PACIFIC SCIENCE CENTER

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Final Report

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PROGRAM GENESIS

Pacific Science Center evolved out of the U. S. Science Pavilion, created as the federal government's contribution to the 1962 Seattle World's Fair. From its origins as a private not-for-profit institution in October 1962, Pacific Science Center has used a wide range of interpretive programs - from informal one-on-one activities to science theater shows - to explain science to its visitors. One of the great challenges and pleasures of science museum interpretation lies in the comparatively broad nature of the science center visitor base; such visitors range from preschoolers through retired engineers, and bring different learning styles, levels of interest, and scientific understanding to their visit. Along with such educational and age-level factors, audiences have become more sophisticated over the years in their entertainment and educational expectations; in the science museum world alone, for instance, live interpretive programs coexist with laser shows, IMAX films, virtual reality programs, etc. As the visitors' expectations grow, it becomes ever more important for public educational institutions like Pacific Science Center to seek out new ways to reach their audiences.

The Department of Energy grant (DE FG 06 94 ER 75959) allowed Pacific Science Center to explore an entirely new direction in hands-on science education. Each year, Pacific Science Center develops a "feature demonstration" which is promoted to teachers, who may register their classes to see that featured show during their trip to Pacific Science Center. The featured demonstration is offered in the Boeing Spacearium, a large domed theater otherwise used for laser light shows. The featured show has long been a venue for seeking out new approaches to informal science education; for instance the show for the 1992- 1993 school year, *Jazz Fantasia*, blended a live demonstration on lasers with a 20-minute laser light show on the theater dome. The exploratory nature of the featured show continued with the *Balance of Power* program, funded by the Department of Energy.

Pacific Science Center wanted to explore new ideas and development approaches in the electricity show. To this end, Pacific Science Center chose to

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work with Entros, a local firm of theater and design specialists, in the development of *Balance of Power*. The blend of role-playing, intellectual gamesmanship and real-life applications found in their games were main reasons for the selection of Entros as a partner in the development of *Balance of Power*.

Project Manager Ron Rohovit, the Visitor Education Manager for Pacific Science Center during the development phase of *Balance of Power*, met with Entros staff and provided an outline of the key educational goals of the desired program; the Entros staff then developed a program which conveyed key points about energy conservation in the home by making full use of Pacific Science Center's domed Spacearium theater. Thus, *Balance of Power* was a unique project in its very genesis, a special collaboration between an entertainment company and a non-profit science center.

COLLABORATION WITH SEATTLE CITY LIGHT:

One of the most effective elements of *Balance of Power* was the collaborative nature of the program. Seattle City Light funded the school bus costs for Seattle School District middle school students to come and see the show at Pacific Science Center. Seattle City Light contributed 450 copies of their book *Teach with Energy*. City Light also developed an Educators' Resource Guide (copy enclosed) guide in collaboration with Pacific Science Center staff, which was made available to all of the classes coming to see *Balance of Power*. Mark Van Oss, Pacific Science Center's liaison with City Light on this project, also reviewed the script and the presentation itself for scientific and technical accuracy.

PACIFIC SCIENCE CENTER PROGRAM SUPERVISION:

- Diane Carlson remained the Project Manager throughout the duration of the *Balance of Power* project.
- Ron Rohovit, the direct supervisor of the *Balance of Power* program, left Pacific Science Center in October of 1994. He was replaced in that role by Mike Shanahan, who assumed supervisory duties over *Balance of Power* in October 1994 and remained with the project to the end.
- Carol Weinstein, the Lead Demonstrator in charge of coordinating the installation of *Balance of Power* and supervising staff training to the demonstration, was replaced in that role by Brian Wennerlind in December 1994.
- Mena Wiley coordinated the details of the grant from the accounting and administrative end.

DEVELOPMENT OF THE SHOW:

Entros developed the script, interactive stations, and large demonstration props for *Balance of Power*, and trained Pacific Science Center staff on the program. The contract fee for Entros: \$27,200.

Pacific Science Center contributed \$2000 to renovate the Spacearium's lighting and sound systems to prep the space for *Balance of Power*. Pacific Science Center also removed two rows of seats near the back of the theater and took other measures to make sure that the space was safe for an activity that would involve up to 120 school children running around excitedly as they assembled puzzle information.

Pacific Science Center selected a team of demonstrators with acting experience to present *Balance of Power*; while such skills had always been desirable in the past, the large-scale nature of *Balance of Power* called for a higher level of theater experience than before. Hired for the program's start were Carol Weinstein, a local actor with experience in educational theater, and Seattle actor and playwright Brian Wennerlind. The staffing needs called for a demonstrator/actor, a technical operator, and a staff member to run the spotlight.

The game component of *Balance of Power* was tested separately on October 4, 1994, using groups of school children assembled specifically for that purpose. Rehearsals for the complete show took place in the first 9 days of November 1994, and the program debuted for the first school group audiences on November 10.

