Status Report on:

Docket No. C-2018-3002271

1. 1ST of all Date ~~Prior~~ June 2ND, 2019 I have made several attempts to contact Tori L Giesler by telephone leaving messages on her answering machine. She has not responded.
2. In any event here are the dates we are able to to hold the hearing Aug. 27-29, Sept. 3-5, Sept. 24-25
3. Reuben W. Adams will not be available to testify at this hearing
4. Francois (Bud) Anderson has been contacted, but has not responded Never the less I am ready to go to trail, on the dates listed above IN NO. 2
5. I have thought about it and I would ~~prefer~~ prefer to hold the hearing, over the telephone, on my part.
6. Enclosed in this filing you will find documents I intend to use or refer to ~~as~~ at the hearing. DATE: 6/2/19 Reuben Adams

DATE: 6/2/19 Reuben Adams

7. Also, I will be referring to Title 66, act 129, and the tariff laws. I did not include them in this filing, as I would think all involved parties would readily have copies of them available.

8. Also, I am providing Interrogatories responses of W.P.P., SET 1 - and SET 2. I don't remember, if they have been provided to the court or not.

I REPEAT:

9. Never the less: I am prepared to go to trial. On the dates listed in No. 2 of this response.

DATE 6/2/19 Mr. Dorie Adams

NOTE: Francis (Bud) ~~Ed~~ Anderson contacted me by telephone. He is sending me a summary testimony response tomorrow. He was out of town, tending to his ailing mother.

SUMMARY TESTIMONY OF

Richard L. Plummer
13604 NW 44th Ct
Vancouver, WA 98685

Background: Retired Supervisory Security Specialist (GG-15), Defense Intelligence Agency and retired U.S. Army Electronic Warfare/Signal Intelligence (SIGINT) Specialist (MSG/E8)

Education: Webster University, MA in Security Management

Testimony Subject: Privacy and Security Issues Associated with Smart Meters

Summary: Initial discussion will outline the definitions, differences, and similarities of the terms Privacy and Security. From there, the testimony will shift to privacy and security concerns associated with the use of smart meters systems. Discussion will address potential individual privacy consequences associated with the use of these devices, as well as addressing some of the security threats and vulnerabilities of smart metering systems.

TELE. 1-360-510-0162

13. Please list the specific issues you intend to raise at the hearing in this proceeding
Answer : Privacy And Security.

Prepared by Dorie Adams

---

14. Please identify the legal support, including specific citations, for each issue

Identified in question 13.

Answer : Penna. Constitution Article 1, Article 1 Section 8. see Exhibit J
, Also, D.O.E Strategic Energy plan for 2014-2018 More or less (Disclaimer) ,Cybersecurity Strategy plan 2018 – 2020. Penna. Law Act 129., Which is Unconstitutional
And memos from Penna State Legislators of concern on this matter before the House .
They in my opinion fall short on my case .,
I,We do not want the new meter on the house . It is illegal and the government can not force a citizen to buy anything.

Prepared by Dorie Adams

---

15. Please list the factual support for each issue identified in question 13.
1. Exhibit A. DOE. Strategic Energy plan for 2014-2018
2. Exhibit B Cybersecurity Strategy plan for 2016-2018
3. Exhibit C copy of U.S.Army retirement. awarded
4. Exhibit D Certificate of Achievement awarded
5. Exhibit E Certificate of Achievement awarded
6. Exhibit F Block diagram of a typical H.F.I.D meter or smart meter
7 Exhibit G Penna. State Energy program
8. Exhibit H Enlisted Oath of Enlistment
9 Exhibit I Letters from W.P.P West Power dated
10. Exhibit J Penna. State Constitution (House version)
11 . Exhibit K, References To F.C. C. License With Broadcast Endorsement
12.Exhibit L 3 Letters from Penna. House memo's
13. EXHIBIT M - REPORT ON N.T.P, NAT. EXEC. PROGRAM
14. EXHIBIT N - REPORT FROM DEPT OF EDUC. DEPT OF HEALTH

Prepared by Mr. Dorie Adams

Exhibit A

my NOTE:

Reference :U.S department of Energy Strategic Energy Plan 2014 -2018 (Disclaimer)

This report was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government.

EXIBIT B, 3 PAGES, PAGE 1

Exhibit B

US. Department of Energy Cybersecurity Strategy 2018 - 2020
MESSAGE FROM THE CHIEF INFORMATION OFFICER The U.S. Department of Energy Office of the Chief Information Officer has prepared this DOE Cybersecurity Strategy and Implementation Plan to improve the cybersecurity and resilience of the Department's networks and systems. It lays out an integrated strategy to reduce cyber risks to the Department and provide support to the U.S. energy sector by engaging in a range of high-impact activities in coordination with other DOE offices and the strategies, plans, and activities of the Federal Government. The Strategy will also support the energy sector by reinforcing the Department's Multiyear Plan for Energy Sector Cybersecurity. The Cybersecurity Strategy is aligned to the Multiyear Plan to reduce the risk of energy disruptions due to cyber incidents and describes how DOE will carry out its mandated cybersecurity responsibilities and address the Department's evolving cybersecurity needs. Our Cybersecurity Strategy and Implementation Plan will manage transformational change, improve outcomes, and establish a sustainable cybersecurity future. This strategy is structured around: ♣ Mission Alignment – ensuring a direct line between the DOE Strategic Plan and the Cybersecurity Strategy; ♣ Customer and Stakeholder Alignment – Bringing value to both customers and stakeholders by strengthening collaboration with a brokerage posture; ♣ Process Alignment – Ensuring processes create value through analytics and business intelligence, to achieve sustainable levels of performance, execution, and innovation; and ♣ Resource Management Alignment – ensuring our workforce strategy helps to recruit, develop, and retain the talent we need to meet the needs of the DOE enterprise. The DOE Cybersecurity Strategy addresses the challenges associated with an increasingly complex cyber landscape. Successful implementation of our strategy will require a transparent, inclusive, and collaborative governance process across DOE Staff Offices, Program Offices, National Laboratories, Power Marketing Administrations, Plants, and Sites. This Strategy will help to modernize DOE IT infrastructure to deliver effective services that will support smart, efficient cybersecurity and enhance DOE's cybersecurity risk management across the enterprise. Our network modernization initiatives will improve IT infrastructure, enhance cybersecurity, increase resiliency (including the expanded use of cloud services), scale capacity commensurate with demand to meet customers' needs, raise awareness, and promote best practices across the DOE enterprise. Our Cybersecurity Strategy and Implementation Plan will deliver high quality IT and cybersecurity, continuously improve our cybersecurity posture, help us make the transition from IT owner to IT broker, and excel as stewards of taxpayer dollars. I am pleased to present the Cybersecurity Strategy of the Department of Energy for 2018-2020. Max Everett Chief Information officer Department of Energy June 2018 U.S. Department of Energy Cybersecurity Strategy 2018 - 2020 Contents Executive

EXHIBIT B PAGE 2

EXHIBIT B PAGE 3

EXHIBIT C

CERTIFICATE OF RETIREMENT

FROM THE ARMED FORCES OF THE UNITED STATES OF AMERICA

TO ALL WHO SHALL SEE THESE PRESENTS, GREETING:

THIS IS TO CERTIFY THAT

SERGEANT DORIE ADAMS

HAVING SERVED FAITHFULLY AND HONORABLY,
WAS RETIRED FROM THE

UNITED STATES ARMY

ON THE FIRST DAY OF AUGUST
ONE THOUSAND NINE HUNDRED AND EIGHTY

WASHINGTON, D. C.

GENERAL, UNITED STATES ARMY,
CHIEF OF STAFF

Exhibit D

DEPARTMENT OF THE ARMY

CERTIFICATE OF ACHIEVEMENT

AWARDED TO

SPECIALIST FOUR DORIE ADAMS, 178-42-4642

For distinguishing himself as an outstanding Direction Finding operator during the period July 75 to May 77, while assigned to USASATC Berlin. During this period Specialist Adams displayed a thorough knowledge of his assigned duties. His ability to perform in any and all of the various duty positions within the subsystem had made him a valuable asset to this section's mission. His natural talent to work effectively with both his supervisors and peers has contributed significantly to the over all team effort. SP4 Adam's accomplishments reflect the professional attitude of excellence that is in keeping with the highest traditions of the United States Army.

EXHIBIT E

DEPARTMENT OF THE ARMY

CERTIFICATE OF ACHIEVEMENT

AWARDED TO

Specialist Four Dorie Adams, 178-42-4642

During the period 5 January 1976 to 28 January 1976, Specialist Adams' technical abilities and professional dedication were instrumental in achieving a new level of productivity in Subsystem P. This performance far exceeded the expectation of operators with greater experience and mission knowledge. During this period C Trick, through the efforts of Specialist Adams, outproduced all other tricks by a substantial margin. Such achievement by a relatively new and inexperienced operator is a credit to the individual and the Field Station.

19 March 1976

Patrick A. Ulmer

Exhibit F

After doing due diligence on this Exhibit F this is the most I feel I can provide you . Secured Technology is preventing from anymore.

Smart Grid Technology - Smart Meter

By today's technological standards, the common electromechanical energy meter is a relic of the past – incapable of anything but flat-rate pricing and infrequent meter readings.

- AC/DC Converter
- AFE
- Application Processor
- ittery Charger
- ittery
- Sub Connector
- ergy Meter IC
- hernet Transceiver
- M RF
- D Display
- C Modem
- -45 Connector
- -485 Transceiver
- C
- nart Card Connecto
- nart Card Interface
- pervisory
- B Receptacles
- B Transceiver
- EG
- gBee

Application

Smart meters go well beyond the rudimentary functions of a basic electrical meter. Above all, the quality of a smart meter is to support 2-way communication with utility providers. This is the key that opens t ther "smart" functions and the benefits thereof. Smart meters can provide support for remote diagnostics, dyr mper notification, consumption analysis, and more.This design is for reference only. The design, as we cts suggested, has not been tested for compatibility or inte

Voltage **Energy** **ZigBee**

U
or gethe ting tc **Module**

devices) and are available 3 sizes: standard, mini, and olugs strear dowi USB is used in many applications covering all areas of t requ **IC PLC** ion, t only w **Card** **ar**

AC/DC **Interface** **rd**

Modem

devices that need fast or easy connections for interaction with computers. Since USB provides a small charging current as well, it is becoming a de facto standard for charging portable devices.

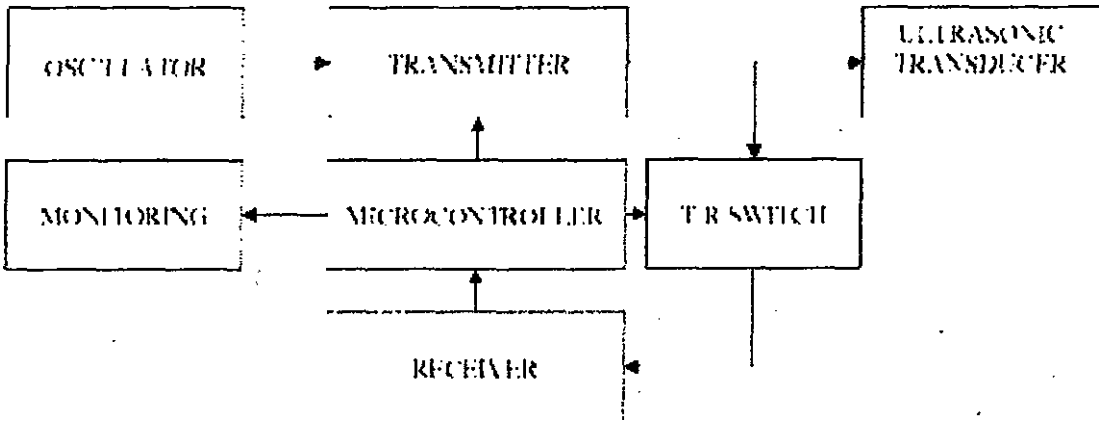


EXHIBIT G PAGE

STATE ENERGY PROGRAM

As Pennsylvania's main contact to the U.S. Department of Energy (DOE), we serve as the State Energy Office for the Commonwealth. One of our responsibilities is to submit an annual plan (referred to as the State Energy Plan or SEP) to the DOE for energy efficiency, renewable energy, and energy assurance activities. A formula grant is used to award DOE funding to all State Energy Offices that submit annual SEP.

Annual SEP cover all activities carried out by the State Energy Office, even those items not funded by DOE. The SEP includes planning, tracking, implementing and promoting energy efficiency, building codes, energy management systems, renewable energy, alternative fuels, energy assurance and security, fuel resources, financial markets, and more.

The DEP annually updates the SEP programs and projects. See examples of the work we do on the right-hand toolbar. For more information on the State Energy Plans from the DOE see their [illegible].

Exhibit H

I, (NAME), do solemnly swear (or affirm) that I will support and defend the Constitution of **the United States** against all enemies, foreign and domestic; that I will bear true faith and **allegiance** to the same; and that I will obey the orders of the President of **the United States** and the orders of the officers appointed ...

Met-Ed
Penelec
Penn Power
West Penn Power
FirstEnergy Companies

EXHIBIT I, PAGE 1, of 2 PAGE

76 South Main Street
Akron, Ohio 44308-1890

April 10, 2018

DORIE ADAMS
940 SHADY DELL RD
PORT MATILDA PA 16870

RE: 940 SHADY DELL RD
~~Account Number: 100093095121~~

Dear Dorie Adams:

We have made several attempts to contact you so we can discuss with you the installation of a smart meter at the service address shown above. Unfortunately, we have been unable to make arrangements with you to install the new meter.

It is important to note that the company is required by Pennsylvania law (Act 129) to install a smart meter for all of our Pennsylvania customers. (For more information about the law that mandates our smart meter program, you can visit the Pennsylvania Public Utility Commission's website at http://PAUTL.com/PXw5x.)

Please call us at 1-855-344-3400 (Monday through Friday, 8:00 a.m. to 6:00 p.m.) so we can answer questions that you have regarding our smart meter program and make arrangements to install the new meter. Please be aware that failure to comply with this request could result in the shut off of your electric service.

Sincerely,

Pennsylvania Meter Deployment

EXHIBIT F, PAGE 2 of 2 PAGES

Met-Ed
Penelec
Penn Power
West Penn Power
FirstEnergy Companies

76 South Main Street
Akron, Ohio 44308-1890

May 30, 2018

DORIE ADAMS
940 SHADY DELL RD
PORT MATILDA PA 16870

10-DAY NOTICE

RE: 940 SHADY DELL RD
Account Number: 100093095121

Dear Dorie Adams:

We have made several attempts to contact you and make arrangements to install a new smart meter at the service address shown above. As of the date on this letter, we have not been able to schedule a time with you to install the new meter.

It is important to note that the company is required by Pennsylvania law (Act 129) to install a smart meter for all of our Pennsylvania customers. You should also be aware that our tariff permits us to have access to your property for electric service-related matters, including exchanging the meter. As a result, you are required to allow our installers access to the electric meter so that we can safely install the new smart meter.

Unless you contact us by June 11, 2018 to replace the meter, the electric service for the account listed above will be subject to being shut off. In the event your service is shut off, the new meter must be installed at the premises before service will be restored.

Please contact us immediately by calling 1-855-344-3400 (Monday through Friday, 8:00 a.m. to 6:00 p.m.) to make the necessary arrangements to avoid the shut off of your electric service.

Sincerely,

Pennsylvania Meter Deployment

Exhibit J

Penna. State Constitution House version

1. **Inherent rights of mankind.** All men are born equally free and independent, and have certain inherent and indefeasible rights, among which are those of enjoying and defending life and liberty, of acquiring, possessing and protecting property and reputation, and of pursuing their own happiness.

8. **Security from searches and seizures.**

The people shall be secure in their persons, houses, papers and possessions from unreasonable searches and seizures, and no warrant to search any place or to seize any person or things shall issue without describing them as nearly as may be, nor without probable cause, supported by oath or affirmation subscribed to by the affiant.

Met-Ed
Penelec
Penn Power
West Penn Power

FirstEnergy Companies

EXHIBIT I, PAGE 1, of 2 PAGES

76 South Main Street
Akron, Ohio 44308-1890

April 10, 2018

DORIE ADAMS
940 SHADY DELL RD
PORT MATILDA PA 16870

RE: 940 SHADY DELL RD
Account Number: 100093095121

Dear Dorie Adams:

We have made several attempts to contact you so we can discuss with you the installation of a smart meter at the service address shown above. Unfortunately, we have been unable to make arrangements with you to install the new meter.

It is important to note that the company is required by Pennsylvania law (Act 129) to install a smart meter for all of our Pennsylvania customers. (For more information about the law that mandates our smart meter program, you can visit the Pennsylvania Public Utility Commission's website at http://PAUTL.com/PXw5x.)

Please call us at 1-855-344-3400 (Monday through Friday, 8:00 a.m. to 6:00 p.m.) so we can answer questions that you have regarding our smart meter program and make arrangements to install the new meter. Please be aware that failure to comply with this request could result in the shut off of your electric service.

