be taken while further information from other sources is being obtained on the chemical substance(s) involved.

CTIF is therefore proposing the inclusion of emergency action codes to the current RID and ADR marking scheme, while retaining the Hazard identification number (HIN). To reduce the costs and complexity of adding the EAC, there are 3 options given for the new, combined marking scheme.

Action to be taken: Amend relevant paragraphs in ADR and RID. Specific examples include paragraphs 3.2.1, 5.3.2.1.2, 5.3.2.1.4, 5.3.2.1.6, 5.3.2.2.1, 5.3.2.2.2, 5.3.2.2.3, 5.3.2.3 and 5.3.2.3.1 in ADR (fuller list to follow).

Introduction

1. For a number of years CTIF has been developing an emergency action code (EAC) system for the marking of dangerous goods carried in road tankers, rail tank wagons and tank containers taking into account comments, concerns and suggestions from experts in the field of transport of dangerous goods.

2. In the early nineties the United Kingdom invited experts of dangerous goods to the Fire Service College in Morton-in-Marsh to demonstrate the advantage of an action code for police, fire service and other emergency responders. This was done to underpin the United Kingdom proposal to use an action code in the ADR and RID marking schemes instead of a hazard identification number (HIN), e.g. display UN-number, and emergency action code (EAC) on the orange plate. This proposal was not accepted mainly because there were some concerns about the proposed actions such as diluting the released product especially from an environmental perspective. This issue was later addressed by making changes to the method for assigning codes.

3. CTIF being convinced of the approach of an emergency action code system, started to work on improvement of these codes. In preparing these codes for every UN dangerous goods entry, CTIF has utilised existing UN classification together with other chemical and physical data by means of flow charts to identify the appropriate extinguishing media, protective clothing and immediate response actions. This process includes a risk assessment done by a group of experts in the field of chemistry and emergency response. The result of that work was presented to the Joint Meeting in the year 2000 in document TRANS/WP.15/AC.1/2000/20 where the replacement of the Hazard identification number by the Emergency action code was suggested.

4. According to the report of that session (TRANS/WP.15/AC.1/82) opinions were divided in the Joint Meeting between those who welcomed and supported this initiative and those who also wanted to retain the HIN. With reference to the ongoing harmonization process it was suggested to discuss the CTIF proposal at a later stage within the Joint Meeting and that the question should also be dealt with by the United Nations.

5. Motivated by the support received from the Joint Meeting, CTIF together with UIC explained the advantages of coded information at meetings of the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods. Here the North American Emergency Response Guide book (ERG) was considered a valuable and sufficient source of information for emergency responders. However, due to the variety of languages spoken in Europe, CTIF still saw a need for a coded system and therefore a comparison between the EAC and the ERG was carried out in close cooperation with CANUTEC, Transport Canada. The result was that the two systems were found to be consistent, with some minor exceptions which have now been resolved.

6. The CTIF is therefore convinced that the benefits of such a code for emergency response – in improvements of efficiency, safety, appropriateness, and cost savings - would outweigh the costs of the change. The costs can also be reduced by offering options for implementing the change and by applying a transitional period to introduce the EAC.

Justification

7. At incidents involving dangerous goods, information obtained should allow emergency service personnel to take action without endangering their own safety, that of the public or the environment. The first few minutes are often vital with the priorities for responders being life saving, protecting themselves and the public, and also preventing the incident from escalating.

8. On arrival at an incident, emergency responders have to make very quick decisions, the consequences of which will determine the success or otherwise of the operations carried out. However, information gathering is time consuming and it is therefore often necessary for responders to act only on the information immediately available. Driver Instructions in Writing (IIW) were changed in ADR2009 to generic instructions for the driver of the vehicle. Previously IIW, while not intended for use by emergency responders, contained information on the products being transported that could be used by emergency responders. This is no longer the case.

9. When dealing with incidents involving dangerous goods in transport, CTIF have developed the following 4 step approach:

- Immediate information (first few minutes) using information available direct from orange plates and hazard labels;
- Short term information (up to 30 minutes) including vehicle documentation and guidebooks;
- Detailed information including databases and specialised literature;
- Expert advice including attendance by specialists.

10. The EAC system is designed to cover the first vital step and gives an immediate indication of any actions that could be taken should it be necessary without the use of reference materials or expert advice.

