



March 15, 2018

## March 2018 Citizens Advisory Board Meeting Agenda

**Chair**  
Bill Murphy

**Vice-Chair**  
Mike Kemp

**Board Members**  
Renea Akin  
Charles Allen  
Renie Barger  
Cindy Butterbaugh  
Victoria Caldwell  
Judy Clayton  
Nancy Duff  
Celeste Emerson  
Lesley Garrett  
Tom Grassham  
Shay Morgan  
Cindy Ragland  
Patrick White  
Carol Young

Jennifer Woodard  
*DOE DDFO*

Buz Smith  
*DOE Federal Coordinator*

**Board Liaisons**

Brian Begley  
*Division of Waste  
Management*

Julie Corkran  
*Environmental Protection  
Agency*

Mike Hardin  
*Fish and Wildlife Resources*

Stephanie Brock  
*Radiation Health Branch*

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**6:00pm**

Call to order, introductions  
Review of agenda

**DOE Comments**

-- 5 minutes

**Federal Coordinator Comments**

-- 5 minutes

**Liaison Comments**

-- 5 minutes

**Presentation**

-- 20 minutes

- Paducah Virtual Museum Project – Steve Hampson

**Public Comments**

-- 15 minutes

**Final Comments**

-- 10 minutes

**Adjourn**

# PGDP Virtual Museum Project Progress Presentation



Slide Background  
Enlarged photo of backlit PGDP Site Model  
Courtesy UK College of Design

# PGDP Virtual Museum Project Goal

“The goal of the PGDP Virtual Museum (Project) is to develop a web-based archive of information that can be used to communicate to the public and stakeholders the history, local impacts of the PGDP .....”

- Conducted as a ‘STEM’ educational activity
- Consistent with a recommendation made in Paducah Public End State Vision Project.
- “....utilize related information on KRCEE web site (about PGDP operations)....”

# Project History

- Fall 2013 – Spring 2014
  - UK College of Design (CoD) Start
  - Physical Museum Design
  - Target Market, Museum Information & Branding Research
- Summer 2014
  - Begin Development of Beta Virtual Museum (VM) Web Site
  - Compilation of History Information
  - Format and Navigation Framework Developed
- Fall 2014 thru Summer 2015
  - Development of Content and Web Pages
- July 2015 - First draft Beta VM to DOE for Review
- August – December 2015
  - Refine Beta content & site navigation

# Project History

- January 2016 - Commence Project Team participation
- August 2016 - Presentation to DOE Managers
- November 2016 – Decision Point
  - Plan, gain consensus and execute Expanded VM Content
- April 2017 – Begin VM Expanded Content Update
  - Construction History (photo documentaries)
  - DOE Missions (Site operations overview)
  - Nuclear Energy and the Atom (Uranium, Diffusion, Enrichment)
- September 2017 - Begin Platform recode
  - from Wordpress to HTML/CSS
- November 2017 - Presentation to DOE PPPO
- January 2018 – Wordpress to HTML/CSS code completed
- February to March 2018
  - Finalize Content, Review & Edits – Tune/Synchronize Visual Layout

# Content & Navigation

- HOME PAGE

- Banner – Introduces ‘PGDP’ & Logo



Home Button accessible and navigable from all pages  
(Logo derived from Union Carbide Logo)

- HOME PAGE

- Supports two means of site navigation:

1. Home Page Headlines & Text

- Provide critical background
- Introduce & build important information by topic
- Provides links to topic pages

2. Home Page Banner Direct Links to topic pages

- HISTORY, FACES OF PGDP, SIGHTS AND SOUNDS

# Content & Navigation

- HOME PAGE
  - Headlines and Text – Navigation to PGDP Topical ‘Pages’
    1. ‘What is the Paducah Gaseous Diffusion Plant?’
      - Plant introduction, brief background and summary
    2. ‘The Need for Uranium’
      - History & atomic science leading to use of uranium
    3. ‘What is Gaseous Diffusion’
      - Teaser text and Link to ‘Nuclear Energy and the Atom’ page.
        - Description of Gaseous Diffusion Process
    4. ‘Why Paducah’
      - History Introduction text
    5. Sights and Sounds of the PGDP
      - Link to ‘Faces of PGDP’ Oral History Videos (10 posted)
      - Gallery link to collection of all VM Site Photos, Videos
    6. Bottom of Page Link [NUCLEAR ENERGY and the ATOM](#) to next Topic page