Sincerely,

Pennsylvania Meter Deployment

Met-Ed
Penelec
Penn Power
West Penn Power
FirstEnergy Companies

EXHIBIT F, PAGE 2 of 2 PAGES

76 South Main Street
Akron, Ohio 44308-1890

May 30, 2018

DORIE ADAMS
940 SHADY DELL RD
PORT MATILDA PA 16870

10-DAY NOTICE

RE: 940 SHADY DELL RD
Account Number: 100093095121

Dear Dorie Adams:

We have made several attempts to contact you and make arrangements to install a new smart meter at the service address shown above. As of the date on this letter, we have not been able to schedule a time with you to install the new meter.

It is important to note that the company is required by Pennsylvania law (Act 129) to install a smart meter for all of our Pennsylvania customers. You should also be aware that our tariff permits us to have access to your property for electric service-related matters, including exchanging the meter. As a result, you are required to allow our installers access to the electric meter so that we can safely install the new smart meter.

Unless you contact us by June 11, 2018 to replace the meter, the electric service for the account listed above will be subject to being shut off. In the event your service is shut off, the new meter must be installed at the premises before service will be restored.

Please contact us immediately by calling 1-855-344-3400 (Monday through Friday, 8:00 a.m. to 6:00 p.m.) to make the necessary arrangements to avoid the shut off of your electric service.

Sincerely,

Pennsylvania Meter Deployment

Exhibit J
Penna. State Constitution House version

1. **Inherent rights of mankind.** All men are born equally free and independent, and have certain inherent and indefeasible rights, among which are those of enjoying and defending life and liberty, of acquiring, possessing and protecting property and reputation, and of pursuing their own happiness.

8. **Security from searches and seizures.**

The people shall be secure in their persons, houses, papers and possessions from unreasonable searches and seizures, and no warrant to search any place or to seize any person or things shall issue without describing them as nearly as may be, nor without probable cause, supported by oath or affirmation subscribed to by the affiant.

EXHIBIT L

Pennsylvania House of Representatives

https://www.legis.state.pa.us/cfdocs/Legis/CSM/showMemoPublic.cfm?chamber=H&SPick=20190&cosponId=27345 **05/15/2019 08:29 AM**

House Co-Sponsorship Memoranda

House of Representatives
Session of 2019 - 2020 Regular Session

MEMORANDUM

Posted: January 3, 2019 02:23 PM
From: Representative Mike Reese
To: All House members
Subject: Consumer Consent to Share Smart Meter Information

In the near future, I plan to introduce legislation to amend Title 66 (Public Utilities) to add "government agencies" to the list of specifically enumerated third parties where customer consent is required in order for an electric distribution company to provide access to customer meters and meter data.

Act 129 of 2008 requires electric distribution companies to develop energy efficiency and conservation plans. The Act also requires electric distribution companies to deploy smart meter technology throughout their service territories according to a 15-year depreciation schedule. Smart meter technology transmits usage data to an electric distribution company and to the consumer on an hourly basis.

Part of this mandate is the requirement that, with customer consent, power companies provide direct meter access or meter data to third parties including electric generation suppliers and providers of conservation and load management services. While it makes sense for certain third parties to have access to data necessary to ensure that consumers are billed properly for the services they receive, I am concerned about this information being shared with government agencies without prior consent.

This legislation, one of three bills addressing smart meter technology that I intend to introduce, will ensure that customer consent is required before an electric distribution company may share customer meter data or provide meter access to a government agency.

During the 2017-2018 Legislative Session, this bill was introduced as House Bill 1563. It was considered and passed by the House 191-1 on July 7, 2017. The following members served as co-sponsors:

REESE, BOBACK, V. BROWN, DUNBAR, EMRICK, GABLER, GILLEN, GROVE, PHILLIPS-HILL, JAMES, KAUFFMAN, METCALFE, B. MILLER, ORTITAY, PETRARCA, PICKETT, READSHAW, SACCONE, SONNEY, STAATS, WALSH, WARD, WARNER, KORTZ, NELSON, BARBIN, WENTLING, COX, ROE, SIMMONS and MACKENZIE

Introduced as HB310

PRINTER'S NO. 290

THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE BILL

No. 310 Session of 2019

INTRODUCED BY REESE, BOBACK, BERNSTINE, BROWN, DUNBAR, EMRICK, JAMES, JONES, JOZWIAK, KAUFFMAN, KEEFER, M. K. KELLER, MACKENZIE, METCALFE, B. MILLER, NELSON, OBERLANDER, PETRARCA, PICKETT, READSHAW, RYAN, STAATS, STRUZZI AND ZIMMERMAN, FEBRUARY 1, 2019

REFERRED TO COMMITTEE ON CONSUMER AFFAIRS, FEBRUARY 1, 2019

AN ACT

Amending Title 66 (Public Utilities) of the Pennsylvania Consolidated Statutes, in restructuring of electric utility industry, further providing for duties of electric distribution companies.

The General Assembly of the Commonwealth of Pennsylvania hereby enacts as follows:

Section 1. Section 2807(f)(3) of Title 66 of the Pennsylvania Consolidated Statutes is amended to read:

§ 2807. Duties of electric distribution companies.

* * *

(f) Smart meter technology and time of use rates.--

* * *

(3) (i) Electric distribution companies shall, with customer consent, make available direct meter access and electronic access to customer meter data to third parties, including electric generation suppliers [and], providers of conservation and load management services[.]

and government agencies.

(ii) Notwithstanding subparagraph (i), customer consent shall not be required if:

(A) the information is released to comply with a subpoena or order issued by a court or regulatory agency;

(B) the information is released on a confidential basis in the context of an administrative proceeding involving a customer complaint;

(C) the information is released in aggregated form; or

(D) there is an emergency situation involving an imminent threat to public health or safety.

* * *

Section 2. This act shall take effect in 60 days.

Pennsylvania House of Representatives

https://www.legis.state.pa.us/cfdocs/Legis/CSM/showMemoPublic.cfm?chamber=H&SPick=20190&cosponId=27346 05/15/2019 08:29 AM

House Co-Sponsorship Memoranda

House of Representatives
Session of 2019 - 2020 Regular Session

MEMORANDUM

Posted: January 3, 2019 02:25 PM
From: Representative Mike Reese
To: All House members
Subject: Consumer "Opt Out" of Smart Meter Usage

In the near future, I plan to introduce legislation to amend Title 66 (Public Utilities) to permit consumers to "opt-out" of having smart meter technology deployed at their premises.

Act 129 of 2008 requires electric distribution companies to develop energy efficiency and conservation plans. The Act also requires electric distribution companies to deploy smart meter technology throughout their service territories according to a 15-year depreciation schedule. Smart meter technology transmits usage data to an electric distribution company and to the consumer on an hourly basis.

I and other legislators have been contacted by constituents that have expressed their desire to not have smart meter technology at their homes or businesses. Their concerns range from securing sensitive and personal information to the health impacts of radio frequency (RF) waves. My perspective is one that questions if a government mandate was appropriate at all.

This legislation, one of three bills addressing smart meter technology that I intend to introduce, would provide consumers the ability to "opt-out" of having a smart meter and require the Pennsylvania Utility Commission to create a fair surcharge system that would be paid by these consumers.

During the 2016-2017 Legislative Session, this bill was introduced as House Bill 1564. The following members served as co-sponsors:

REESE, BOBACK, R. BROWN, V. BROWN, DUNBAR, EMRICK, GABLER, GILLEN, GROVE, A. HARRIS, PHILLIPS-HILL, JAMES, KAUFFMAN, LAWRENCE, METCALFE, METZGAR, B. MILLER, B. O'NEILL, ORTITAY, PETRARCA, PICKETT, READSHAW, ROTHMAN, SACCONE, SONNEY, STAATS, WALSH, WARD, WARNER, MALONEY, DIAMOND, WENTLING, ZIMMERMAN, HELM, COX, RAPP, GAINEY, ROE, NELSON, C. QUINN, CORR, SIMMONS, JOZWIAK and ROAE

Introduced as HB311

PRINTER'S NO. 291

THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE BILL

No. 311 Session of 2019

INTRODUCED BY REESE, BOBACK, BARRAR, BERNSTINE, BROWN, DUNBAR, EMRICK, HAHN, HERSHEY, HILL-EVANS, IRVIN, JAMES, JONES, JOZWIAK, KAUFFMAN, KEEFER, LAWRENCE, METCALFE, METZGAR, B. MILLER, NELSON, OBERLANDER, PETRARCA, PICKETT, PYLE, READSHAW, ROTHMAN, RYAN, STRUZZI AND ZIMMERMAN, FEBRUARY 1, 2019

REFERRED TO COMMITTEE ON CONSUMER AFFAIRS, FEBRUARY 1, 2019

AN ACT

Amending Title 66 (Public Utilities) of the Pennsylvania Consolidated Statutes, in restructuring of electric utility industry, further providing for duties of electric distribution companies.

The General Assembly of the Commonwealth of Pennsylvania hereby enacts as follows:

Section 1. Section 2807(f)(2)(iii) of Title 66 of the Pennsylvania Consolidated Statutes is amended to read:

§ 2807. Duties of electric distribution companies.

* * *

(f) Smart meter technology and time of use rates.--

* * *

(2) Electric distribution companies shall furnish smart meter technology as follows:

* * *

(iii) In accordance with a depreciation schedule not to exceed 15 years. Customers may opt out of receiving

smart meter technology under this subparagraph by notifying, in writing, the electric distribution company. The following shall apply:

(A) The electric distribution company shall provide an opt-out form to customers upon request and may provide a method for customers to opt out electronically through the electric distribution company's publicly accessible Internet website.

(B) The commission shall create and regulate a surcharge for customers who elect to opt out of receiving smart meter technology under this subparagraph. The surcharge may include a one-time fee and a monthly fee reflective of the actual costs incurred by an electric distribution company to install, read, maintain or service the meters of customers who elect to opt out.

* * *

Section 2. This act shall take effect in 60 days.

Pennsylvania House of Representatives
https://www.legis.state.pa.us/cfdocs/Legis/CSM/showMemoPublic.cfm?chamber=H&SPick=20190&cosponId=27348 **05/15/2019 08:29 AM**

Home / House Co-Sponsorship Memoranda

House Co-Sponsorship Memoranda

House of Representatives
Session of 2019 - 2020 Regular Session

MEMORANDUM

Posted: January 3, 2019 02:28 PM
From: Representative Mike Reese
To: All House members
Subject: Repeal of Smart Meter Mandate

In the near future, I plan to introduce legislation to amend Title 66 (Public Utilities) to repeal a mandate imposed on electricity companies to install smart meter technology on the buildings of their customers.

Act 129 of 2008 requires electric distribution companies to develop energy efficiency and conservation plans. The Act also requires electric distribution companies to deploy smart meter technology throughout their service territories according to a 15-year depreciation schedule. Smart meter technology transmits usage data to an electric distribution company and to the consumer on an hourly basis.

I am of the opinion that although smart meters may be a technology that has advantages, no government body should mandate their usage. Such a mandate jeopardizes common principles of supply and demand.

This legislation, one of three bills addressing smart meter technology that I intend to introduce, would simply remove language that requires energy companies to provide smart meters while still allowing companies to offer the technology should they choose.

During the 2017-2018 Legislative Session, this bill was introduced as House Bill 1565. The following members served as co-sponsors:

REESE, BARRAR, BOBACK, V. BROWN, DeLUCA, DUNBAR, GABLER, GILLEN, GROVE, PHILLIPS-HILL, JAMES, KAUFFMAN, LAWRENCE, MARSHALL, METCALFE, METZGAR, B. MILLER, ORTITAY, PETRARCA, PICKETT, ROTHMAN, SACCONE, WALSH, WARD, WARNER, ZIMMERMAN, MALONEY, WENTLING, COX, MACKENZIE and JOZWIAK

Introduced as HB312

PRINTER'S NO. 292

THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE BILL

No. 312 Session of 2019

INTRODUCED BY REESE, BOBACK, BARRAR, BERNSTINE, BROWN, DUNBAR, EMRICK, HAHN, JONES, JOZWIAK, KAUFFMAN, KEEFER, M. K. KELLER, MACKENZIE, METCALFE, METZGAR, NELSON, PETRARCA, PICKETT, PYLE, RAPP, READSHAW, ROTHMAN, RYAN, STRUZZI AND ZIMMERMAN, FEBRUARY 1, 2019

REFERRED TO COMMITTEE ON CONSUMER AFFAIRS, FEBRUARY 1, 2019

AN ACT

Amending Title 66 (Public Utilities) of the Pennsylvania Consolidated Statutes, in restructuring of electric utility industry, further providing for duties of electric distribution companies.

The General Assembly of the Commonwealth of Pennsylvania hereby enacts as follows:

Section 1. Section 2807(f) of Title 66 of the Pennsylvania Consolidated Statutes is amended to read:

§ 2807. Duties of electric distribution companies.

* * *

(f) Smart meter technology and time of use rates.--

(1) [Within nine months after the effective date of this paragraph, electric] Electric distribution companies [shall] may file a smart meter technology procurement and installation plan with the commission for approval. [The plan shall describe the smart meter technologies the electric distribution company proposes to install in accordance with

[paragraph (2).]

[(2) Electric distribution companies shall furnish smart meter technology as follows:

(i) Upon request from a customer that agrees to pay the cost of the smart meter at the time of the request.

(ii) In new building construction.

(iii) In accordance with a depreciation schedule not to exceed 15 years.]

(3) Electric distribution companies shall, with customer consent, make available direct meter access and electronic access to customer meter data to third parties, including electric generation suppliers and providers of conservation and load management services.

(4) In no event shall lost or decreased revenues by an electric distribution company due to reduced electricity consumption or shifting energy demand be considered any of the following:

(i) A cost of smart meter technology recoverable under a reconcilable automatic adjustment clause under section 1307(b), except that decreased revenues and reduced energy consumption may be reflected in the revenue and sales data used to calculate rates in a distribution rate base rate proceeding filed under section 1308 (relating to voluntary changes in rates).

(ii) A recoverable cost.

(5) [By January 1, 2010, or at the end of the applicable generation rate cap period, whichever is later, a] A default service provider [shall] may submit to the commission one or more proposed time-of-use rates and real-time price plans. The commission shall approve or modify the time-of-use rates

and real-time price plan within six months of submittal. The default service provider [shall] may offer the time-of-use rates and real-time price plan to all customers that have been provided with smart meter technology [under paragraph (2)(iii)]. Residential or commercial customers may elect to participate in time-of-use rates or real-time pricing. [The default service provider shall submit an annual report to the price programs and the efficacy of the programs in affecting energy demand and consumption and the effect on wholesale market prices.]

[(6) The provisions of this subsection shall not apply to an electric distribution company with 100,000 or fewer customers.]

(7) An electric distribution company may recover reasonable and prudent costs of providing smart meter technology [under paragraph (2)(ii) and (iii)], as determined by the commission[. This paragraph includes], including annual depreciation and capital costs over the life of the smart meter technology and the cost of any system upgrades that the electric distribution company may require to enable the use of the smart meter technology which are incurred after the effective date of this paragraph, less operating and capital cost savings realized by the electric distribution company from the installation and use of the smart meter technology. Smart meter technology shall be deemed to be a new service offered for the first time under section 2804(4)(vi). An electric distribution company may recover smart meter technology costs:

(i) through base rates, including a deferral for future base rate recovery of current basis with carrying

charge as determined by the commission[; or

(ii) on a full and current basis through a reconcilable automatic adjustment clause under section 1307].

* * *

Section 2. This act shall take effect in 60 days.

Pennsylvania House of Representatives

https://www.legis.state.pa.us/cfdocs/Legis/CSM/showMemoPublic.cfm?chamber=H&SPick=20190&cosponId=27350 05/15/2019 08:29 AM

House Co-Sponsorship Memoranda

House of Representatives
Session of 2019 - 2020 Regular Session

MEMORANDUM

Posted: January 3, 2019 02:31 PM
From: Representative Mike Reese
To: All House members
Subject: Smart Meter Legislation

In the near future, I plan to introduce legislation that combines language to amend Title 66 (Public Utilities), which I have also offered in three separate bills.

Act 129 of 2008 requires electric distribution companies to develop energy efficiency and conservation plans. The Act also requires electric distribution companies to deploy smart meter technology throughout their service territories according to a 15-year depreciation schedule. Smart meter technology transmits usage data to an electric distribution company and to the consumer on an hourly basis.

Many electricity customers throughout Pennsylvania have expressed their desire to not have smart meter technology at their homes or businesses. Their concerns range from securing sensitive and personal information to the health impacts of radio frequency (RF) waves. My perspective is one that questions if a government mandate was appropriate at all.

This legislation addresses this matter in three ways. It would:

- remove language that requires energy companies to provide smart meters.

- provide consumers the ability to "opt-out" of having a smart meter and require the Pennsylvania Utility Commission to create a fair surcharge system that would be paid by these consumers.

- ensure that customer consent is required before an electric distribution company share customer meter data or provide meter access to a government agency.