11. Once any immediate action has been taken to save life, protect the environment and prevent the incident escalating, the next phase can be taken which will involve more detailed information from the operator or driver, the company, paperwork from the vehicle cab and various data sources

12. In utilising EACs, emergency responders do not need a detailed knowledge of chemistry, nor reference to chemical literature and it is not necessary to memorise any part of the code. It is sufficient to carry a small card (which could also be displayed in the

inside of the emergency vehicle) giving quick, easy and safe interpretation of a code. In this way the crew can often understand what actions are required before they have even left the vehicle and can immediately implement them at the same time as obtaining more detailed information from other sources. With the current Hazard identification number, having first inspected the situation, an assessment needs to be carried out on what action to take utilising the HINs. This is not however required using an EAC as risk assessments on all substances will have been undertaken when determining the appropriate emergency action code.

13. HINs are useful in identifying the specific hazard but add very little more than the current danger labels and essentially show similar information. Nevertheless, it is proposed to retain the use of the HIN alongside the EAC to enable those who want to continue to use the HIN to do so.

14. However, it is the EAC that will provide the information on the actions to take if immediate action is required e.g. the correct fire fighting media, level of protective clothing and environmental considerations.

15. As an example consider the rail incident at Schönebeck (Germany) detailed in Annex II, from which the following is quoted:

> "A train with a number of tank wagons containing compressed vinyl chloride came off the rails and caught fire. The fire service arrived within 6 minutes and found the HIN of 239 indicating a flammable gas which can spontaneously lead to violent reaction. Because the fire service had no other information, they were not able to attack the fire until 30 minutes later when they received the more detailed information on the load. Most of the wagons were destroyed and 65 people were hospitalised. Had the wagons had EAC markings the outcome could have been very different. The EAC would have immediately shown which fire fighting media to use and also that chemical protective clothing was required because of the toxic gases formed as a result of the combustion of vinyl chloride (this fact was not know until 30 minutes into the incident and could not be deduced from either the HIN or danger label). It is highly likely that using an EAC far fewer wagons would have been destroyed and far fewer people would have been hospitalised."

16. The proposed code is made up of three characters consisting of a number, a letter and a further number. These three characters of the EAC contain guidance and warning about the following five areas:

- Fire fighting media
- Personal protective equipment
- Possibility of violent or explosive reaction (including fire)
- Possibility of public safety hazard beyond the immediate area of the incident
- Containment or dilution of substance to protect the environment

17. The advantages of using an emergency action code system are:

- It is unnecessary to have information on the substance in the initial stages and valuable time can be saved from the start thus avoiding delays while detailed information is being obtained on the load.
- Immediate action can be taken using the correct fire fighting medium and personal protective equipment preventing associated dangers of being under protected whilst eliminating the costly, time consuming and sometimes dangerous use of over protection.

- The code will indicate immediately whether there is a hazard that might spread to the surrounding area enabling immediate steps to be taken to protect the public.
- The code will indicate if it is essential to contain a spillage to protect the environment or if it can be safely diluted saving valuable time and resources and reducing a potential danger of the incident escalating more rapidly.
- The code will take account of the type of hazard associated with a particular class of substance e.g. whether a toxic substance is toxic by inhalation, skin absorption or ingestion.
- The code is flexible enough to be able to provide advice on the appropriate action where mixed loads are involved.
- A risk assessment of every substance (including how to mitigate the effects) will have already been undertaken, saving valuable time and reducing the subjectivity required by non-specialist first responders.
- The code can easily be used by both sophisticated well-trained and equipped responders or by rural volunteer responders.
- It does not rely on radio or other communications systems, which can be unreliable especially in noisy emergency situations.
- It does not require the driver to provide information to emergency responders or for information to be obtained by the emergency responders from the cab of the vehicle.

18. Different plate design options could be utilised to fit in with existing plate and plate holder arrangements where possible and reduce the costs of implementing the change. Some examples are shown in Annex I.

19. The cost to industry is balanced by savings in dealing with incidents more efficiently, having regard to safety and environment and thus reducing costly clean up operations and possible litigation costs. As it is generally the polluter who pays, any reduction in the time and operational costs involved in an incident will be of benefit to industry.

20. Space can be provided on the new plates for an emergency contact number. However, this will be optional rather than mandatory.