# Content & Navigation

- HOME PAGE
  - Banner Links – Navigation to VM Topic ‘Pages’
    - ‘HISTORY’
      - Local History - Paducah & Vicinity
      - How it All Began - Paducah is Chosen
      - The Plant Comes to Life – Construction
      - Life Comes to the Plant – Plant Work
      - Missions – DOE Work
    - ‘Faces of PGDP’
      - Oral History Videos (10 posted, 8 new to be added)
    - ‘Sights and Sounds’
      - Collection of Photos & Videos from all Pages

# NAVIGATION STANDARDS - ALL PAGES

## 1. Photos

- Click Photo to enlarge view
- Click < > to advance/retreat through related, captioned photo 'Collection'.
- Finger slide On touch devices



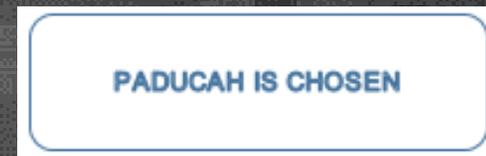
## 2. Videos

- Click Video Arrow on filmstrip to open video and use controls



## 3. Link Boxes

- Click to go to page & topic

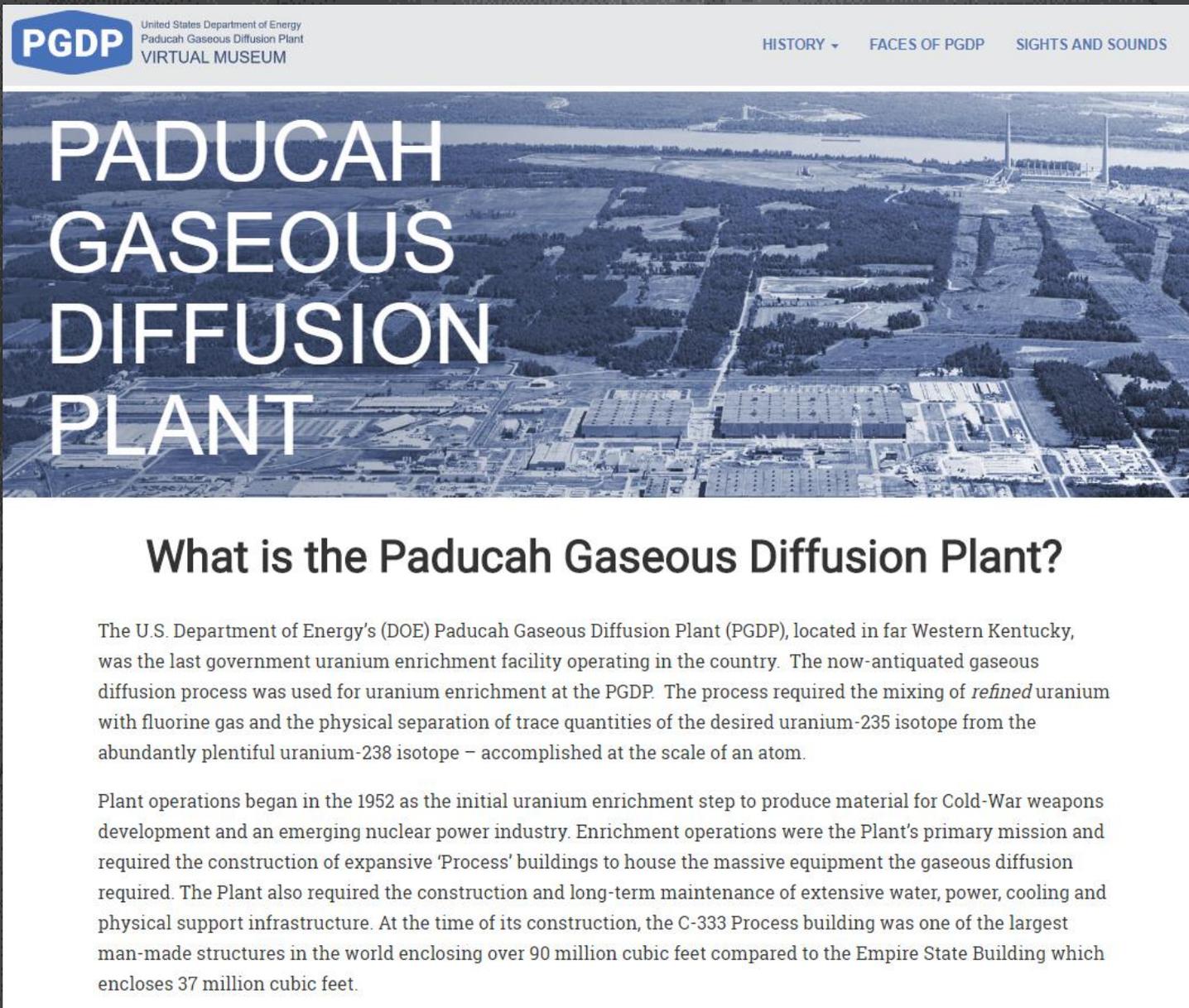


## 4. < Hyperlink >

- Click to access



# TOUR HOME PAGE (using Posted VM Website)



United States Department of Energy  
 Paducah Gaseous Diffusion Plant  
 VIRTUAL MUSEUM

HISTORY ▾ FACES OF PGDP SIGHTS AND SOUNDS

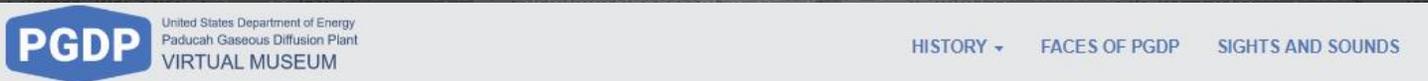
## PADUCAH GASEOUS DIFFUSION PLANT

### What is the Paducah Gaseous Diffusion Plant?

The U.S. Department of Energy's (DOE) Paducah Gaseous Diffusion Plant (PGDP), located in far Western Kentucky, was the last government uranium enrichment facility operating in the country. The now-antiquated gaseous diffusion process was used for uranium enrichment at the PGDP. The process required the mixing of *refined* uranium with fluorine gas and the physical separation of trace quantities of the desired uranium-235 isotope from the abundantly plentiful uranium-238 isotope – accomplished at the scale of an atom.

Plant operations began in the 1952 as the initial uranium enrichment step to produce material for Cold-War weapons development and an emerging nuclear power industry. Enrichment operations were the Plant's primary mission and required the construction of expansive 'Process' buildings to house the massive equipment the gaseous diffusion required. The Plant also required the construction and long-term maintenance of extensive water, power, cooling and physical support infrastructure. At the time of its construction, the C-333 Process building was one of the largest man-made structures in the world enclosing over 90 million cubic feet compared to the Empire State Building which encloses 37 million cubic feet.

# TOUR Local History (using Posted VM Website)



## Before the Plant



Bumper to Bumper, Downtown Paducah, circa early 1950's  
*Photo Courtesy of Phil Brown*

Paducah is located below the confluence of the Tennessee, Cumberland and Ohio Rivers in the "Jackson Purchase" Region of far western Kentucky. In 1818 as settlement pushed west from the Appalachian Mountains, General Andrew Jackson purchased a large tract of land surrounded by the Tennessee, Ohio, and Mississippi Rivers from the Chickasaw Indian Tribe – the Jackson Purchase. The major rivers of the Jackson Purchase served as primary transportation routes for early explorers and settlers.