During the 2017-2018 Legislative Session, this bill was introduced as House Bill 1566. The following members served as co-sponsors:

REESE, BOBACK, V. BROWN, DOWLING, DUNBAR, EMRICK, GABLER, GILLEN, GROVE, PHILLIPS-HILL, JAMES, KAUFFMAN, LAWRENCE, MARSHALL, METCALFE, B. MILLER, ORTITAY, PICKETT, SACCONE, STAATS, WALSH, WARNER, DIAMOND, WENTLING, GAINEY, COX and JOZWIAK

Introduced as HB313

PRINTER'S NO. 293

THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE BILL

No. 313 Session of 2019

INTRODUCED BY REESE, BOBACK, BARRAR, BERNSTINE, BROWN, DUNBAR, EMRICK, GABLER, HAHN, HILL-EVANS, IRVIN, JONES, JOZWIAK, KAUFFMAN, KEEFER, M. K. KELLER, METCALFE, NELSON, PETRARCA, PICKETT, RYAN, STAATS, STRUZZI AND ZIMMERMAN, FEBRUARY 1, 2019

REFERRED TO COMMITTEE ON CONSUMER AFFAIRS, FEBRUARY 1, 2019

AN ACT

Amending Title 66 (Public Utilities) of the Pennsylvania Consolidated Statutes, in restructuring of electric utility industry, further providing for duties of electric distribution companies.

The General Assembly of the Commonwealth of Pennsylvania hereby enacts as follows:

Section 1. Section 2807(f) of Title 66 of the Pennsylvania Consolidated Statutes is amended to read:

§ 2807. Duties of electric distribution companies.

* * *

(f) Smart meter technology and time of use rates.--

(1) [Within nine months after the effective date of this paragraph, electric] Electric distribution companies [shall] may file a smart meter technology procurement and installation plan with the commission for approval. [The plan shall describe the smart meter technologies the electric distribution company proposes to install in accordance with

paragraph (2).

(2) Electric distribution companies shall furnish smart meter technology as follows:

(i) Upon request from a customer that agrees to pay the cost of the smart meter at the time of the request.

(ii) In new building construction.

(iii) In accordance with a depreciation schedule not to exceed 15 years.] Customers may opt out of receiving smart meter technology under this paragraph by notifying, in writing, the electric distribution company. The following shall apply:

(i) The electric distribution company shall provide an opt-out form to consumers upon request and may provide a method for consumers to opt out electronically through the electric distribution company's publicly accessible Internet website.

(ii) The commission shall create and regulate a surcharge for consumers who elect to opt out of receiving smart meter technology under this subparagraph. The surcharge may include a one-time fee and a monthly fee reflective of the actual costs incurred by an electric distribution company to install, read, maintain or service the meters of customers who elect to opt out.

(3) (i) Electric distribution companies shall, with customer consent, make available direct meter access and electronic access to customer meter data to third parties, including electric generation suppliers [and], providers of conservation and load management services[.] and government agencies.

(ii) Notwithstanding subparagraph (i), customer

consent shall not be required when:

(A) the information is released to comply with a subpoena or order issued by a court or regulatory agency;

(B) the information is released on a confidential basis in the context of an administrative proceeding involving a customer complaint;

(C) the information is released in aggregated form; or

(D) there is an emergency situation involving an imminent threat to public health or safety.

(4) In no event shall lost or decreased revenues by an electric distribution company due to reduced electricity consumption or shifting energy demand be considered any of the following:

(i) A cost of smart meter technology recoverable under a reconcilable automatic adjustment clause under section 1307(b), except that decreased revenues and reduced energy consumption may be reflected in the revenue and sales data used to calculate rates in a distribution rate base rate proceeding filed under section 1308 (relating to voluntary changes in rates).

(ii) A recoverable cost.

(5) [By January 1, 2010, or at the end of the applicable generation rate cap period, whichever is later, a] A default service provider [shall] may submit to the commission one or more proposed time-of-use rates and real-time price plans. The commission shall approve or modify the time-of-use rates and real-time price plan within six months of submittal. The

default service provider [shall] may offer the time-of-use rates and real-time price plan to all customers that have been provided with smart meter technology [under paragraph (2)(iii)]. Residential or commercial customers may elect to participate in time-of-use rates or real-time pricing. [The default service provider shall submit an annual report to the price programs and the efficacy of the programs in affecting energy demand and consumption and the effect on wholesale market prices.]

[(6) The provisions of this subsection shall not apply to an electric distribution company with 100,000 or fewer customers.]

(7) An electric distribution company may recover reasonable and prudent costs of providing smart meter technology [under paragraph (2)(ii) and (iii)], as determined by the commission[. This paragraph includes], including annual depreciation and capital costs over the life of the smart meter technology and the cost of any system upgrades that the electric distribution company may require to enable the use of the smart meter technology which are incurred after the effective date of this paragraph, less operating and capital cost savings realized by the electric distribution company from the installation and use of the smart meter technology. Smart meter technology shall be deemed to be a new service offered for the first time under section 2804(4)(vi). An electric distribution company may recover smart meter technology costs:

(i) through base rates, including a deferral for future base rate recovery of current basis with carrying charge as determined by the commission[; or

(ii) on a full and current basis through a reconcilable automatic adjustment clause under section 1307].

* * *

Section 2. This act shall take effect in 60 days.

EXHIBIT M

National Toxicology Program
U.S. Department of Health and Human Services

Share This:
https://ntp.niehs.nih.gov/go/about

About NTP

We're exposed to many substances daily thanks to our jobs, hobbies, home life, diets, and even the air we breathe. Many substances are harmless to humans at the doses we encounter day to day, and we are still discovering which may harm us and under what circumstances. The National Toxicology Program (NTP), an interagency program within the U.S. Department of Health and Human Services, evaluates and identifies the health effects of select substances which could be hazardous to humans. In other words, NTP studies the toxicology of these test substances.

NTP's Vision

Our vision is to maintain an objective, science-based approach to deal with critical issues in toxicology by using the best science available for our studies. We continually evolve to be at the cutting edge of scientific research as we develop and apply the latest technologies and research methods available.

From the end of the 20th century to the modern day, there have been many advances in molecular biology, computer science, and more; these advances have helped scientists better identify critical cellular and molecular events (mechanisms) that may lead to adverse responses to toxicants. These discoveries have also given us a better understanding of the causes of disease and illness within the human population.

As the primary source of toxicology information for the federal government, NTP seeks to utilize advanced technologies in its research. Our intent is to improve the ability of government agencies to make informed public health decisions. NTP does this by expanding the existing data pool on the potential toxicity of various substances and environmental agents and providing that information for use in decision-making.

History of NTP

Before 1978, there was a growing concern about the effects of various substances in the environment which could directly or indirectly contribute to diseases and illness. Unfortunately,

in most cases there wasn't enough data to prove a link. Systematic testing was needed to understand the effect of environmental substances on human health.

This is why the National Toxicology Program was created. Our ultimate goal is to provide information on harmful substances, prevent disease and disability due to exposure, and improve the health of the general population.

Establishment

NTP was established in 1978 by Joseph A. Califano, Jr., the then Secretary of Health, Education and Welfare (today known as the Department of Health and Human Services). This program was created as a joint effort to:

- Coordinate toxicology testing programs within the federal government.
- Strengthen the science base in toxicology.
- Develop and validate improved testing methods.
- Provide information about potentially toxic substances to health, regulatory, and research agencies, scientific and medical communities, and the public.

David P. Rall, who at the time was Director of the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health (NIH), was named the first NTP director and built the program's foundation. Some core program features developed under Rall's direction included:

- Board of Scientific Counselors (BSC): an advisory committee that provides external scientific oversight of the program's activities.
- Report on Carcinogens (RoC): currently in its 14th edition, the RoC was enacted to document substances known or believed to cause cancer in humans.
- Executive Committee: consisting of stakeholders from various branches of the government, the Executive Committee provides programmatic and policy oversight to the NTP Director.

In October of 1981, Secretary Richard S. Schwiker granted permanent status to NTP as a government program and independent partner of the National Institute of Environmental Health Sciences (NIEHS).

Continued Mission

NTP has continued our research and analysis for over 30 years. We constantly strive to use the latest technologies and scientific analysis available.

In 2004 we released Toxicology in the 21st Century: The Role of The National Toxicology Program. This document announced the updated vision of NTP and a roadmap to achieve that vision. We continually update our decision-making and older tests from the 1970s and 1990s with faster mechanism-based testing. You can learn more about the process involved in creating these documents in the Past Meetings and Workshops section of the site.

Partnerships

We work closely with federal agencies which are represented in the NTP Executive Committee. Additionally, we work with state and international governments to:

- Address issues of importance to public health.
- Support the shaping of public health policy.
- Protect the environment.

NTP also has a critical role in:

- Building interagency collaborations in research and exposure assessment.
- Providing interpretation and alternative methods for toxicity testing.
- Exploring new technologies to evaluate environmental substances which cause disease.

Web page last updated on March 15, 2019

NTP is located at the National Institute of Environmental Health Sciences, part of the National Institutes of Health

EXHIBIT M

Industrial, Scientific and Medical Radio Band (ISM Band)

Definition - What does *Industrial, Scientific and Medical Radio Band (ISM Band)* mean?

The industrial, scientific, and medical radio band (ISM band) refers to a group of radio bands or parts of the radio spectrum that are internationally reserved for the use of radio frequency (RF) energy intended for scientific, medical and industrial requirements rather than for communications . ISM bands are generally open frequency bands, which vary according to different regions and permits.

The 2.54 GHz ISM band is a commonly accepted band for worldwide operations . Microwave ovens, cordless phones, medical diathermy machines, military radars and industrial heaters are just some of the equipment that makes use of this ISM band.

ISM bands are also called unlicensed bands.

Techopedia explains *Industrial, Scientific and Medical Radio Band (ISM Band)*

The use of ISM equipment generates electromagnetic interference that interrupts radio communications that make use of the same frequency. Therefore, this equipment was restricted to specific frequency bands. Generally, the communication equipment that operates in these bands should tolerate the interference created by ISM equipment, and therefore users do not have any regulatory protection from the use of ISM equipment.

In spite of the real purpose of ISM bands, there has been rapid growth in its use in low-power, short-range communications platforms. Bluetooth devices, cordless phones, Wi-Fi computer networks, and NFC devices all make use of ISM bands. In 1985, the U.S. Federal Communications Commission opened the ISM bands for use in mobile communications and wireless LANs. In 1997, it incorporated supplementary bands in the 5 GHz range, referred to as the Unlicensed National Information Infrastructure (U-NII). The HIPERLAN wireless LANs of Europe make use of the same 5 GHz bands known as the Broadband Radio Access Network.

Featured Q&A

More of your questions answered by our Experts (/experts)

EXHIBIT M

WIKIPEDIA

ISM band

The **industrial, scientific and medical (ISM) radio bands** are radio bands (portions of the radio spectrum) reserved internationally for the use of radio frequency (RF) energy for industrial, scientific and medical purposes other than telecommunications.[1] Examples of applications in these bands include radio-frequency process heating, microwave ovens, and medical diathermy machines. The powerful emissions of these devices can create electromagnetic interference and disrupt radio communication using the same frequency, so these devices were limited to certain bands of frequencies. In general, communications equipment operating in these bands must tolerate any interference generated by ISM applications, and users have no regulatory protection from ISM device operation.

Despite the intent of the original allocations, in recent years the fastest-growing uses of these bands have been for short-range, low power wireless communications systems, since these bands are often approved for such devices that can be used without a government license, as would otherwise be required for transmitters; ISM frequencies are often chosen for that purpose as they already have serious interference. Cordless phones, Bluetooth devices, near field communication (NFC) devices, garage door openers, baby monitors and wireless computer networks (WiFi) all may use the ISM frequencies, although these low power emitters are not considered ISM.

Contents

Definition

The ISM bands are defined by the ITU Radio Regulations (article 5) in footnotes 5.138, 5.150, and 5.280 of the Radio Regulations. Individual countries' use of the bands designated in these sections may differ due to variations in national radio regulations. Because communication devices using the ISM bands must tolerate any interference from ISM equipment, unlicensed operations are typically permitted to use these bands, since unlicensed operation typically needs to be tolerant of interference from other devices anyway. The ISM bands share allocations with unlicensed and licensed operations; however, due to the high likelihood of harmful interference, licensed use of the bands is typically low. In the United States, uses of the ISM bands are governed by Part 18 of the Federal Communications Commission (FCC) rules, while Part 15 contains the rules for unlicensed communication devices, even those that share ISM frequencies. In Europe, the ETSI is responsible for regulating the use of Short Range Devices, some of which operate in ISM bands.

Frequency allocation

The allocation of radio frequencies is provided according to *Article 5* of the ITU Radio Regulations (edition 2012).[2]

In order to improve harmonisation in spectrum utilisation, the majority of service-allocations stipulated in this document were incorporated in national Tables of Frequency Allocations and Utilisations which is within the responsibility of the appropriate national administration. The allocation might be primary, secondary, exclusive, and shared.

- primary allocation: is indicated by writing in capital letters (see example below)
- secondary allocation: is indicated by small letters
- exclusive or shared utilization: is within the responsibility of administrations

Example of frequency allocation

Frequency range		Center frequency	Bandwidth	Type	Availability	Licensed users
6.765 MHz	6.795 MHz	6.78 MHz	30 KHz	A	Subject to local acceptance	FIXED SERVICE & Mobile service
13.553 MHz	13.567 MHz	13.56 MHz	14 KHz	B	Worldwide	FIXED & Mobile services except Aeronautical mobile (R) service
26.957 MHz	27.283 MHz	27.12 MHz	326 KHz	B	Worldwide	FIXED & MOBILE SERVICE except Aeronautical mobile service, CB Radio
40.66 MHz	40.7 MHz	40.68 MHz	40 KHz	B	Worldwide	Fixed, Mobile services & Earth exploration-satellite service
433.05 MHz	434.79 MHz	433.92 MHz	1.74 MHz	A	only in Region 1, subject to local acceptance	AMATEUR SERVICE & RADIOLOCATION SERVICE, additional apply the provisions of footnote 5.280. For Australia see footnote AU.
902 MHz	928 MHz	915 MHz	26 MHz	B	Region 2 only (with some exceptions)	FIXED, Mobile except aeronautical mobile & Radiolocation service; in Region 2 additional Amateur service
2.4 GHz	2.5 GHz	2.45 GHz	100 MHz	B	Worldwide	FIXED, MOBILE, RADIOLOCATION, Amateur & Amateur-satellite service
5.725 GHz	5.875 GHz	5.8 GHz	150 MHz	B	Worldwide	FIXED-SATELLITE, RADIOLOCATION, MOBILE, Amateur & Amateur-satellite service
24 GHz	24.25 GHz	24.125 GHz	250 MHz	B	Worldwide	AMATEUR, AMATEUR-SATELLITE, RADIOLOCATION & Earth exploration-satellite service (active)
61 GHz	61.5 GHz	61.25 GHz	500 MHz	A	Subject to local acceptance	FIXED, INTER-SATELLITE, MOBILE & RADIOLOCATION SERVICE
122 GHz	123 GHz	122.5 GHz	1 GHz	A	Subject to local acceptance	EARTH EXPLORATION-SATELLITE (passive), FIXED, INTER-SATELLITE, MOBILE, SPACE RESEARCH (passive) & Amateur service
244 GHz	246 GHz	245 GHz	2 GHz	A	Subject to local acceptance	RADIOLOCATION, RADIO ASTRONOMY, Amateur & Amateur-satellite service

Type A (footnote 5.138) = frequency bands are designated for *ISM applications*. The use of these frequency bands for ISM applications shall be subject to special authorization by the administration concerned, in agreement with other administrations whose radiocommunication services might be affected. In applying this provision, administrations shall have due regard to the latest relevant ITU-R Recommendations.

Type B (footnote 5.150) = frequency bands are also designated for ISM applications. Radiocommunication services operating within these bands must accept harmful interference which may be caused by these applications.

ITU RR, Footnote 5.280 = In Germany, Austria, Bosnia and Herzegovina, Croatia, Macedonia, Liechtenstein, Montenegro, Portugal, Serbia, Slovenia and Switzerland, the band 433.05-434.79 MHz (center frequency 433.92 MHz) is designated for *ISM applications*. Radiocommunication services of these countries operating within this band must accept harmful interference which may be caused by these applications.

Footnote AU, Australia is part of ITU Region 3 the band 433.05 to 434.79 MHz is not a designated ISM band in Australia, however the operation of low powered devices in the radiofrequency band 433.05 to 434.79 MHz is supported through Radiocommunications class licence for low interference potential devices (LIPDs)[3].

History

The ISM bands were first established at the International Telecommunications Conference of the ITU in Atlantic City, 1947. The American delegation specifically proposed several bands, including the now commonplace 2.4 GHz band, to accommodate the then nascent process of microwave heating;[4] however, FCC annual reports of that time suggest that much preparation was done ahead of these presentations.[5]

From the proceedings: "The delegate of the United States, referring to his request that the frequency 2450 Mc/s be allocated for I.S.M., indicated that there was in existence in the United States, and working on this frequency a diathermy machine and an electronic cooker, and that the latter might eventually be installed in transatlantic ships and airplanes. There was therefore some point in attempting to reach world agreement on this subject."