21. Although there would be an initial training cost to emergency services and operators, it can easily be demonstrated that training for this system will be minimal. A generic document outlining the meaning of the EAC could be made available in much the same way as the generic Instructions in Writing for driver's document.

22. CTIF will manage the process of assigning codes using a set of decision algorithms and ensuring new codes are assigned to new UN numbered dangerous goods entries in close cooperation with all relevant stakeholders.

23. The attached Annex III shows some examples of current UN numbers with HINs and equivalent proposed EACs.

Proposal

24. To change the relevant sections of ADR, ADN and RID paragraphs in order to incorporate the EAC system. The following is not an exhaustive list of changes but is intending to illustrate how the system is intended to be introduced. A full list of changes required will be assembled following the adoption of the approach suggested.

3.2.1. Amend Column (20) to read “Emergency action code and hazard identification number and”. Add the following text to the beginning of the next paragraph “The Emergency action code contains one digit to advise on the fire-fighting measures to be taken, followed by one letter and a second number to indicate the level of personal protection needed and the appropriate actions for immediate emergency response. The hazard identification number…”

Amend the title of Column (20) of the Dangerous Goods Table to “Emergency action code and hazard identification No”

Insert into Column (20) of the Dangerous Goods Table the emergency action codes indicated in Annex III.

5.3.2.1.2 Change the opening sentence to:

“When an emergency action code and hazard identification number are indicated in column (20) of table A of Chapter 3.2…”

5.3.2.1.4 Change the opening sentence to

“When an emergency action code and hazard and identification number are indicated in column (20) of table A of Chapter 3.2…”

5.3.2.1.6 After “…with 5.3.2.1.1…” change the text to

“…bear the emergency action code and hazard identification number and the UN number for that substance prescribed respectively in columns (20) and (1) of Table A of Chapter 3.2.”

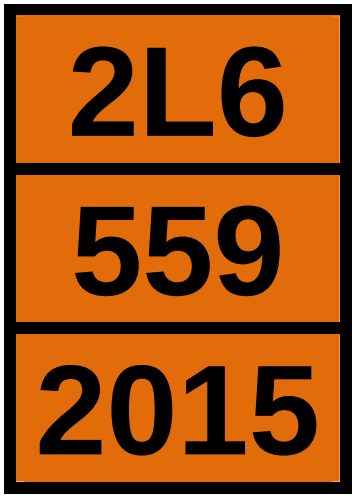
5.3.2.2.1 Change the first sentence to “The orange-coloured plates shall be reflectorized and where the emergency action code, hazard identification number and UN number are displayed on a three-tier single plate as per Figure 1 of 5.3.2.2.3, this plate shall be of 40cm base and be 45cm high; they shall have a black border of 15 mm wide. Where one or two panels shall be used according to Figure 2 or Figure 3 of 5.3.2.2.3, this plate shall be of 40cm base and 30cm high; they shall have a black border of 15 mm wide”

5.3.2.2.2 Change the first sentence to “The emergency action code, hazard identification number and UN number, where displayed according to Figure 1 of 5.3.2.2.3, shall consist of black digits 100mm high and of 15mm stroke thickness. The emergency action code shall be inscribed in the top part of a combined three section plate. The emergency action code, hazard identification number and UN number, where displayed according to Figure 2 of 5.3.2.2.3, shall consist of black digits 100mm high and of not less than 10mm and not greater than 15mm stroke thickness. The emergency action code and hazard identification number shall be inscribed in the upper part of the plate. The emergency action code, hazard identification number and UN number, where displayed according to Figure 3 of 5.3.2.2.3, shall consist of black digits 100mm high and of 15mm stroke thickness. The emergency action code shall be inscribed in the upper part of one plate and hazard identification number shall be inscribed in the upper part of the other plate.”