# TOUR Nuclear Energy & The Atom (using Posted VM Website)

United States Department of Energy  
Paducah Gaseous Diffusion Plant  
VIRTUAL MUSEUM

HISTORY ▾ FACES OF PGDP SIGHTS AND SOUNDS

## WHAT IS ENRICHMENT?

### Nuclear Energy & The ATOM

Atoms are the basic building block of everything that surrounds you. They are very small, the size of the largest atom is less than 1/100th the width of a human hair. Each atom is composed of subatomic particles: protons, neutrons, and electrons. The center or "nucleus" of an atom contains protons and neutrons which make up most of every atom's mass. Orbiting the nucleus of every atom is an electron cloud that contains the rest of the atom's mass.

This is a hydrogen atom.

This photograph shows the atom's electron orbital - the first time we have ever been able to observe the wave function of an atom.

Elements are composed of atoms that contain the same number of protons in their nucleus. Elements are identified on the periodic table by their atomic number. The lightest element, hydrogen, is assigned atomic number 1 because it contains only 1 proton in its nucleus and a single orbiting electron (left).

Elements may exist in several different forms, or isotopes, and each isotope contains a different number of

# TOUR PGDP History – Construction (using Posted VM Website)



## Construction Begins



[< Construction Workforce >](#)

“Boom!”, “The Mud Starting Churning on January 2” read storylines of the Paducah Sun-Democrat referring to the construction of the Paducah Gaseous Diffusion Plant which began on January 2, 1951. The construction of the plant employed some 23,000 workers representing 19 different trades and crafts, An additional 6,000 workers concurrently constructed two new nearby steam power plants to feed electricity to the Plant.

# TOUR Faces of the PGDP (using Posted VM Website)

The screenshot shows the PGDP Virtual Museum website. At the top left is the PGDP logo and the text 'United States Department of Energy Paducah Gaseous Diffusion Plant VIRTUAL MUSEUM'. At the top right are navigation links: 'HISTORY ▾', 'FACES OF PGDP', and 'SIGHTS AND SOUNDS'. Below the navigation is a large blue-tinted image of two workers in a factory setting. The text 'FACES OF THE PGDP' is overlaid on the right side of this image. Below the image is the section title 'Video Oral History'. Underneath the title is a sub-header: 'Learn what the Paducah Gaseous Diffusion Plant was like from the workers themselves.' Below this are three portrait photos of workers. Each photo is accompanied by a quote:

- Worker 1 (Man with glasses):** 'Even during the big snow storms people would find a way to come to work because they wanted to be there.'
- Worker 2 (Woman with glasses):** 'I earned 10x at Paducah than what I did at my previous job. It really did provide my family with a better quality of life.'
- Worker 3 (Man):** 'I quickly became a combustible gas expert at the plant. It was important to me that I helped to keep all the people and equipment safe.'

# TOUR PGDP MISSIONS (using Posted VM Website)



## MISSIONS

In 1950 the need for uranium for weapons manufacture was paramount due to the onset of the Cold War and the nuclear arms race. The decision to build the PGDP and expand the nation's nuclear material production capacity was accompanied by a primary mission for the site - to produce enriched uranium in sufficient quantity to satisfy the Nation's defense needs.

Once production began, a number of PGDP activities evolved to become additional missions. Those included: Upgrading and maintaining the process equipment to optimize output, reliability and cost efficiency; Recovery and recycling of metals and precious metals from plant equipment and surplus weapons; Recycling of highly enriched uranium to reduce international weapons stockpiles; Application of technical and crafts expertise to support the needs of government and industry; Deactivation, decontamination and decommissioning (D&D), and demolition of out of use structures; Environmental surveillance, regulatory compliance and remediation.

# TOUR PGDP TIMELINES (using Posted VM Website)

United States Department of Energy  
Paducah Gaseous Diffusion Plant  
VIRTUAL MUSEUM

HISTORY ▾ FACES OF PGDP SIGHTS AND SOUNDS

## Timelines

US Department of Energy

Workers lay railroad track during early construction of the Paducah Gaseous Diffusion Plant

# HISTORY OF THE PADUCAH GASEOUS DIFFUSION PLANT

STATEHOOD GRANTED

History of the Paducah, Kentucky area, nuclear science milestones, and events leading to the United States' need for uranium culminating with the construction and operations of the Paducah Gaseous Diffusion Plant.