Radio frequencies in the ISM bands have been used for communication purposes, although such devices may experience interference from non-communication sources. In the United States, as early as 1958 Class D Citizens Band, a Part 95 service, was allocated to frequencies that are also allocated to ISM. [1]

In the U.S., the FCC first made unlicensed spread spectrum available in the ISM bands in rules adopted on May 9, 1985.[6]

Many other countries later developed similar regulations, enabling use of this technology. The FCC action was proposed by Michael Marcus of the FCC staff in 1980 and the subsequent regulatory action took five more years. It was part of a broader proposal to allow civil use of spread spectrum technology and was opposed at the time by mainstream equipment manufacturers and many radio system operators.[7]

Applications

Industrial, scientific and medical (ISM) applications (of radio frequency energy) (short: **ISM applications**) are – according to *article 1.15* of the International Telecommunication Union's (ITU) ITU Radio Regulations (RR)[8] – defined as «*Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications.*»

The original ISM specifications envisioned that the bands would be used primarily for noncommunication purposes, such as heating. The bands are still widely used for these purposes. For many people, the most commonly encountered ISM device is the home microwave oven operating at 2.45 GHz which uses microwaves to cook food. Industrial heating is another big application area; such as induction heating, microwave heat treating, plastic softening, and plastic welding processes. In medical settings, shortwave and microwave diathermy machines use radio waves in the ISM bands to apply deep heating to the body for relaxation and healing. More recently hyperthermia therapy uses microwaves to heat tissue to kill cancer cells.

However, as detailed below, the increasing congestion of the radio spectrum, the increasing sophistication of microelectronics, and the attraction of unlicensed use, has in recent decades led to an explosion of uses of these bands for short range communication systems for wireless devices, which are now by far the largest uses of these bands. These are sometimes called "non ISM" uses since they do not fall under the originally envisioned "industrial", "scientific", and "medical" application areas. One of the largest applications has been wireless networking (WiFi). The IEEE 802.11 wireless networking protocols, the standards on which almost all wireless systems are based, use the ISM bands. Virtually all laptops, tablet computers, computer printers and cellphones now have 802.11 wireless modems using the 2.4 and 5.7 GHz ISM bands. Bluetooth is another networking technology using the 2.4 GHz band, which can be

problematic given the probability of interference. [9] Near field communication devices such as proximity cards and contactless smart cards use the lower frequency 13 and 27 MHz ISM bands. Other short range devices using the ISM bands are: wireless microphones, baby monitors, garage door openers, wireless doorbells, keyless entry systems for vehicles, radio control channels for UAVs (drones), wireless surveillance systems, RFID systems for merchandise, and wild animal tracking systems.

Some electrodeless lamp designs are ISM devices, which use RF emissions to excite fluorescent tubes. Sulfur lamps are commercially available plasma lamps, which use a 2.45 GHz magnetron to heat sulfur into a brightly glowing plasma.

Long-distance wireless power systems have been proposed and experimented with which would use high-power transmitters and rectennas, in lieu of overhead transmission lines and underground cables, to send power to remote locations. NASA has studied using microwave power transmission on 2.45 GHz to send energy collected by solar power satellites back to the ground.

Also in space applications, a Helicon Double Layer ion thruster is a prototype spacecraft propulsion engine which uses a 13.56 MHz transmission to break down and heat gas into plasma.

Non-ISM uses

In recent years ISM bands have also been shared with (non-ISM) license-free error-tolerant communications applications such as wireless sensor networks in the 915 MHz and 2.450 GHz bands, as well as wireless LANs and cordless phones in the 915 MHz, 2.450 GHz, and 5.800 GHz bands. Because unlicensed devices are required to be tolerant of ISM emissions in these bands, unlicensed low power users are generally able to operate in these bands without causing problems for ISM users. ISM equipment does not necessarily include a radio receiver in the ISM band (e.g. a microwave oven does not have a receiver).

In the United States, according to 47 CFR Part 15.5, low power communication devices must accept interference from licensed users of that frequency band, and the Part 15 device must not cause interference to licensed users. Note that the 915 MHz band should not be used in countries outside Region 2, except those that specifically allow it, such as Australia and Israel, especially those that use the GSM-900 band for cellphones. The ISM bands are also widely used for Radio-frequency identification (RFID) applications with the most commonly used band being the 13.56 MHz band used by systems compliant with ISO/IEC 14443 including those used by biometric passports and contactless smart cards.

In Europe, the use of the ISM band is covered by Short Range Device regulations issued by European Commission, based on technical recommendations by CEPT and standards by ETSI. In most of Europe, LPD433 band is allowed for license-free voice communication in addition to PMR446.

Wireless LAN devices use wavebands as follows:

- Bluetooth 2450 MHz band[10] falls under WPAN
- HiPERLAN 5800 MHz band
- IEEE 802.11/Wi-Fi 2450 MHz and 5800 MHz bands

IEEE 802.15.4, ZigBee and other personal area networks may use the 915 MHz and 2450 MHz ISM bands because of frequency sharing between different allocations.

Wireless LANs and cordless phones can also use bands other than those shared with ISM, but such uses require approval on a country by country basis. DECT phones use allocated spectrum outside the ISM bands that differs in Europe and North America. Ultra-wideband LANs require more spectrum than the ISM bands can provide, so the relevant standards such as IEEE 802.15.4a are designed to make use of spectrum outside the ISM bands. Despite the fact that these additional bands are outside the official ITU-R ISM bands, because they are used for the same types of low power personal communications, they are sometimes incorrectly referred to as ISM bands as well.

Also note that several brands of radio control equipment use the 2.4 GHz band range for low power remote control of toys, from gas powered cars to miniature aircraft.

Worldwide Digital Cordless Telecommunications or WDCT is a technology that uses the 2.4 GHz radio spectrum.

Google's Project Loon uses ISM bands (specifically 2.4 and 5.8 GHz bands) for balloon-to-balloon and balloon-to-ground communications.

Pursuant to 47 CFR Part 97 some ISM bands are used by licensed amateur radio operators for communication - including amateur television.

See also

- ISM applications
- Frequency allocation
- Fixed wireless
- Electromagnetic interference at 2.4 GHz

Notes

References

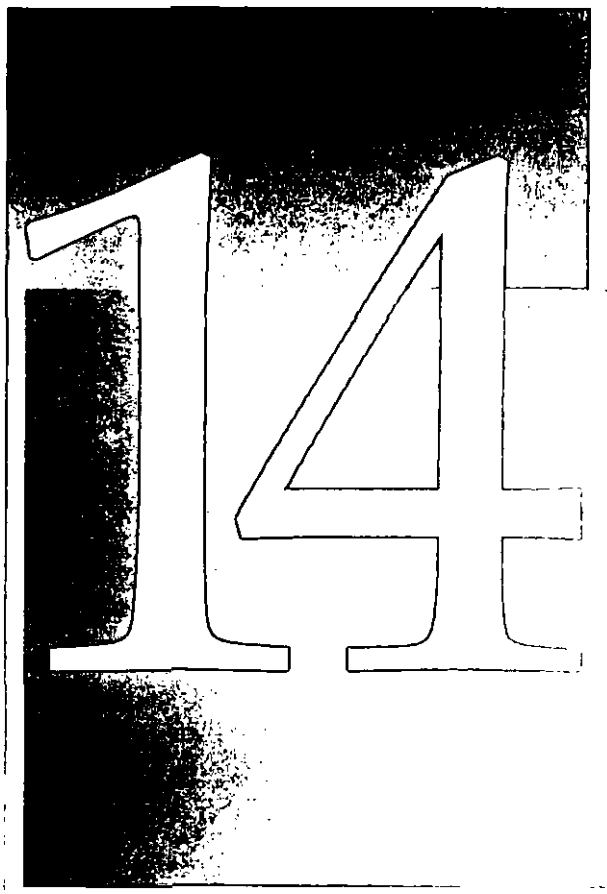
1. "ARTICLE 1 - Terms and Definitions" (http://life.itu.int/radioclub/rr/art1.pdf) (PDF). *life.itu.ch*. International Telecommunication Union. 19 October 2009. 1.15. "industrial, scientific and medical (ISM) applications (of radio frequency energy): Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications."
2. *ITU Radio Regulations, CHAPTER II – Frequencies, ARTICLE 5 Frequency allocations, Section IV – Table of Frequency Allocations*
3. ACMA (April 1999). "Spectrum at 434 MHz for low powered devices" (http://acma.gov.au/theACMA/spectrum-at-434-mhz-for-low-powered-devices). *Australian Communications and Media Authority*. Australian Communications and Media Authority. Retrieved 28 June 2017.
4. "Documents of the International Radio Conference (Atlantic City, 1947) - Doc. No. 1-100" (http://www.itu.int/dms_pub/itu-s/oth/02/01/S020100002B4813PDFE.pdf) (PDF). p. 464.
5. Thirteenth Annual Report of the FCC, June 30, 1947 (http://transition.fcc.gov/Bureaus/Mass_Media/Databases/documents_collection/annual_reports/1947.pdf) (PDF) (Report). pp. 8, 50–51.
6. "Authorization of Spread Spectrum Systems Under Parts 15 and 90 of the FCC Rules and Regulations" (https://web.archive.org/web/20070314063902/http://www.marcus-spectrum.com/documents/81413RO.txt). Federal Communications Commission. June 18, 1985. Archived from the original (http://www.marcus-spectrum.com/documents/81413RO.txt) (TXT) on March 14, 2007. Retrieved 2007-08-31.
7. "The Genesis of Unlicensed Wireless Policy" (http://www.iep.gmu.edu/UnlicensedWireless.php). George Mason University. April 4, 2008. Retrieved 2008-04-20.
8. ITU Radio Regulations, Section IV. Radio Stations and Systems – Article 1.15, definition: *Industrial, scientific and medical (ISM) applications (of radio frequency energy) / ISM application*

9. Eizikowitz, Grant (2018-03-05). "Why does Bluetooth still suck?" (http://www.businessinsider.com/why-bluetooth-sucks-bad-problems-issues-disconnects-2018-2). *Business Insider*. Retrieved 2018-07-15.
10. Chakrabarti, P. (2009). *International Conference on Emerging Trends in Electronic and Photonic Devices and Systems (ELECTRO-2009), December 22-24, 2009* (https://books.google.co.in/books?id=8U86p2igDhsC&pg=PA397&lpg=PA397&dq=Bluetooth+2450+MHz+band+falls+under+WPAN&source=bl&ots=fOuqn2PKDE&sig=Ilqg8uHuMcAFpxj7DgmB65XdOI0&hl=en&sa=X&v 202450%20MHz%20band%20falls%20under%20WPAN&f=false). Macmillan Publishers India. ISBN 9780230328518.

External links

- Cordless phone frequencies (http://telecom.hellodirect.com/docs/Tutorials/5.8GHzFrequency.1.031903.asp)
- ITU page on definitions of ISM bands (http://www.itu.int/ITU-R/terrestrial/faq/index.html#g013)
- ITU page on Radio Regulations (http://www.itu.int/publications/productslist.aspx?lang=e&CategoryID=R-REG&product=R-REG-RR)
- European Radiocommunications Office frequency information system (http://www.efis.dk/)
- In the US, CFR Title 47 Part 18 (http://www.access.gpo.gov/nara/cfr/waisidx_07/47cfr18_07.html) describes the regulation of the ISM bands. [1] (http://www.gpo.gov/fdsys/pkg/CFR-2011-title47-vol1/pdf/CFR-2011-title47-vol1-sec15-247.pdf) contains some of the regulations for wireless LAN devices operating in three of the low power communication, Part 15, bands.

EXHIBIT N



14th Report on Carcinogens

2016

U.S. Department of Health and Human Services
Public Health Service
National Toxicology Program

Introduction

The Objective of the Report on Carcinogens

The Report on Carcinogens (RoC) is a scientific and public health document that identifies and discusses agents, substances, mixtures, or exposure circumstances (referred to in the report as "substances") that may pose a cancer hazard to humans. As the identification of carcinogens is a key step in cancer prevention, publication of the RoC represents an important government activity towards improving public health. The box to the right lists the four elements the congressionally mandated RoC is required to contain.

The Burden of Cancer

Cancer—a group of diseases characterized by uncontrolled growth of abnormal cells that can result in death if not controlled—affects almost everyone's life, either directly or indirectly. About 1 out of 2 men and 1 out of 3 women living in the United States will develop cancer at some point in his or her lifetime (ACS 2016). Worldwide, over 14 million cases of cancer occur each year, and this figure is expected to reach nearly 22 million by 2030 (Bray *et al.* 2015). Cancer is the second leading cause of death globally, accounting for an estimated 8.2 million deaths in 2012 (Stewart *et al.* 2016). It disproportionately affects the poor, both in the United States and worldwide. Among both black and non-Hispanic white men in the United States, those with less than 12 years of education are three times more likely than college-educated men to die of cancer (ACS 2016). Of all cancer deaths worldwide, 70% occur in low- and middle-income countries. Moreover, the global burden of cancer is expected to increase in these poorer countries over the next two decades because of aging, population growth, and changes in cancer risk factors as these countries undergo economic transitions (Stewart *et al.* 2016). Beyond the toll on human life and health, cancer has a high economic cost. In 2009, cancer cost the United States over $243 billion, including $99 billion in medical costs, $19.6 billion in lost productivity due to illness, and $124.8 billion in lost productivity due to premature death (Reuben 2010).

Cancer Prevention

Reducing deaths from cancer will require not only improvements in treatment, but greater emphasis on cancer prevention and early detection (Stewart *et al.* 2016). The World Health Organization recognizes primary prevention as the most cost-effective and sustainable intervention for reducing the global burden of cancer (Jacobs *et al.* 2014). The good news is that over 35% of cancers are due to modifiable risk factors and can be prevented (Beaglehole *et al.* 2006, Reuben 2010, Stewart *et al.* 2016). The major causes of cancer are environmental factors, genetic factors, and physiological factors (e.g., related to hormones or immune conditions), and cancer may be caused by a combination of these factors occurring together or as a sequence of events. The targets for primary prevention are environmental causes, including occupational exposures, pollution, household exposures, medical treatment, infections, exposures resulting from lifestyle choices, or naturally occurring exposures (such as to ultraviolet [UV] radiation in sunlight) (Reuben 2010, ACS 2016). An important step in primary prevention is to identify the carcinogens. In 1978, the U.S. Congress passed legislation for this purpose, requiring the Secretary of Health and Human Services (HHS) to publish a report that identifies environmental causes of cancer. The National Toxicology Program (NTP) prepares the Report for the Secretary, HHS.

What Listing in the RoC Means

A listing in the RoC identifies a substance or exposure circumstance as ***known*** or ***reasonably anticipated to be a human carcinogen*** and thus indicates a potential hazard. It does not estimate cancer risks to individuals associated with exposures in their daily lives, because many factors affect whether a person will or will not develop cancer, including the carcinogenic potency of the substance, the level and duration of exposure, and an individual's susceptibility to the carcinogenic action of the substance. Formal risk assessments are the responsibility of the appropriate federal, state, and local health regulatory and research agencies. The RoC does not attempt to rank the listed substances according to their potency. Finally, the report does not address any potential benefits of listed carcinogenic substances (such as chemotherapeutic agents for cancer patients).

Section 301(b)(4) of the Public Health Service Act, 42 USC 241(b)(4), as amended

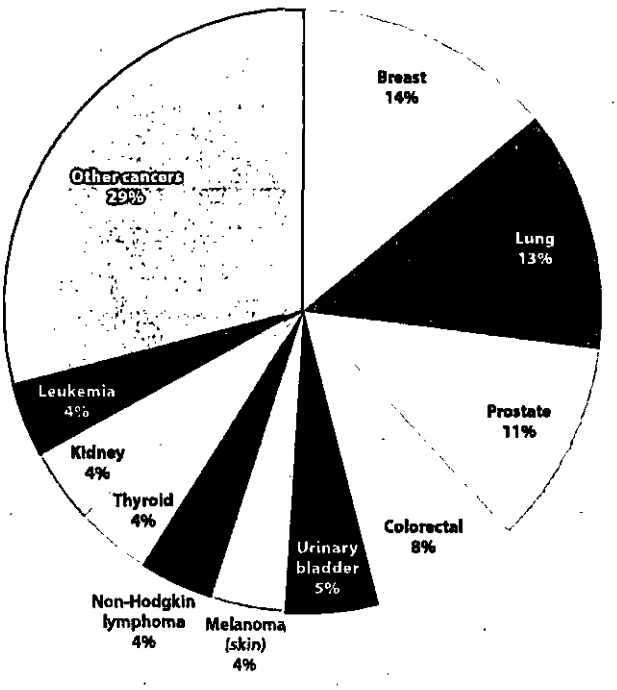
The report should contain the following elements:

1. A list of all substances (1) which either are known to be human carcinogens or may reasonably be anticipated to be human carcinogens and (2) to which a significant number of persons residing in the United States are exposed.
2. Information concerning the nature of such exposure and the estimated number of persons exposed to such substances.
3. A statement identifying (1) each substance contained in this list for which no effluent, ambient, or exposure standard has been established by a Federal agency and (2) for each effluent, ambient, or exposure standard established by a Federal agency with respect to a substance contained in this list, the extent to which such standard decreases the risk to public health from exposure to the substance.
4. A description of (1) each request received during the year to conduct research into, or testing for, the carcinogenicity of a substance and (2) how the Secretary and other responsible entities responded to each request.