5.3.2.2.3 Change the title to “Examples of orange-coloured plates with emergency action code, hazard identification number and UN number”

And insert the following:

“Figure 1. 3-part plate showing the emergency action code, hazard identification number and UN number



Emergency action code (2 or 3 characters, see 5.3.2.3)

Hazard identification number (2 or 3 figures preceded where appropriate by the letter X, see 5.3.2.3)

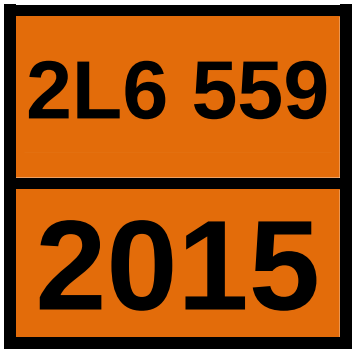
UN Number (4 figures)

Background orange

Size 40 cm wide by 45 cm high

Border, horizontal lines and figures black, 15 mm thickness

Figure 2 – 2-part plate showing the emergency action code, hazard identification number and UN number



Emergency action code and Hazard identification number (2 or 3 figures preceded where appropriate by the letter X, see 5.3.2.3)

UN Number (4 figures)

Background orange

Size 40 cm wide by 30 cm high

Border, horizontal lines and figures black, at least 10 mm and not greater than 15 mm thickness for top row, 15 mm thickness for bottom row.

Figure 3 – one plate showing the emergency action code and UN number and one plate showing the hazard identification number and UN number

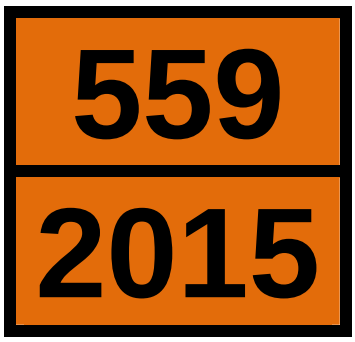
Emergency action code (2 or 3 characters, see 5.3.2.3)

UN Number (4 figures)

Background orange

Size 40 cm wide by 30 cm high

Border, horizontal line and figures black, 15 mm thickness



Hazard identification number (2 or 3 figures preceded where appropriate by the letter X, see 5.3.2.3)

UN Number (4 figures)

Background orange

Size 40 cm wide by 30 cm high

Border, horizontal line and figures black, 15 mm thickness”

5.3.2.3 Change title to “Meaning of emergency action codes and hazard identification numbers”

5.3.2.3.1 Insert the following text “The emergency action code consists of two or three characters. In general these indicate the following actions that should be taken:

Emergency Action Code		
1	Coarse Spray	
2	Fine Spray	
3	Alcohol Resistant Foam or Fine Spray	
4	Normal Foam	
5	Alcohol Resistant Foam or Normal Foam	
6	Dry Agent	
C	Fire Protective Clothing with Breathing Apparatus	
D	Liquid-Tight Chemical Protection Suit*	
E	Liquid-Tight Chemical Protection Suit* worn over Fire Protective Clothing*	
F	Gas-Tight Chemical Protection Suit*	
G	Gas-Tight Chemical Protection Suit* worn over Fire Protective Clothing*	
K	Fire Protective Clothing with Breathing Apparatus*	
L	Liquid-Tight Chemical Protection Suit*	
M	Liquid-Tight Chemical Protection Suit worn over Fire Protective Clothing*	**VIOLENT REACTION**
N	Gas-Tight Chemical Protection Suit*	
Q	Gas-Tight Chemical Protection Suit worn over Fire Protective Clothing*	
6	No Public Safety Hazard	**CAN DILUTE**
7	Public Safety Hazard	
8	No Public Safety Hazard	**CONTAIN**
9	Public Safety Hazard	

***EN Standards to be quoted, as applicable, on the final table drawn up**

Annex I

Marking scheme options

The following options are given for the inclusion of the EAC alongside the HIN number. Plates shall be consistent with the existing dimensions used and as described in Part 5.3.2.2.3 of ADR unless otherwise indicated. The panels shown would be displayed next to the UN Hazard Class markings ("hazard diamonds"). Emergency telephone numbers can also be displayed separately.

Option 1 – Combined 3-Part Panel

Plate would have a height of 45cm and a width of 40cm. Characters would be 10cm high.

2L6	Emergency action code
559	Hazard identification number
2015	UN Number

The EAC is added as an extra row to the existing panel.

Option 2 – Using the existing 2-Part Panel

Plate would have a height of 30cm and a width of 40cm. Characters would be 10cm high with a reduction in the width of the characters in the upper row to accommodate the EAC and HIN side-by-side.

2L6 559	Emergency action code and Hazard identification number
2015	UN Number

This option would have the advantage of avoiding the need to change plate mounting systems where these are used. The font size of the EAC and HIN are reduced but would still remain clearly visible to emergency responders.