Timeline JS

Year	Event
1792	Statehood ...
1820	Jackson Pur...
1830	First Settlers
1838	Paducah PL...
1840	Paducah Na...
1850	Lumber I...

# Virtual Museum Project Schedule

- March 2018
  - Complete Layout/Navigation
  - Complete compilation of Photo Gallery
- March 30, 2018
  - Submit to posted website to DOE for Final Reviews
    - Content/Factual Accuracy/Security/Grammar
- April – June 2018
  - Final Reviews & Edits
  - Content Recommendations
- June 15, 2018 – Release to DOE for pending Public Release
- July 2018 – Start Curation



# PADUCAH GASEOUS DIFFUSION PLANT CITIZENS ADVISORY BOARD

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## Paducah Gaseous Diffusion Plant Citizens Advisory Board Meeting Minutes March 15, 2018

*The Citizens Advisory Board (CAB) met at the West Kentucky Community and Technical College in Paducah, Kentucky on Thursday, March 15th at 6:00 p.m.*

**Board members present:** Renie Barger, Bill Murphy, Mike Kemp, Tom Grassham, Victoria Caldwell, Carol Young, Patrick White, Judy Clayton, Nancy Duff, Cindy Ragland, Shay Morgan, Renea Akin, and Celeste Emerson.

**Board Members absent:** Cindy Butterbaugh, Lesley Garrett and Charles Allen.

**Board Liaisons and related regulatory agency employees:** Stephanie Brock, Radiation Health Branch; Julie Corkran, EPA; Brian Begley, Gaye Brewer, Chris Jung, Commonwealth of Kentucky;

**DOE Deputy Designated Federal Official:** Robert Smith, DOE.

**U.S. Department of Energy (DOE) related employees:** Steve Christmas, Four Rivers Nuclear Partnership, LLC (FRNP); Eric Roberts, Jim Ethridge, EHI Consultants (EHI).

**Public:** Mike Turnbow, Fran Johnson, and Steve Hampson.

**Murphy** called the meeting to order and asked for introductions. **Roberts** then reviewed the new microphones being used for the meeting.

**DOE Comments: Smith** thanked everyone for attending the meeting.

**Liaison Comments:** None

**Roberts** introduced Steve Hampson from the University of Kentucky for a presentation about the development of a virtual museum about PGDP.

**Murphy** asked if the Kentucky Research Consortium for Energy and Environment (KRCEE) was part of the Center for Applied Energy Research (CAER). **Hampson** indicated that they were.

**Grassham** asked if the virtual museum web page was active. **Hampson** said that it was for the project team that was working on it, but not yet for the public. **Grassham** then asked when it would be active for the public. **Hampson** said that it was planned to be released to DOE by June 15. **Grassham** said that it might help the members of the public that would be going on one of the public tours of the plant to view the virtual museum web page prior to going on the tour.

**Murphy** asked if the interview videos of the former plant workers totaled 10 gigabytes or if they were at least that much for each one. **Hampson** said that that was for the smallest one that he had.

**Brock** said that she thought the virtual museum of the site would be a great addition for anyone interested in the history of the plant. **Brewer** added that she thought it would be a great addition to history school curriculum. **Caldwell** asked if there was an education department at UK that might develop a curriculum using the web page to be used in local schools. **Hampson** said that he presently worked with high school students and did have connections to the other departments at UK that would develop a curriculum. He also indicated that he had some interest in discussing that issue with those people. **Ragland** said that she thought that most people in the area would be very interested in the web page because so many people from this area had connections to the building of the plant as well as working there. **Clayton** complimented **Hampson** on the job of putting the virtual museum web page together. She also said that she had ended up with several historical photographs from the plant and could supply them to **Hampson** if needed. She also committed to getting them to **Smith** for review.

**Roberts** asked if there were any members that might be interested in serving on a subcommittee to look and ways to market the virtual museum web page to the public. He committed to sending out an email request with that purpose.

**Public comments:** None

**Murphy** adjourned the meeting at 6:12 pm.

Approved by William E. Murphy, Chair



William E. Murphy