Cancer in the United States

In 2016, almost 1.7 million people living in the United States are expected to be diagnosed with cancer. An estimated 1,630 people will die from cancer each day, totaling over 590,000 projected deaths in 2016 (ACS 2016, Howlader *et al.* 2016). Most of these people (almost 70%) will develop one of ten different types of cancer, and the four most common cancers—breast, lung, prostate, and colon and rectal cancer—account for almost half of all new cases of cancer. The graph on the next page shows the ten most common types of cancer as percentages of all cancer projected for 2016.

Rates of cancer incidence (new cases) and mortality (deaths) vary with age, sex, race, and type of cancer. Most cancer (85%) is diagnosed in people aged 50 or older, and cancer rates are highest among black men and lowest among white women. The last ten years have seen decreases in total annual cancer incidence (by 1%) and mortality (by 1.5%) and in some of the most common cancers, such as lung cancer (incidence and mortality), prostate cancer (incidence and mortality), breast cancer (mortality), colorectal cancer (incidence and mortality), urinary-bladder cancer (incidence), and non-Hodgkin lymphoma (mortality). In contrast, the incidences of some cancers, such as anal cancer, kidney cancer, liver cancer, pancreatic cancer, melanoma, myeloma, and thyroid cancer, have increased (though the increases in



The ten most common cancers in the United States

kidney and thyroid cancer may be explained in part by improved methods for detecting these cancers). In addition, patterns in the incidence or mortality of specific types of cancer may vary by age, sex, or race. For example, increased rates have been seen for breast cancer among black women, colorectal cancer among people under the age of 50, leukemia among people over 50, and oral and pharyngeal cancer among white men (thought to be related to human papilloma virus) (ACS 2016, Howlader *et al.* 2016).

The majority of people (67%) diagnosed with cancer at any tissue site are still alive five years after diagnosis; however, relative five-year survival rates (survival of cancer patients compared with survival of healthy people of the same age, sex, and race) vary by cancer type (statistics for 2006 to 2012, Howlader *et al.* 2016). For example, survival is much lower for lung cancer (17.7%) than breast cancer (89.7%), which explains why there are more deaths from lung cancer although there are more new cases of breast cancer.

In contrast with trends in adults, the total incidence of cancer has been increasing in children (up to age 14), at a rate of 0.6% per year (ACS 2016). Children are particularly vulnerable to environmental risk factors, including numerous biological toxins and harmful exposures from air, food, water, medicines, pesticides, and ionizing radiation, even before birth (Reuben 2010). Although deaths from childhood cancer have been decreasing because of improved treatment and participation in clinical trials, cancer remains the second leading cause of death among children in the United States; the projected number of deaths for 2016 is 1,250 (ACS 2016). The causes of childhood cancer are largely unknown. The most common types of cancer observed in children are different from those in adults; children are more likely to develop cancers of the blood (leukemia), brain and central nervous system, and bone or soft tissue (Ward *et al.* 2014, ACS 2016).

How the RoC Addresses the Public Health Service Act

This section describes how the RoC addresses the Public Health Service Act to (1) identify carcinogens, (2) estimate exposure, and (3) identify federal regulations to reduce exposure and cancer risk. The fourth type of information requested by Congress — to identify requests for carcinogenicity testing — is provided in Appendix E of the RoC, which includes a link to information on carcinogenicity testing activities at NTP. Specific information on each listed substance is provided in its substance profile, which discusses (1) the listing status, (2) cancer studies in humans and animals, studies of biologic mechanisms, and other data relevant to carcinogenicity, (3) the potential for human exposure in the United States, and (4) federal regulations to limit exposure.

Identifying Carcinogens

Studies in both humans and experimental animals are used to evaluate whether a substance is potentially carcinogenic in humans. The evaluation also considers other studies that may shed light on the potential carcinogen's possible mechanisms of action. The *Handbook for Preparing Report on Carcinogens Monographs* (NTP 2015) provides guidelines on how to assess the studies and how to apply the listing criteria in order to reach a decision on listing a substance (see The Fourteenth RoC: Preparation and Contents, below). Each substance profile provides an overview of the studies that were considered key in the decision to list the substance in the report. Other organizations that conduct evaluations of carcinogenicity include the World Health Organization's International Agency for Research on Cancer (IARC), the Environmental Protection Agency of the State of California, and the U.S. Environmental Protection Agency (EPA); their evaluations serve as a resource to NTP for identifying exposure and carcinogenicity data.

The most applicable evidence for establishing a relationship between exposure to any given substance and cancer in humans comes from epidemiological studies — studies of the occurrence of a disease in a defined human population and the factors that affect its occurrence (Hill 1971). Some of the first studies to identify carcinogens were occupational studies of workers exposed to high levels of carcinogens, including substances mined (e.g., asbestos) or extracted (e.g., benzene) from natural sources, synthesized chemicals (e.g., vinyl chloride), and complex mixtures (e.g., coal tar) (Fontham *et al.* 2009). Other epidemiological studies include those of patients receiving medical treatments (e.g., chemotherapeutic drugs or hormones), studies of lifestyle factors (such as alcohol consumption or tobacco smoking), or studies of environmental exposures in the general population.

Interpretation of epidemiological studies of human exposure and cancer can be difficult, as they must rely on natural, not experimental, human exposure and must therefore consider many factors that may affect cancer incidence in addition to the exposure under study (Rothman *et al.* 2012). The evaluation of human studies requires a critical analysis of the potential for biases and the ability of the study to detect a true effect. Several considerations — the strength of the association between exposure and cancer, consistency across studies, evidence of a relationship between the level or duration of the exposure and the risk of cancer (i.e., an exposure-response relationship), and the timing of exposure relative to the development of cancer (Hill 1965) — are used to help guide the cancer evaluation (for more information, see the *RoC Handbook*, NTP 2015). Nevertheless, despite some limitations, observational epidemiological studies have played a key role in identifying most of the substances listed in the RoC and by other authoritative bodies as known human carcinogens.

Another valuable method for identifying substances as potential human carcinogens is the long-term bioassay in experimental animals. Carcinogenicity testing in experimental animals began in the early 1900s, with studies showing that coal tar experimentally applied to the ears of rabbits caused malignant skin tumors, and has been used over the last four to five decades (as reviewed by Maronpot *et al.* 2004). Although animals are not perfect surrogates for humans, experimental evidence has demonstrated that rodents are similar enough to humans in their physiological, biochemical, metabolic, and genetic or genomic characteristics to warrant their use in predicting whether a substance is expected to cause cancer in humans. Moreover, all chemicals known to cause cancer in humans also cause cancer in experimental animals, and about a third of them were first identified in experimental animals (Huff 1993, 1999, Fung *et al.* 1995, Maronpot *et al.* 2004).

In addition to studies in humans and experimental animals, toxicological, toxicokinetic, and mechanistic studies can be used to identify carcinogens or provide evidence supporting the findings of cancer studies in humans and animals. For example, studies of the genetic makeup of tumor tissue have identified mutational signatures related to carcinogenicity for several substances listed in the RoC, which help to explain how UV radiation causes skin cancer, aflatoxin causes liver cancer, aristolochic acid causes cancer of the upper urinary tract, and vinyl chloride causes liver cancer (Stewart *et al.* 2016). Recently, Smith *et al.* (2016) proposed an approach for systematically evaluating mechanistic data by identifying and organizing the data according to ten biological effects that are caused by many different carcinogens. These ten characteristics of carcinogens were identified from an evaluation of known human carcinogens by an IARC working group. They broadly include traits related to metabolism — transformation to metabolites that can bind and potentially damage DNA or other molecules — and those related to adverse biological outcomes, such as causing effects (by various mechanisms) that lead to the accumulation of genetic damage of a cell, alter how genes are expressed (turned on or turned off), disrupt how cells or molecules communicate with each other, disrupt the immune system, and cause other effects related to uncontrolled growth of the damaged cells. No one carcinogen will have all of these traits, but most carcinogens will have at least one of them.

Testing methods that incorporate advances in molecular toxicology, computational sciences, and information technology also are being developed to prioritize substances for carcinogenicity testing and reduce the use of animals in testing (as reviewed by Collins *et al.* 2008). For example, the federal interagency program Toxicology in the 21st Century (Tox21, NTP 2016b) and EPA's Toxicity Forecaster (ToxCast, EPA 2016) both use high-throughput screening, in which automated methods can screen thousands of chemicals in a large number of assays to identify cellular processes that may predict toxicity. EPA's Advancing the Next Generation of Risk Assessment program (Next Gen) is also exploring approaches for evaluating and integrating mechanistic data or prioritizing chemicals. Examples of these approaches include using physical and chemical properties of molecules to predict their toxicity (structure-activity relationship modeling), analyzing large numbers of genes and their products measured in a biological sample (genomics, transcriptomics, and proteomics), conducting studies in cultured cells and short-term studies in experimental animals, using computational techniques for mining large amounts of data, employing methods for evaluating the relationship between expression of genes related to exposure and/or cancer (pathway and network analyses), and conducting clinical and molecular studies to measure key molecular changes in tissues from exposed humans (Cote *et al.* 2016).

The table at the bottom of this page summarizes the types of evidence streams being used to evaluate carcinogenicity.

Estimating Exposure

The RoC is required to list only those substances to which a significant number of people living in the United States are exposed, and to provide information about the nature of exposure and the estimated numbers of people exposed to listed substances. Because little information typically is available, estimating the number of people who could be exposed and the route, intensity, and duration of exposure for each substance is a difficult task. However, other types of information, such as data on use, production, occupational exposure, and exposure resulting from environmental releases or occurrence, together with biomonitoring data (such as data from the National Health and Nutrition Examination Survey, CDC 2016), can be used to determine whether people in the United States are (or were) exposed to a substance. This information is included in each substance profile. Some substances whose use has been banned or restricted (e.g., safrole, arsenical pesticides, and mirex) are listed either because people who were previously exposed remain potentially at risk or because these substances are still present in the environment.

Providing Information on Reducing Exposure and Preventing Cancer

U.S. Federal Regulations and Guidelines To Reduce Exposure

The RoC is required to identify each of the listed substances for which no standard for exposure or release into the environment has been established by a federal agency. The RoC addresses this requirement by providing in each substance profile a summary of the regulations and guidelines, if any, that are likely to decrease human exposure to that substance and thus are likely to reduce the risk of cancer and other

Methods for Identifying Human Carcinogens

Epidemiology studies	Experimental animal studies	Mechanistic and related studies	Emerging mechanistic data
Occupational exposure	Typically rodents	Genomic data/ mutational signatures	High-throughput screening: • Tox21 • ToxCast *in vitro* assays
General population: • Environmental exposures • Lifestyle exposures (e.g., tobacco smoking)	Exposure to multiple doses for most of their lifetimes Doses: Relatively high but not toxic, chosen to increase the sensitivity of the assay, because a small number of animals are used to predict the effects in millions of people	Ten characteristics of carcinogens: Biological effects common to many different carcinogens	Studies of genetic mechanisms in whole organisms (e.g., zebrafish, roundworms) NextGen approaches
Patients receiving medical treatments (e.g., chemotherapeutic drugs)			

adverse health effects. (Many of the regulations and guidelines set limits on exposure levels based on protection against adverse health effects other than cancer, but these limits may not be fully protective if cancer can be caused by exposures below the regulated levels.) The majority of these cited regulations are from the Consumer Product Safety Commission, EPA, U.S. Food and Drug Administration, and Occupational Safety and Health Administration (OSHA), and the primary guidelines are those published by the National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists. Links to the websites for the *Code of Federal Regulations* and for each of the major regulatory agencies are provided at the end of the Reference section of this Introduction.

Regulations Related To Listing in the RoC

Listing of a substance in the RoC may lead to enactment of additional federal or state regulations. Although the RoC is not a regulatory document, and government agencies are not required to take action when a substance is listed, certain federal and state regulatory agencies have chosen to base specific regulatory actions on the listing of a substance in the report. Both OSHA and the Mine Safety and Health Administration (MSHA) recognize the RoC as an authoritative source for identifying carcinogens for which hazard communications to workers are required (OSHA's Hazard Communication Standard and MSHA's Hazard Communication Standard). These communication requirements involve hazard labeling of shipped and workplace containers, preparation and distribution of safety data sheets to employees, and training of employees on handling of known and suspected carcinogens. The State of California uses the RoC to identify carcinogens, which necessitates labeling requirements under the State's Safe Drinking Water and Toxic Enforcement Act (Proposition 65).

In addition, the U.S. EPA uses the RoC as a source to identify carcinogens for the following regulatory purposes: (1) to prohibit ocean dumping of materials containing carcinogens (Criteria for the Evaluation of Permit Applications for Ocean Dumping of Materials under the the Marine Protection, Research and Sanctuaries Act), (2) to report carcinogens above a *de minimis* concentration level for exporting purposes (Toxic Substances Control Act, Section 12[b], export notification requirements), and (3) to report carcinogens above a *de minimis* concentration level (0.1% of a mixture) to the Toxics Release Inventory (TRI). For some regulations, a listing in the RoC may directly trigger the regulation (e.g., ocean dumping) or a specific requirement under the regulation (e.g., export reporting), whereas for other regulations (e.g., the TRI), the listing may trigger an evaluation of the substance by the agency. Links to websites with information on the regulations mentioned above are provided at the end of this Introduction.

Reducing Exposure and Preventing Cancer Cases and Deaths

Estimating the extent to which listing a substance in the RoC or federal regulation of a substance listed in the RoC decreases exposure and protects public health is perhaps the most difficult task in preparing the RoC, because little information is available on this topic. An example of a successful program leading to decreased exposure to carcinogens in the United States is the Massachusetts Toxic Use Reduction Act (TURA) program (Jacobs *et al.* 2014). An analysis of exposure data for Massachusetts companies reporting to TURA during the period from 1991 to 2014 found that the use of carcinogens or suspected carcinogens, identified in the RoC and by other authoritative sources, declined by 32%, and reported releases declined by 93%. Primary prevention is the rationale for current regulatory policies that aim to lower human exposure to cancer-causing substances and thereby improve public health. No studies were identified that evaluated the impact of specific federal regulations or a listing in the RoC on cancer incidence or mortality. Nevertheless, the importance of primary prevention is demonstrated by several examples where decreasing exposure to carcinogens listed in the RoC and identified by other authoritative bodies has resulted in decreased cancer mortality or morbidity, as summarized in the table below. In addition, studies have shown that federal regulations (e.g., EPA's Resource Conservation and Recovery Act, Clean Water Act, and Clean Air Act) have reduced exposure to a number of pollutants, resulting in decreased mortality, morbidity, and economic cost for diseases other than cancer (EPA 2010), which suggests that federal regulations also have the potential to reduce cancer risks.

The *Fourteenth Report on Carcinogens*: Preparation and Contents

Preparation and Listing Criteria

NTP prepares the RoC on behalf of the Secretary of Health and Human Services. To prepare the *Fourteenth Report on Carcinogens* (Fourteenth RoC), NTP followed a four-part process (described in detail in the next section, Process for Preparation of the RoC) using established listing criteria (see below). This process included input from the NTP Board of Scientific Counselors and the NTP Executive Committee, which includes the heads (or their designees) from several HHS agencies (FDA, National Cancer Institute, National Center for Environmental Health/Agency for Toxic Substances and Disease Registry, National Institute of Environmental Health Sciences, and NIOSH),

Examples of Cancer Prevention

Exposure	Impact of cancer	Prevention measures	Decrease in cancer
Tobacco	Single most preventable cause of cancer; causes 80% of lung cancer cases in men and 40% in women worldwide[a]	Cancer prevention programs such as legislation, taxes on tobacco products, education[a]	Decrease in lung cancer mortality: 38% in men and 12% in women since 1990[b] Mortality has decreased more slowly in women because smoking peaked 10 to 20 years later in women than in men[c]
Hepatitis B virus	Causes 54% of liver cancer worldwide[e]	Implementation of hepatitis B vaccination program in Taiwan[d]	80% decrease in liver cancer incidence in children and young adults[d]
Occupational	United States (2007): 20,386 cancer cases and deaths; medical cost $4.1 billion[e]	Workplace levels for some substances reduced in the United States since the 1970s[f,g]	Decreased incidences of specific occupation-related cancers[f]

Sources: [a]Thun *et al.* 2010, [b]ACS 2016, [c]Weiss 1997, [d]Bray *et al.* 2015, [e]Leigh 2011, [f]Espina *et al.* 2013, [g]Fontham *et al.* 2009.

as well as other federal agencies (Consumer Product Safety Commission, Department of Defense, EPA, and OSHA). The RoC monograph on each substance was prepared according to guidelines outlined in the protocols (i.e., methods) for each monograph, the RoC Handbook, or the introduction and methods sections of the monograph.