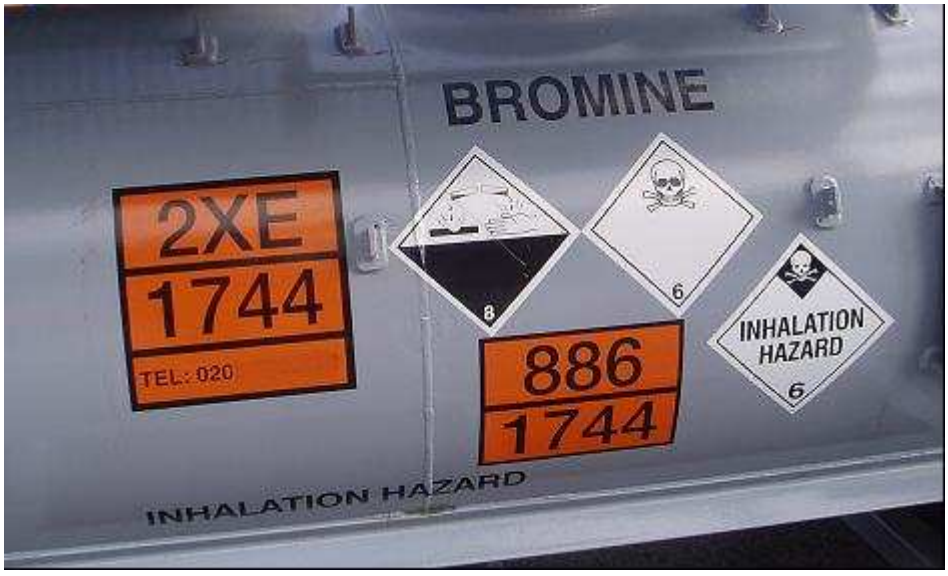
Option 3 – 2 Separate Panels

Plates would have a height of 30cm and a width of 40cm. Characters would be 10cm high.

2L6	Emergency action code
2015	UN Number

559	Hazard identification number
2015	UN Number

Figure 1. Photograph of current UK EAC and HIN combined system



Separate panels are already used on some European journeys. The UK EAC and UN number panel shown above would be replaced by the new EAC and UN number panel.

Annex II

Case study

Rail incident at Schönebeck (Germany)

On 1st June 1996 at 17:30 a train consisting of 18 tank wagons of compressed vinyl chloride came off the rails at Schönebeck in Germany. Vinyl chloride is a flammable unstable gas which evolves toxic vapours on combustion.

The fire service was called immediately and arrived in 6 minutes. The United Nations Number and danger labels were noted and advice was called for. Although these wagons would have been marked with the HIN 239, this was not used by the fire service, and in fact would not have given much useful information, indicating only a flammable gas, which can spontaneously lead to violent reaction.

Information on how to deal with the incident was received by the fire service on site at 18:06 (30 minutes later). In the meantime the fire service worked on the surrounding fires caused by the burning vinyl chloride but were unable to do anything to suppress the fires in the wagons until details of how to deal with it were obtained. It was thus 30 minutes from the time the fire service arrived until the time they were able to set up sprays on the wagons to knock down the flammable, toxic vapours.

Most of the 18 wagons were destroyed by fire. 65 people, including 10 firefighters, were hospitalised. Fortunately none of the injuries were fatal. Considerable environmental damage was caused and the rail line was closed for 3 weeks.

It is impossible to say definitively what would have happened had the wagons been marked with an emergency action code.

The suggested EAC for this material (2N9) would have resulted in the fire service taking immediate action by donning chemical protective clothing, setting up water sprays on the wagons, containing the run-off and considering public safety, including the possibility of evacuation. This would all have been started within the first few minutes rather than having to wait 30 minutes by which time the damage had already been done.

It is interesting to note that the firefighters in this incident were at risk from toxic vapours but this would not have been identified from either the danger label or the HIN but would have been from the EAC.

Annex III

Examples of Emergency Action Code

The following table shows examples of the proposed emergency action code alongside the existing HIN and ADR class and sub-risks.