The criteria for listing an agent, substance, mixture, or exposure circumstance in the RoC are shown in the box below. The listing criteria presented here were first adopted for use in the *Eighth Report on Carcinogens* (1998) and clarified the following year in two *Federal Register* notices (NTP 1999a,b). For more information, see History of the Report on Carcinogens (NTP 2016a). The listing criteria for substances listed in earlier editions of the RoC are outlined in the introductions to those editions.

Known To Be Human Carcinogen:

There is sufficient evidence of carcinogenicity from studies in humans,* which indicates a causal relationship between exposure to the agent, substance, or mixture, and human cancer.

Reasonably Anticipated To Be Human Carcinogen:

There is limited evidence of carcinogenicity from studies in humans,* which indicates that causal interpretation is credible, but that alternative explanations, such as chance, bias, or confounding factors, could not adequately be excluded,

or

there is sufficient evidence of carcinogenicity from studies in experimental animals, which indicates there is an increased incidence of malignant and/or a combination of malignant and benign tumors (1) in multiple species or at multiple tissue sites, or (2) by multiple routes of exposure, or (3) to an unusual degree with regard to incidence, site, or type of tumor, or age at onset,

or

there is less than sufficient evidence of carcinogenicity in humans or laboratory animals; however, the agent, substance, or mixture belongs to a well-defined, structurally related class of substances whose members are listed in a previous Report on Carcinogens as either known to be a human carcinogen or reasonably anticipated to be a human carcinogen, or there is convincing relevant information that the agent acts through mechanisms indicating it would likely cause cancer in humans.

Conclusions regarding carcinogenicity in humans or experimental animals are based on scientific judgment, with consideration given to all relevant information. Relevant information includes, but is not limited to, dose response, route of exposure, chemical structure, metabolism, pharmacokinetics, sensitive sub-populations, genetic effects, or other data relating to mechanism of action or factors that may be unique to a given substance. For example, there may be substances for which there is evidence of carcinogenicity in laboratory animals, but there are compelling data indicating that the agent acts through mechanisms which do not operate in humans and would therefore not reasonably be anticipated to cause cancer in humans.

*This evidence can include traditional cancer epidemiology studies, data from clinical studies, and/or data derived from the study of tissues or cells from humans exposed to the substance in question, which can be useful for evaluating whether a relevant cancer mechanism is operating in humans.

Contents of the Fourteenth RoC

Listed Substances

Each edition of the RoC is cumulative and includes substances newly reviewed in addition to those listed in previous editions. Newly reviewed for this edition, the *Fourteenth Report on Carcinogens,* are seven substances (or classes of structurally related chemicals, shown in the box below), including five viruses, one metal-related class, and one chemical, bringing the total number of listed substances or classes of structurally related chemicals or agents to 248. These include 62 listings as *known to be a human carcinogen* and 186 listings as *reasonably anticipated to be a human carcinogen.*

Substances newly reviewed for the Fourteenth RoC

Known to be a human carcinogen

Epstein-Barr virus (EBV)
Human immunodeficiency virus type 1 (HIV-1)
Human T-cell lymphotropic virus type 1 (HTLV-1)
Kaposi sarcoma–associated herpesvirus (KSHV)
Merkel cell polyomavirus (MCV)
Trichloroethylene

Reasonably anticipated to be a human carcinogen

Cobalt and cobalt compounds that release cobalt ions *in vivo*

Trichloroethylene was first listed as *reasonably anticipated to be a human carcinogen* in 1999 and has been reclassified because of new studies finding sufficient evidence of carcinogenicity in humans. The new listing of Cobalt and Cobalt Compounds that Release Cobalt Ions *In Vivo* applies to a class of cobalt compounds and supersedes the previous listing of a specific cobalt compound, cobalt sulfate.

A profile is written for each listed substance (as discussed under Identifying Carcinogens, above). For readers' convenience, profiles for related exposures, such as exposure to various types of UV radiation or to selected members of chemical families, such as nitroarenes, are often grouped together. New to the *Fourteenth Report on Carcinogens* are two additional groupings: (1) Viruses: Eight Listings, which includes the five newly reviewed viruses and three viruses or families of viruses that were previously listed in the RoC, and (2) Cobalt-Related Exposures, which includes the newly reviewed class of Cobalt and Cobalt Compounds That Release Cobalt Ions *In Vivo* and a previously listed substance, Cobalt–Tungsten Carbide: Powders and Hard Metals.

Supplemental Information

In addition to the substance profiles, the Fourteenth RoC contains the supplemental information identified in the table on the next page. As described in the following section of the RoC, Process for Preparation of the Report on Carcinogens, the *Fourteenth RoC* was prepared according to procedures that maximized the quality, objectivity, utility, and integrity of the information contained in the report. Although not anticipated, factual errors or omissions in this report may be identified after its distribution. If this should happen, these errors or omissions will be addressed by the NTP.

Supplemental information provided in the Fourteenth RoC

Section	Contents
Substances listed	Alphabetical list of substances listed in the RoC as known to be a human carcinogen
	Alphabetical list of substances listed as reasonably anticipated to be a human carcinogen
Glossary	Definitions of scientific and technical terms used in the substance profiles
Acronyms and abbreviations	Definitions of acronyms and abbreviations used in the substance profiles
Units of measurement	Definitions of units of measurement commonly used in the substance profiles
Appendix A	List of manufacturing processes, occupations, and exposure circumstances classified by IARC as carcinogenic to humans
Appendix B	List of agents, substances, mixtures, or exposure circumstances that have been delisted from the RoC
Appendix C	List of the agents, substances, mixtures, or exposure circumstances that have been reviewed but not recommended for listing in the RoC
Appendix D	List of participants who collaborated in preparation of the Fourteenth RoC
Appendix E	Link to a searchable database of substances nominated to the NTP for toxicological testing
Appendix F	Cross-referenced list of listed substances and their common synonyms or abbreviations
Appendix G	List of Chemical Abstracts Service Registry Numbers of substances listed in the Fourteenth RoC

References

ACS. 2016. *Cancer Facts & Figures 2016.* American Cancer Society. http://www.cancer.org/acs/groups/content/@research/documents/document/acspc-047079.pdf.

Beaglehole R, Bonita R, Magnusson R. 2011. Global cancer prevention: An important pathway to global health and development. *Pub Health* 125: 821-831.

Bray F, Jemal A, Torre LA, Forman D, Vineis P. 2015. Long-term realism and cost-effectiveness: Primary prevention in combatting cancer and associated inequalities worldwide. *J Natl Cancer Inst* 107(2): djv273. 8 pp.

CDC. 2016. National Health and Nutrition Examination Survey. Centers for Disease Control and Prevention. Last updated: 2/24/16. http://www.cdc.gov/nchs/nhanes.

Cote I, Andersen ME, Ankley GT, Barone S, Birnbaum LS, Boekelheide K, *et al.* 2016. The next generation of risk assessment multiyear study — Highlights of findings, applications to risk assessment and future directions. *Environ Health Perspect* [epub posted 4/19/16].

Collins FS, Gray GM, Bucher JR. 2008. Transforming environmental health protection. *Science* 319(5865): 906-907.

EPA. 2010. *Benefits and Costs of the Clean Air Act. Second Prospective Study, 1990 to 2020.* U.S. Environmental Protection Agency. Last updated: 4/15/10. http://www.epa.gov/air/sect812/prospective2.html.

EPA. 2016. *Toxicity Forecasting: Advancing the Next Generation of Chemical Evaluation.* The U.S. Environmental Protection Agency. Last updated: 3/4/16. https://www.epa.gov/chemical-research/toxicity-forecasting.

Espina C, Porta M, Schüz J, Hernández Aguado I, Percival RV, Dora C, *et al.* 2013. Environmental and occupational interventions for primary prevention of cancer: A cross-sectorial policy framework. *Environ Health Perspect* 121(4): 420-426.

Fontham ET, Thun MJ, Ward E, Balch AJ, Delancey JOL, Samet JM. 2009. American Cancer Society perspectives on environmental factors and cancer. *CA Cancer J Clin* 59(6): 343-351.

Fung VA, Barrett JC, Huff JE. 1995. The carcinogenesis bioassay in perspective: application in defining human cancer hazards. *Environ Health Perspect* 103(7-8): 680-683.

Hill, AB, 1965. The environment and disease; association or causation? *Proc R Soc Med* 58:295-300.

Hill, AB. 1971. *Principles of Medical Statistics,* 9th ed. New York: Oxford University Press.

Howlader N, Noone AM, Krapcho M, Miller D, Bishop K, Altekruse SF, *et al.*, eds. 2016. *SEER Cancer Statistics Review, 1975-2013.* Surveillance, Epidemiology, and End Results Program, National Cancer Institute. http://seer.cancer.gov/csr/1975_2013.

Huff JE. 1993. Chemicals and cancer in humans: first evidence in experimental animals. *Environ Health Perspect* 100: 201-210.

Huff JE 1999. Value, validity, and historical development of carcinogenesis studies for predicting and confirming carcinogenic risks to humans. In *Carcinogenicity Testing, Predicting, and Interpreting Chemical Effects.* Kitchin KT, ed. New York: Marcel Dekker. pp. 21-123.

Jacobs MM, Massey RI, Tenney H, Harriman E. 2014. Reducing the use of carcinogens: The Massachusetts experience. *Rev Environ Health* 29(4): 319-340.

Leigh JP. 2011. Economic burden of occupational injury and illness in the United States. *Milbank Q* 89(4): 728-772.

Maronpot RR, Flake G, Huff J. 2004. Relevance of animal carcinogenesis findings to human cancer predictions and prevention. *Toxicol Pathol* 32(Suppl 1): 40-48.

NTP. 1999a. National Toxicology Program: Carcinogens Report, Tenth Edition — Substances, mixtures and exposure circumstances for listing or delisting. *Fed Regist* 64(63): 15983-15984.

NTP. 1999b. National Toxicology Program: Carcinogens Report, Tenth Edition — Substances, mixtures and exposure circumstances for listing or delisting. *Fed Regist* 64(74): 19188-19189.

NTP. 2015. *Handbook for Preparing Report on Carcinogens Monographs.* National Toxicology Program, Office of the Report on Carcinogens. http://ntp.niehs.nih.gov/pubhealth/roc/handbook/index.html.

NTP. 2016a. *History of the Report on Carcinogens (RoC).* The National Toxicology Program. Last updated: 7/12/16. http://ntp.niehs.nih.gov/pubhealth/roc/history/index.html.

NTP. 2016b. *Tox 21: Toxicology in the 21st Century.* The National Toxicology Program. Last updated: 3/21/16. http://ntp.niehs.nih.gov/results/tox21/index.html.

Reuben S. 2010. *Reducing Environmental Cancer Risk: What We Can Do Now.* 2008–2009 Annual Report of the President's Cancer Panel. National Cancer Institute. 240 pp. http://deainfo.nci.nih.gov/advisory/pcp/annualReports/pcp08-09rpt/PCP_Report_08-09_508.pdf.

Rothman KJ, Greenland S, Lash TL. 2012. *Modern Epidemiology.* Philadelphia: Lippincott Williams & Wilkins. 758 pp.

Smith MT, Guyton KZ, Gibbons CF, Fritz JM, Portier CJ, Rusyn I, *et al.* 2016. Key characteristics of carcinogens as a basis for organizing data on mechanisms of carcinogenesis. *Environ Health Perspect* 124(6): 713-721.

Stewart BW, Bray F, Forman D, Ohgaki H, Straif K, Ullrich A, Wild CP. 2016. Cancer prevention as part of precision medicine: "Plenty to be done." *Carcinogenesis* 37(1): 2-9.

Thun MJ, DeLancey JO, Center MM, Jemal A, Ward EM. 2010. The global burden of cancer: Priorities for prevention. *Carcinogenesis* 31(1): 100-110.

Ward E, DeSantis C, Robbins A, Kohler B, Jemal A. 2014. Childhood and adolescent cancer statistics, 2014. *CA Cancer J Clin* 64: 83-103.

Weiss W. 1997. Cigarette smoking and lung cancer trends. A light at the end of the tunnel? *Chest* 111:1414-1416.

Websites (Agencies and Regulations)

American Conference of Governmental Industrial Hygienists (ACGIH)
http://www.acgih.org/home.htm

Code of Federal Regulations (CFR), U.S. Government Printing Office
http://www.gpoaccess.gov/cfr/index.html

Consumer Product Safety Commission (CPSC)
http://www.cpsc.gov

Department of Transportation (DOT)
http://www.dot.gov

Environmental Protection Agency (EPA)
http://www.epa.gov

- Integrated Risk Information System (IRIS)
  http://cfpub.epa.gov/ncea/iris/index.cfm
- Marine Protection, Research, and Sanctuaries Act
  Criteria for the Evaluation of Permits Applications for Ocean Dumping of Materials
  https://ecfr.io/Title-40/pt40.25.227#se40.27.227_16
- Toxic Substances Control Act (TSCA)
  TSCA Requirements for Exporting Chemicals
  https://www.epa.gov/tsca-import-export-requirements/tsca-requirements-exporting-chemicals
- Toxics Release Inventory Program
  https://www.epa.gov/toxics-release-inventory-tri-program

Food and Drug Administration (FDA)
http://www.fda.gov

- Center for Food Safety & Applied Nutrition
  http://www.fda.gov/aboutfda/centersoffices/officeoffoods/cfsan/default.htm

International Agency for Research on Cancer (IARC).
http://www.iarc.fr

- Monographs on the Evaluation of Carcinogenic Risks of Chemicals to Humans
  http://monographs.iarc.fr/index.php

Mine Safety and Health Administration
https://www.msha.gov

- MSHA Hazard Communication
  http://arlweb.msha.gov/hazcom/hazcom.htm

National Institute for Occupational Safety and Health (NIOSH)
http://www.cdc.gov/niosh

- Pocket Guide to Chemical Hazards
  http://www.cdc.gov/niosh/npg
- NIOSH Safety and Health Topic – Cancer
  http://www.cdc.gov/niosh/topics/cancer
- NIOSH Carcinogen List
  http://www.cdc.gov/niosh/topics/cancer/npotocca.html

National Toxicology Program (NTP)
http://ntp.niehs.nih.gov

- Report on Carcinogens
  http://ntp.niehs.nih.gov/go/roc
- Process for Preparation of the Report on Carcinogens
  http://ntp.niehs.nih.gov/go/rocprocess
- Handbook for Preparing Report on Carcinogens Monographs
  http://ntp.niehs.nih.gov/pubhealth/roc/handbook/index.html
- Scientific Reviews: Report on Carcinogens (RoC) Evaluations Since 1996
  http://ntp.niehs.nih.gov/pubhealth/roc/listings/index.html

Occupational Safety and Health Administration (OSHA)
http://www.osha.gov

- OSHA Hazard Communication Standard
  https://www.osha.gov/dsg/hazcom/standards.html

State of California Safe Drinking Water and Toxic Enforcement Act
http://oehha.ca.gov/proposition-65/law/proposition-65-law-and-regulations

Process for Preparation of the Report on Carcinogens

The Report on Carcinogens (RoC) is a Congressionally mandated, biennial document that identifies and discusses agents, substances, mixtures, or exposure circumstances (collectively referred to as "substances") that may pose a hazard to human health by virtue of their carcinogenicity. Substances are listed in the report as either *known* or *reasonably anticipated to be human carcinogens*, and a description of the substance, its uses, potential sources of exposure, the rationale for listing, and applicable federal regulations are included in the RoC in a "substance profile." Each edition of the report is cumulative. The National Toxicology Program (NTP) prepares the RoC on behalf of the Secretary of Health and Human Services (HHS). Review of candidate substances and preparation of the report are managed by the Office of the Report on Carcinogens (ORoC) within the Division of the NTP, National Institute of Environmental Health Sciences (NIEHS).

A schematic of the process for preparation of the RoC is provided below. The process has four parts: (1) nomination and selection of candidate substances, (2) scientific evaluation of candidate substances, (3) public release and peer review of draft RoC monographs, and (4) HHS approval and release of the latest edition of the RoC. Each part is described below.

Nomination and Selection of Candidate Substances

The NTP invites nominations of substances for consideration for listing in the RoC from anyone in the public or private sector. A nomination may seek to list a new substance in the RoC, reclassify the listing status of a substance already listed, or remove a substance already listed. Nominations may be submitted by mail or fax to ORoC[1] or online at http://ntp.niehs.nih.gov/go/27911.

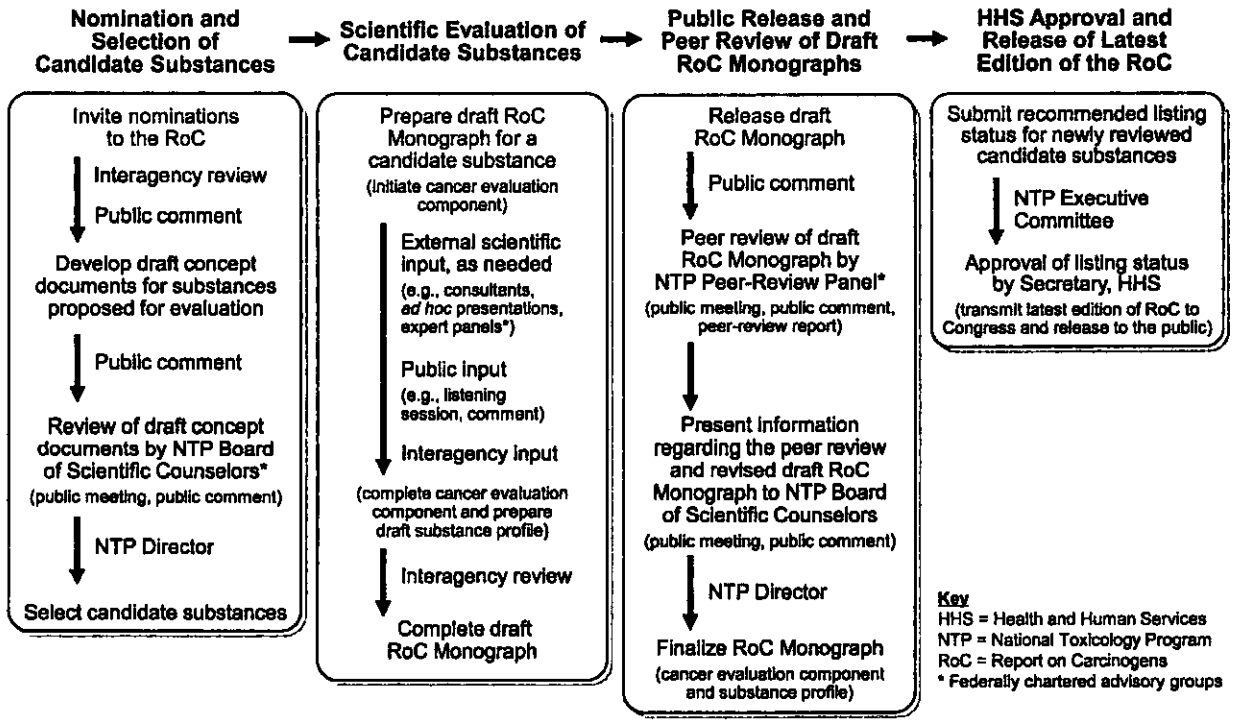
A nomination should contain a rationale or reason for the RoC review and, if possible, appropriate background information and relevant data to support the rationale (e.g., journal articles, NTP Technical Reports, International Agency for Research on Cancer Monographs, exposure surveys, or release inventories).

ORoC initially evaluates each nomination to determine whether there is sufficient information on exposure and carcinogenicity to justify formal evaluation of the substance and its consideration for the RoC. ORoC informs its partner agencies of nominations and invites their review.[2] The NTP solicits public comments on nominations through the *Federal Register*, requesting information about ongoing studies, recent publications, current production, use patterns, sources of exposure, and the names of scientific experts with relevant knowledge, as well as scientific issues important for assessing the carcinogenicity of the substance. Public comments received on the nominations are posted on the RoC website (http://ntp.niehs.nih.gov/go/roc). The NTP considers the interagency and public comments and identifies nominated substances for evaluation for the RoC. Those nominated substances proposed for evaluation are evaluated

[1]Office of the Report on Carcinogens
National Toxicology Program
National Institute of Environmental Health Sciences
P.O. Box 12233, MD K2-14
Research Triangle Park, NC 27709
Contact information: Dr. Ruth Lunn, telephone: (919) 316-4637, FAX: (301) 480-2970, email: lunn@niehs.nih.gov

[2]Interagency review is invited from agencies represented on the NTP Executive Committee, including the Consumer Product Safety Commission, Department of Defense, Environmental Protection Agency, Food and Drug Administration, National Cancer Institute, National Center for Environmental Health/Agency for Toxic Substances and Disease Registry, National Institute of Environmental Health Sciences, National Institute for Occupational Safety and Health, and Occupational Safety and Health Administration.

Process for Preparation of the Report on Carcinogens



by the process described below. For those nominated substances not selected for evaluation, the NTP notifies the nominators.

For each substance proposed for evaluation, ORoC prepares a draft concept document. The concept document is a brief document that outlines the rationale for the nomination of the substance, including information on exposure, the extent and nature of the scientific evidence for evaluating carcinogenicity in humans and experimental animals, and any major relevant issues, such as proposed mechanisms or modes of action of carcinogenicity. The concept document also lays out the proposed approach to development of the cancer evaluation component of the draft RoC Monograph on the substance, including the search strategy for identifying relevant scientific literature and the strategy for obtaining external scientific and public input (see Scientific Evaluation of Candidate Substances). The NTP announces one or more proposed substances for evaluation and solicits public comments on draft concept documents through announcements in the *Federal Register* and NTP publications.

The NTP presents the draft concept document for a substance to the NTP Board of Scientific Counselors (BSC)[3] at a public meeting that provides opportunity for public comment.[4] The BSC is asked to comment on the draft concept document for a proposed substance, including (1) the rationale for its review for the RoC and (2) the proposed approach for obtaining external scientific and public input in development of the cancer evaluation component of its draft RoC Monograph. The NTP considers the BSC comments and public comments, and the NTP Director makes the final determination whether to add the substance to the list of candidate substances for RoC evaluation. Concept documents for approved candidate substances are finalized based upon BSC comments and public comments and posted on the NTP RoC website (http://ntp.niehs.nih.gov/go/roc). The NTP maintains the complete list of candidate substances on the NTP RoC website. The list includes all substances for which concept documents have been approved for review, but placement on this list does not necessarily mean that the substance will undergo review for any specific edition of the RoC. The NTP may defer or terminate the review of a candidate substance for the RoC at any time if relevant information becomes available that warrants its reconsideration or if scheduling issues preclude completion of a timely review. In such cases, the nominator, the BSC, the NTP Executive Committee, and the public are notified of this action.

Scientific Evaluation of Candidate Substances

ORoC prepares a draft RoC Monograph for each candidate substance. The RoC Monograph has two parts: (1) a cancer evaluation component that reviews all information that may bear on a listing decision, assesses its quality and sufficiency for reaching a listing decision, applies the RoC listing criteria[5] to the relevant scientific information, and recommends an RoC listing status for the candidate substance and (2) a substance profile that contains the NTP's preliminary listing recommendation and a summary of the scientific evidence considered key to reaching that recommendation.

In general, the cancer evaluation component addresses the following topics, although other topics may be included when relevant to evaluating the carcinogenicity of the candidate substance:

- properties (e.g., chemical, physical, or biological), production, and use
- human exposure
- toxicokinetics[6]
- cancer studies in humans
- cancer studies in experimental animals
- mechanisms of cancer induction and other related effects

Information on exposure and properties of the candidate substance must come from publicly available sources, and all scientific information used to evaluate the potential carcinogenicity of a candidate substance must come from peer-reviewed, publicly available sources.

The cancer evaluation component of the RoC Monograph (1) presents the literature search strategy and the literature inclusion/exclusion criteria, (2) identifies and describes the studies relevant for the RoC evaluation, (3) assesses the quality of individual studies and discusses their usefulness for informing the evaluation of carcinogenicity, (4) assesses the level of evidence from human studies or experimental animal studies in applying the RoC listing criteria, and (5) integrates the overall body of evidence (human, animal, and mechanistic) and reaches a preliminary RoC listing recommendation for the substance.

The nature, extent, and complexity of the scientific information on a candidate substance guides the approach used by the NTP to develop the cancer evaluation component. The approach is tailored to enable ORoC to obtain external advice and address scientific issues in assessing the carcinogenicity of a given candidate substance, and the approach may differ among substances. The approach may include external scientific input (e.g., expert panel,[7] *ad hoc* presentations, or individual technical advisors or consultants), public input (e.g., listening session or comments), and/or interagency input. All public comments received during the evaluation become part of the public record, are posted on the RoC website, and are considered by the NTP and any external advisors during subsequent steps in the evaluation process.

ORoC completes the draft cancer evaluation component with consideration of all inputs to its development. Based on the draft cancer evaluation component, ORoC prepares the draft substance profile. These two documents are compiled to form the draft RoC Monograph.

The NTP requests comment on the draft RoC Monograph from its partner agencies, considers this input, and completes the draft monograph.

Public Release of Draft RoC Monograph and Peer Review

The NTP releases the draft RoC Monograph for public comment and then convenes a meeting of an external scientific panel[7] for peer review of the draft RoC Monograph. Prior to the meeting, the NTP publishes a *Federal Register* notice announcing the peer review and the availability of the draft RoC Monograph and inviting written public comment. The public is also invited to attend the meeting and provide oral comments.

[3]The BSC is a federally chartered advisory committee whose members are appointed by the Secretary of HHS. The BSC provides advice to the NTP Director on matters relating to scientific program content and evaluates the scientific merit of the NTP's intramural and collaborative programs; http://ntp.niehs.nih.gov/go/164.

[4]NTP practice is to allot seven minutes per speaker, one speaker per organization, for presentation of oral public comments.

[5]RoC listing criteria are the standards against which the scientific evidence for carcinogenicity is evaluated to determine whether a candidate substance should be listed in the RoC and, if so, whether as *known to be a human carcinogen* or *reasonably anticipated to be a human carcinogen*. The criteria are available at http://ntp.niehs.nih.gov/go/15209.

[6]Toxicokinetics describes the rate at which a chemical enters the body and how it is handled within the body.

[7]NTP panels are federally chartered technical and scientific advisory groups convened as needed to provide advice on specific scientific issues and peer review. Members of NTP panels are scientists with relevant expertise and knowledge selected by the NTP from the public and private sectors. The final selection of membership is based upon providing a balanced and unbiased group of highly qualified individuals and is made in accordance with the Federal Advisory Committee Act and HHS implementing guidelines; http://ntp.niehs.nih.gov/go/166.

The NTP sets aside time at the meeting for discussion of scientific issues raised in the public comments. The peer-review charge is twofold: (1) to comment on the cancer evaluation component, specifically, whether it is technically correct and clearly stated, whether the NTP has objectively presented and assessed the scientific evidence, and whether the scientific evidence is adequate for applying the listing criteria, and (2) to comment on the substance profile, specifically, whether the scientific justification presented in the substance profile supports the NTP's preliminary policy decision on the RoC listing status of the candidate substance. The panel votes on (1) whether the scientific evidence supports the NTP's level of evidence for human studies or experimental animal studies and (2) whether the scientific evidence supports the NTP's preliminary listing decision. A report of the deliberations by the peer-review panel is prepared and posted on the RoC website.

ORoC considers the peer-review report, prepares the NTP's response to the peer-review report, and posts the response on the RoC website. Based upon the peer-review comments, ORoC prepares a revised draft RoC Monograph. At a public meeting, the NTP provides the BSC with information regarding the peer review. Following the meeting, ORoC, in concert with the NTP Director, finalizes the RoC Monograph on the candidate substance, including the cancer evaluation component and substance profile, and posts the final monograph on the RoC website.

HHS Approval and Release of Latest Edition of the RoC

The NTP submits newly reviewed candidate substances with recommended listing status to the NTP Executive Committee[8] for consultation and then to the Secretary of HHS for review and approval. Upon their approval by the Secretary, the next edition of the RoC is prepared in electronic format, transmitted to Congress, and published on the RoC website for the public. Periodically, the NTP will publish the RoC in both printed and electronic formats, depending upon demand for the printed version.

The NTP publishes a notice in the *Federal Register* and NTP publications announcing the listing outcome for each candidate substance that underwent formal review for the RoC and the availability of the next edition of the RoC.

[8]The NTP Executive Committee is composed of the heads (or their designees) of the federal agencies listed in footnote 2 and provides advice to the NTP on policy issues; http://ntp.niehs.nih.gov/go/163.

Substances Listed in the Fourteenth Report on Carcinogens

Bold entries indicate new or changed listings in the Fourteenth Report on Carcinogens.

Known To Be Human Carcinogens

Aflatoxins
Alcoholic Beverage Consumption
4-Aminobiphenyl
Analgesic Mixtures Containing Phenacetin (see Phenacetin and Analgesic Mixtures Containing Phenacetin)
Aristolochic Acids
Arsenic and Inorganic Arsenic Compounds
Asbestos
Azathioprine
Benzene
Benzidine (see Benzidine and Dyes Metabolized to Benzidine)
Beryllium and Beryllium Compounds
Bis(chloromethyl) Ether and Technical-Grade Chloromethyl Methyl Ether
1,3-Butadiene
1,4-Butanediol Dimethanesulfonate
Cadmium and Cadmium Compounds
Chlorambucil
1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (see Nitrosourea Chemotherapeutic Agents)
Chromium Hexavalent Compounds
Coal Tars and Coal-Tar Pitches
Coke-Oven Emissions
Cyclophosphamide
Cyclosporin A
Diethylstilbestrol
Dyes Metabolized to Benzidine (Benzidine Dye Class) (see Benzidine and Dyes Metabolized to Benzidine)
Epstein-Barr Virus (see Viruses: Eight Listings)
Erionite
Estrogens, Steroidal
Ethylene Oxide
Formaldehyde
Hepatitis B Virus (see Viruses: Eight Listings)
Hepatitis C Virus (see Viruses: Eight Listings)
Human Immunodeficiency Virus Type 1 (see Viruses: Eight Listings)
Human Papillomaviruses: Some Genital-Mucosal Types (see Viruses: Eight Listings)
Human T-Cell Lymphotrophic Virus Type 1 (see Viruses: Eight Listings)
Kaposi Sarcoma–Associated Herpesvirus (see Viruses: Eight Listings)
Melphalan
Merkel Cell Polyomavirus (see Viruses: Eight Listings)
Methoxsalen with Ultraviolet A Therapy
Mineral Oils: Untreated and Mildly Treated
Mustard Gas
2-Naphthylamine
Neutrons (see Ionizing Radiation)
Nickel Compounds (see Nickel Compounds and Metallic Nickel)
Radon (see Ionizing Radiation)
Silica, Crystalline (Respirable Size)
Solar Radiation (see Ultraviolet Radiation Related Exposures)
Soots
Strong Inorganic Acid Mists Containing Sulfuric Acid

Sunlamps or Sunbeds, Exposure to (see Ultraviolet Radiation Related Exposures)
Tamoxifen
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin
Thiotepa
Thorium Dioxide (see Ionizing Radiation)
Tobacco Smoke, Environmental (see Tobacco-Related Exposures)
Tobacco Smoking (see Tobacco-Related Exposures)
Tobacco, Smokeless (see Tobacco-Related Exposures)
o-Toluidine
Trichloroethylene
Ultraviolet Radiation, Broad-Spectrum (see Ultraviolet Radiation Related Exposures)
Vinyl Chloride (see Vinyl Halides [selected])
Wood Dust
X-Radiation and Gamma Radiation (see Ionizing Radiation)

Reasonably Anticipated To Be Human Carcinogens

Acetaldehyde
2-Acetylaminofluorene
Acrylamide
Acrylonitrile
Adriamycin
2-Aminoanthraquinone
o-Aminoazotoluene
1-Amino-2,4-dibromoanthraquinone
2-Amino-3,4-dimethylimidazo[4,5-*f*]quinoline (see Heterocyclic Amines [Selected])
2-Amino-3,8-dimethylimidazo[4,5-*f*]quinoxaline (see Heterocyclic Amines [Selected])
1-Amino-2-methylanthraquinone
2-Amino-3-methylimidazo[4,5-*f*]quinoline (see Heterocyclic Amines [Selected])
2-Amino-1-methyl-6-phenylimidazo[4,5-*b*]pyridine (see Heterocyclic Amines [Selected])
Amitrole
o-Anisidine and Its Hydrochloride
Azacitidine
Basic Red 9 Monohydrochloride
Benz[*a*]anthracene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Benzo[*b*]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Benzo[*j*]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Benzo[*k*]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Benzo[*a*]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Benzotrichloride
2,2-Bis(bromomethyl)-1,3-propanediol (Technical Grade)
Bis(chloroethyl) Nitrosourea (see Nitrosourea Chemotherapeutic Agents)
Bromodichloromethane
1-Bromopropane
Butylated Hydroxyanisole
Captafol
Carbon Tetrachloride
Ceramic Fibers (Respirable Size)
Chloramphenicol
Chlorendic Acid
Chlorinated Paraffins (C_{12}, 60% Chlorine)
Chloroform
1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (see Nitrosourea Chemotherapeutic Agents)
3-Chloro-2-methylpropene