UN No.	*Proposed EAC*	*HIN*	*ADR Class*	*ADR Sub-risk*
1001	2K7	239	2.1	
1002	2C6	20	2.2	
1003	2Q6	225	2.2	5.1
1017	2G9	268	2.3	8 & 5.1
1052	2F9	886	8	6.1
1053	2Q9	263	2.3	2.1
1088	5K9	33	3	
1135	3Q8	663	6.1	3
1136	4Q9	33	3	
1136	4Q8	30	3	
1162	6Q9	X338	3	8
1318	1C8	40	4.1	
1389	6L8	X323	4.3	
1437	1C8	40	4.1	
1438	1C8	50	5.1	
1439	1K8	50	5.1	
1463	1L8	568	5.1	6.1&8
1510	2L8	559	5.1	6.1
1511	1D8	58	5.1	8
1541	3F8	669	6.1	
1749	2Q9	265	2.3	5.1 & 8
1750	2D8	68	6.1	8
1751	2D8	68	6.1	8
1752	2F9	668	6.1	8
1753	6L8	X80	8	
1754	6N9	X88	8	
1755	2D8	80	8	
1777	6N9	88	8	
1778	2D8	80	8	
1779	3Q8	83	8	3
1780	6L8	80	8	
1781	6L8	X80	8	
1782	2D8	80	8	
1783	2D8	80	8	
1784	6L8	X80	8	
1785	N/A			
1786	2N8	886	8	6.1
1787	2D6	80	8	
1910	2D8		8	
1911	2Q7		2.3	2.1
1930	N/A			
1931	2C8	90	9	
1932	1K8	40	4.2	

UN No.	*Proposed EAC*	*HIN*	*ADR Class*	*ADR Sub-risk*
1975	2N7		2.3	5.1 & 8
2194	2G7		2.3	8
2195	2G7		2.3	8
2196	2N9		2.3	8
2211	2K8	90	9	
2212	2D8	90	9	
2213	1C8	40	4.1	
2214	2D8	80	8	
2215	2D8	80	8	
2216	1C8		9	
2217	1K8	40	4.2	
2218	3Q8	839	8	3
2219	3K8	30	3	
2222	4K8	30	3	
2224	4C8	60	6.1	
2225	2D8	80	8	
2226	2D8	80	8	
2227	4Q8	39	3	
2478	5Q8	36	3	6.1
2479	N/A			
2480	5Q9	663	6.1	3
2923	2D8	886/86	8	6.1
2924	5Q9	338	3	8
2924	5Q8	38	3	8
2925	1L8	48	4.1	8
2926	1D8	46	4.1	6.1
2927	2F9	668	6.1	8
2927	2D8	68	6.1	8
2928	2D8	668/68	6.1	8
2929	5Q8	663/63	6.1	3
2930	2D8	664/64	6.1	4.1
2931	2C8	60	6.1	
3097	1K8		4.1	5.1
3098	2L8		5.1	8
3099	2L8		5.1	6.1
3100	1L8		5.1	4.2
3101	2L9		5.2	1
3102	1L9		5.2	1
3103	2L9		5.2	
3104	1L9		5.2	
3105	2L9		5.2	
3106	1L9		5.2	
3107	2L8		5.2	
3108	1L8		5.2	
3109	2L8	539	5.2	
3110	1L8	539	5.2	
3111	2L9		5.2	1
3112	1L9		5.2	1
3113	2L9		5.2	
3114	1L9		5.2	
3115	2L9		5.2	

UN No.	*Proposed EAC*	*HIN*	*ADR Class*	*ADR Sub-risk*
3116	1L9		5.2	
3117	2L8		5.2	
3118	1L8		5.2	
3119	2L8	539	5.2	
3120	1L8	539	5.2	
3121	6L8		5.1	4.3
3122	2N9	665	6.1	5.1
3122	2L9	65	6.1	5.1
3123	6L8	623	6.1	4.3
3124	2L8	664/64	6.1	4.2
3125	6L8	642	6.1	4.3
3126	1L8	48	4.2	8
3127	1L8		4.2	5.1
3128	1L8	46	4.2	6.1
3129	6L8	X382/382	4.3	8
3130	6L8	X362/362	4.3	6.1
3131	6L8	X482/482	4.3	8
3132	6L8		4.3	4.1
3132	6L8	423	4.3	4.1
3471	2D8	86	8	6.1
3472	3D8	80	8	
3473	3Q9		3	
3474	1L8		4.1	
3475	5K9	33	3	
3476	6L8		4.3	
3477	2D8		8	
3478	2K8		2.1	
3479	2L8		2.1	
3480	6L8		9	
3481	6L8		9	