4-Chloro-*o*-phenylenediamine
Chloroprene
p-Chloro-*o*-toluidine and Its Hydrochloride
Chlorozotocin (see Nitrosourea Chemotherapeutic Agents)
Cisplatin
Cobalt and Cobalt Compounds That Release Cobalt Ions *In Vivo* (see Cobalt-Related Exposures)
Cobalt–Tungsten Carbide: Powders and Hard Metals (see Cobalt-Related Exposures)
p-Cresidine
Cumene
Cupferron
Dacarbazine
Danthron
2,4-Diaminoanisole Sulfate
2,4-Diaminotoluene
Diazoaminobenzene
Dibenz[*a,h*]acridine (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Dibenz[*a,j*]acridine (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Dibenz[*a,h*]anthracene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
7H-Dibenzo[*c,g*]carbazole (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Dibenzo[*a,e*]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Dibenzo[*a,h*]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Dibenzo[*a,i*]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Dibenzo[*a,l*]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
2,3-Dibromo-1-propanol
1,4-Dichlorobenzene
3,3′-Dichlorobenzidine and Its Dihydrochloride
Dichlorodiphenyltrichloroethane
1,2-Dichloroethane
Dichloromethane
1,3-Dichloropropene (Technical Grade)
Diepoxybutane
Diesel Exhaust Particulates
Di(2-ethylhexyl) Phthalate
Diethyl Sulfate
Diglycidyl Resorcinol Ether
3,3′-Dimethoxybenzidine (see 3,3′-Dimethoxybenzidine and Dyes Metabolized to 3,3′-Dimethoxybenzidine)
4-Dimethylaminoazobenzene
3,3′-Dimethylbenzidine (see 3,3′-Dimethylbenzidine and Dyes Metabolized to 3,3′-Dimethylbenzidine)
Dimethylcarbamoyl Chloride
1,1-Dimethylhydrazine
Dimethyl Sulfate
Dimethylvinyl Chloride
1,6-Dinitropyrene (see Nitroarenes [Selected])
1,8-Dinitropyrene (see Nitroarenes [Selected])
1,4-Dioxane
Disperse Blue 1
Dyes Metabolized to 3,3′-Dimethoxybenzidine (3,3′-Dimethoxybenzidine Dye Class)
(see 3,3′-Dimethoxybenzidine and Dyes Metabolized to 3,3′-Dimethoxybenzidine)
Dyes Metabolized to 3,3′-Dimethylbenzidine (3,3′-Dimethylbenzidine Dye Class)
(see 3,3′-Dimethylbenzidine and Dyes Metabolized to 3,3′-Dimethylbenzidine)
Epichlorohydrin

Ethylene Thiourea
Ethyl Methanesulfonate
Furan
Glass Wool Fibers (Inhalable), Certain
Glycidol
Hexachlorobenzene
Hexachloroethane
Hexamethylphosphoramide
Hydrazine and Hydrazine Sulfate
Hydrazobenzene
Indeno[1,2,3-*cd*]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Iron Dextran Complex
Isoprene
Kepone
Lead and Lead Compounds
Lindane, Hexachlorocyclohexane (Technical Grade), and Other Hexachlorocyclohexane Isomers
2-Methylaziridine
5-Methylchrysene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
4,4'-Methylenebis(2-chloroaniline)
4,4'-Methylenebis(*N*,*N*-dimethyl)benzenamine
4,4'-Methylenedianiline and its Dihydrochloride
Methyleugenol
Methyl Methanesulfonate
N-Methyl-*N*'-Nitro-*N*-Nitrosoguanidine (see *N*-Nitrosamines: 15 Listings)
Metronidazole
Michler's Ketone
Mirex
Naphthalene
Nickel, Metallic (see Nickel Compounds and Metallic Nickel)
Nitrilotriacetic Acid
o-Nitroanisole
Nitrobenzene
6-Nitrochrysene (see Nitroarenes [Selected])
Nitrofen
Nitrogen Mustard Hydrochloride
Nitromethane
2-Nitropropane
1-Nitropyrene (see Nitroarenes [Selected])
4-Nitropyrene (see Nitroarenes [Selected])
N-Nitrosodi-*n*-butylamine (see *N*-Nitrosamines: 15 Listings)
N-Nitrosodiethanolamine (see *N*-Nitrosamines: 15 Listings)
N-Nitrosodiethylamine (see *N*-Nitrosamines: 15 Listings)
N-Nitrosodimethylamine (see *N*-Nitrosamines: 15 Listings)
N-Nitrosodi-*n*-propylamine (see *N*-Nitrosamines: 15 Listings)
N-Nitroso-*N*-ethylurea (see *N*-Nitrosamines: 15 Listings)
4-(*N*-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (see *N*-Nitrosamines: 15 Listings)
N-Nitroso-*N*-methylurea (see *N*-Nitrosamines: 15 Listings)
N-Nitrosomethylvinylamine (see *N*-Nitrosamines: 15 Listings)
N-Nitrosomorpholine (see *N*-Nitrosamines: 15 Listings)
N-Nitrosonornicotine (see *N*-Nitrosamines: 15 Listings)
N-Nitrosopiperidine (see *N*-Nitrosamines: 15 Listings)
N-Nitrosopyrrolidine (see *N*-Nitrosamines: 15 Listings)
N-Nitrososarcosine (see *N*-Nitrosamines: 15 Listings)

o-Nitrotoluene
Norethisterone
Ochratoxin A
4,4'-Oxydianiline
Oxymetholone
Pentachlorophenol and By-products of Its Synthesis
Phenacetin (see Phenacetin and Analgesic Mixtures Containing Phenacetin)
Phenazopyridine Hydrochloride
Phenolphthalein
Phenoxybenzamine Hydrochloride
Phenytoin and Phenytoin Sodium
Polybrominated Biphenyls
Polychlorinated Biphenyls
Procarbazine and Its Hydrochloride
Progesterone
1,3-Propane Sultone
β-Propiolactone
Propylene Oxide
Propylthiouracil
Reserpine
Riddelliine
Safrole
Selenium Sulfide
Streptozotocin (see Nitrosourea Chemotherapeutic Agents)
Styrene
Styrene-7,8-oxide
Sulfallate
Tetrachloroethylene
Tetrafluoroethylene
Tetranitromethane
Thioacetamide
4,4'-Thiodianiline
Thiourea
Toluene Diisocyanates
Toxaphene
2,4,6-Trichlorophenol
1,2,3-Trichloropropane
Tris(2,3-dibromopropyl) Phosphate
Ultraviolet Radiation A (see Ultraviolet Radiation Related Exposures)
Ultraviolet Radiation B (see Ultraviolet Radiation Related Exposures)
Ultraviolet Radiation C (see Ultraviolet Radiation Related Exposures)
Urethane
Vinyl Bromide (see Vinyl Halides [Selected])
4-Vinyl-1-cyclohexene Diepoxide
Vinyl Fluoride (see Vinyl Halides [Selected])

2 copies

FirstEnergy.

2800 Pottsville Pike
PO Box 16001
Reading, PA 19612-6001

Tori L. Giesler, Esq.
(610) 921-6658
(330) 315-9263 (Fax)

January 28, 2019

VIA FIRST-CLASS MAIL DELIVERY

Dorie Adams
940 Shady Dell Road
Port Matilda, PA 16870

Re: Dorie Adams v. West Penn Power Company
Docket No. C-2018-3002271

Dear Mr. Adams:

Enclosed please find a copy of the responses of West Penn Power Company (the "Company") Responses to the Interrogatories, Set I, propounded by you with regard to the above-referenced proceeding.

Should you have any questions or concerns, please do not hesitate to contact me.

Very truly yours,

Tori L. Giesler

Enclosures

c: As Per Certificate of Service
The Honorable Jeffrey Watson, Public Utility Commission (Cover Letter and Certificate)
Rosemary Chiavetta, Esq., Public Utility Commission (Cover Letter and Certificate)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DORIE ADAMS	:	
	:	
v.	:	**Docket No. C-2018-3002271**
	:	
WEST PENN POWER COMPANY	:	
	:	

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true copy of the Responses of West Penn Power Company to the Interrogatories and Requests for Production of Documents, Set I, propounded by Dorie Adams upon the individuals listed below, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

Service by First Class Mail, postage prepaid, as follows:

Dorie Adams
940 Shady Dell Road
Port Matilda, PA 16870

Dated: January 28, 2019

Lauren M. Lepkoski
Tori L. Giesler
FirstEnergy Service Company
2800 Pottsville Pike
P.O. Box 16001
Reading, Pennsylvania 19612-6001
(610) 921-6203
(610) 921-6658
llepkoski@firstenergycorp.com
tgiesler@firstenergycorp.com

Counsel for West Penn Power Company

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set I, No. 3

Does W.P.P. Sell the information they collect?

a. Who does W.P.P. Sell this information? Please name those party's involved.

RESPONSE:

West Penn Power Company does not sell customer information.

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set I, No. 4

What is the supposed life span of the Smart Meter W.P.P Installs on private homes and businesses?

RESPONSE:

The smart meters have a 15-year book life for depreciation purposes.

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set I, No. 5

Who is in charge of the over all installation of the Smart Meter and day to day operations

RESPONSE:

The Smart Meter Programs group is responsible for the overall project implementation of smart meters and accompanying system infrastructure and software.

The Smart Meter Operations group is responsible for day to day operations of the smart meters' data collection.

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set I, No. 6

If it's the Smart Meter department why is there no outside telephone lines for the public only indirect thru another W.P.P Employee s

RESPONSE:

An outside telephone line of 1-855-344-3400 is provided on the smart meter customer brochure that is mailed to each customer approximately six weeks prior to the installation of a smart meter. That same number is also provided on the literature left behind at the customer's premise following the installation of the smart meter.

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set I, No. 9

Is the High Frequency Smart Meter coupled or changed to a High Frequency in its operations in the collection?

RESPONSE:

It is unclear what is meant by "High Frequency" in the question as stated. The roughly 900-megahertz radio signal of the smart meter is engaged and communicating during the collection of data. See also West Penn Power Company's response to Adams Interrogatory Set I, No. 10.

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set I, No. 10

What is that frequency?

RESPONSE:

The smart meters operate in the Industrial, Scientific and Medical (ISM) bands at frequencies from 902 MHz to 928 MHz.

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set I, No. 13

Does W.P.P sell the information to 3rd parties,Where as that information is to be privileged information.

RESPONSE:

See West Penn Power Company's response to Adams Interrogatory Set I, No. 13.

FirstEnergy

2800 Pottsville Pike
PO Box 16001
Reading, PA 19612-6001

Tori L. Giesler, Esq.
(610) 921-6658
(330) 315-9263 (Fax)

March 11, 2019

VIA FIRST CLASS MAIL

Dorie Adams
940 Shady Dell Road
Port Matilda, PA 16870

Re: Dorie Adams v. West Penn Power Company
Docket No. C-2018-3002271

Dear Mr. Adams:

Attached please find the Responses of West Penn Power Company to the Interrogatories and Requests for Production of Dorie Adams, Set II, Interrogatory Nos. 6, 7, 8, and 9, in the above-referenced matter. This document has been served as shown in the Certificate of Service.

Please contact me if you have any questions.

Very truly yours,

Tori L. Giesler/KBW

Tori L. Giesler

Enclosures

cc: As Per Certificate of Service
Administrative Law Judge Jeffrey Watson (Cover Letter and Certificate)
Rosemary Chiavetta, Esq., Public Utility Commission (Cover Letter and Certificate)

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DORIE ADAMS	:	
	:	
v.	:	**Docket No. C-2018-3002271**
	:	
WEST PENN POWER COMPANY	:	

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true copy of the Responses of West Penn Power Company to the Interrogatories and Requests for Production of Dorie Adams to West Penn Power Company, Set II, upon the individual listed below, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

Service by first class mail, postage prepaid, as follows:

Dorie Adams
940 Shady Dell Road
Port Matilda, PA 16870

Dated: March 11, 2019

Tori L. Giesler/KB

Lauren M. Lepkoski
Tori L. Giesler
FirstEnergy Service Company
2800 Pottsville Pike
P.O. Box 16001
Reading, Pennsylvania 19612-6001
(610) 921-6203
(610) 921-6658
llepkoski@firstenergycorp.com
tgiesler@firstenergycorp.com

Counsel for West Penn Power Company

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set 2, No. 6

What is the names of the contractors who installs the W.P.P., smart meter?

RESPONSE:

Wellington Energy

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set II, No. 7

What are the names of the computer clouds, the information gathered in by W.P.P., with the smart meter, stored in?

A. W.P.P.
B. PA. Government
C. Federal Government

RESPONSE:

The smart meter system used by West Penn Power Company ("West Penn") is hosted on premise, within its own data centers.

A. See response above
B. N/A. West Penn is not in a position to have this information.
C. N/A. West Penn is not in a position to have this information.

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set II, No. 8

It is my understanding that the roughly, 900 mega watts the W.P.P., U.R.L. smart meter operates on. Is a class 2, carinengin and can cause other physical problems. Yes or no. a question of safety.

RESPONSE:

West Penn Power Company ("West Penn") agrees that the International Agency for Research on Cancer ("IARC"), an arm of the World Health Organization, has listed personal exposure from low-power, non-ionizing radio frequency ("RF") emissions as "possibly carcinogenic to humans", falling into Group 2B. The IARC defined three categories for the sources of these emissions: cell phone exposure; occupational exposure; and environmental exposure. Smart meters are included in the environmental exposure category. A primary focus of the data reviewed by the IARC is cell phones, which represent the highest levels of exposure by a large factor. Further, the IARC has listed many other commonplace items as possibly carcinogenic in Group 2B, including pickled vegetables and gasoline exhaust, to name several.

As defined by the IARC, the category of "possibly carcinogenic to humans" is used for agents for which there is *limited evidence of carcinogenicity* in humans and *less than sufficient evidence of carcinogenicity* in experimental animals.

Smart Meter Technology

The key factors to consider when it comes to RF exposure are the duration of the transmission, signal strength and proximity to humans. West Penn notes the following with regard to the Itron OpenWay meters it is installing as part of its deployment plan:

- *Duration of Transmission*: Itron's endpoint devices transmit for very short intervals spread throughout the day – especially when compared to cell phone use – and thus have a very small duty cycle. For example, on average, Itron's OpenWay meter transmits less than three minutes per day.
- *Signal Strength*: Itron's devices are extremely low power; less than one watt. These low levels of RF exposure are insignificant, generating far less RF energy than a cellular network.
- *Proximity to Humans*: Itron's devices are typically installed outside of the home, limiting human exposure, while a cell phone is held directly to the side of the head and close to the body.

Itron's products are stringently evaluated for RF safety and meet all Federal Communication Commission ("FCC"), Industry Canada ("IC") and Institute of Electrical and Electronic Engineers ("IEEE") standards. At just eight inches from the meter, RF energy levels from Itron meters are 10 to 16 times lower than the exposure limits established by regulatory agencies, including the FCC and IC.

DORIE ADAMS
v.
WEST PENN POWER COMPANY
Docket No. C-2018-3002271

Adams Interrogatory Set 2, No. 9

In the Course of receiving or collection or sending of the smart meter are the smart meter of W.P.P. operate in the gigohertz range of this radis spectrum. It is my understanding it does yes or no

RESPONSE:

Please see response to Adams Interrogatory Set I, No. 10

The smart meters operate in the industrial, scientific and medical (ISM) band at frequencies from 902 megahertz ("MHz") to 928 MHz.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

DORIE ADAMS	:	
	:	
v.	:	**DOCKET NO. C-2018-3002271**
	:	
WEST PENN POWER COMPANY	:	
	:	

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the within pleading was served on the following by depositing the same within the custody of the United States Postal Service, first-class mail, postage prepaid, addressed to:

Lauren M. Leposki, Esq.
FirstEnergy Service Company
2800 Pottsville Pike
P.O. Box 16001
Reading, PA 19612-6001

Secretary, Rosemary Chiavetta
Pennsylvania Public Utility Commission
400 North Street, 2nd Floor
Harrisburg, PA 17120

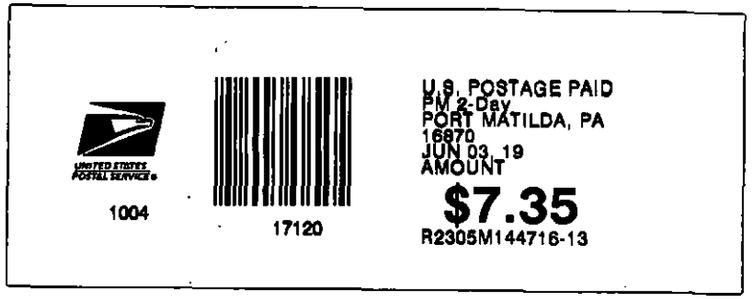
Commonwealth of Pennsylvania
Public Utility Commission
Admin. Law Judge, ALJ Watson
400 North Street
Harrisburg, PA 17120

Dorie Adams

Date: 5/20/19

RECEIVED
JUN - 3 2019
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

D. ADAMS
940 SHADY OIL RD
PORT MATILDA, PA.
16870



SECRETARY Rosemary Chiavetta
Penna. Public Utility Comm.
400 North St. 2ND Floor
HARRISBURG, Penna
17120