DESCRIPTION OF BALANCE OF POWER PROGRAM

Balance of Power was designed specifically for ages 10 - 14; the one-paragraph synopsis of the program provided by Entros is as follows:

Balance of Power is designed to excite 10 - 14 year olds, impart practical knowledge of conservation and demonstrate the social and environmental impacts of mass-producing electric power. It is designed to limit demonstrator "explanation" and maximize student "exploration" by stepping outside the conventional audience-lecture presentation format.

The finished product consists of two parts: a dramatic presentation on the basic nature of electricity, followed by a highly interactive game on energy conservation. The children gather at the main entrance of the Boeing Spacearium Theater, and are divided into teams of 6 students each by the usher. As the children enter the theater, the demonstrator works with the kids, doing routines to hold their attention while they are getting settled in.

The formal demonstration starts with a discussion of the basic qualities of electricity. There is an overview of the main sources of power (oil, coal, hydro-electric) and a discussion of the need to balance the amount of energy created with the amount consumed. In the second part, the audience splits up into small groups of @ six students each. The game is set up so that up to 20 groups can be accommodated at a time or a total of 120 students. The

Balance of Power game can best be described as a non-competitive, energy-conservation-based version of "capture the flag," as children divide up into teams and use puzzles and secret code words to search the theater for clues on saving energy in the home. There are several steps that the participants must take to assemble the clues; they need to really work at the game, which drives home the points of the conservation game more clearly. This game is a unique element; it is intensely interactive and multi-focused. In its overall effect, the *Balance of Power* demonstration and game blended information on the physical behavior of electricity with ecological and social elements of the use and conservation of electricity in the home.

THE REGULAR RUN OF *BALANCE OF POWER*

Balance of Power debuted for school groups on November 10, 1994, and was offered at 10 AM, 11 AM and noon for the remainder of the 1994-95 school season (through June 12 1995). It returned as a school program with the start of the new school year in October 1995 and continued through January 31, 1996.

Total attendance from school group visitors: 20,457.

PERFORMANCES FOR GENERAL PUBLIC

Balance of Power was also offered to the non-school group general public as a special program offered at 11:30 a.m. daily throughout July 1995. While designed for the 10 - 14 year old school group audience, the program worked well for family groups as well. In particular, the concept of working together in teams to solve clues proved to be a very effective activity with families.

Total attendance from non-school group visitors: 874

PROMOTION OF *BALANCE OF POWER*:

Pacific Science Center's registration office handled all on-site and off-site school reservations; the five staff of that office promoted *Balance of Power* to teachers and other educators who phoned in, gave them an overview of the program, and mailed out pre-visit information.

In addition, a preview of *Balance of Power* was given to local Educators during the October 1994 Educators' open house, attended by 350 educators. *Balance of Power* was featured in the teacher newsletter *Aha!* and in the annual calendar sent to educators throughout the state.

When *Balance of Power* was offered in summer 1995 as a program for the general public, it was featured in a newsletter in Pacific Science Center's Centergram, which reaches 35,000 member households.

EDUCATION VAN PROGRAM COMPONENT:

In the 1995-1996 Fiscal Year, a number of components from the *Balance of Power* program were adapted for Pacific Science Center's "Physics on Wheels" traveling van program. Physics on Wheels takes assembly programs,

classroom lessons and portable exhibits throughout the state of Washington. The DOE funds allowed for the construction of exhibit components on energy conservation, based directly on the devices constructed for the on-site *Balance of Power* show. The exhibit concepts were developed by members of Pacific Science Center's Education Team under the supervision of Cheryl Lydon and Leslie Gunby; delivery of the energy-related exhibits and programs through the 1995-1996 school year was the responsibility of the Science on Wheels teachers. Catherine Valiant rewrote the *Charged Up* lesson, adding materials and activities drawn from the original *Balance of Power* onsite program. Pacific Science Center Exhibit Fabricator Ron Owens also created a "circuit board" that was used in the lesson. 30,000 elementary and middle school students attended the Physics on Wheels programs and exhibits during the 1995-96 school year, when the *Balance of Power* components were featured on the van.

SCHOOL GROUP EVALUATION OF BALANCE OF POWER:

Balance of Power was rated highly by the teachers who brought their children to see the program. For instance, in surveys taken from October 1995 through January 31 1996, teachers were asked to rate the program on a scale of '1' ('poor') to '5' ('excellent'). Of 36 classes surveyed, 24 rated the program a '5' ('excellent') and 9 rated it '2' ('very good').

A sample of comments from students who attended *Balance of Power*:

The electric show was cool I liked being in groups of 6. The man that did the show was funny and made it fun.

-Colleen Crimmin
Holy Rosary
January 23 1995

Thank you for the information on electricity now I know how to save more of it. I liked the game we played. And I liked the special effects you had. I appreciate you letting us come and see you.

-Nick
Pinelake Middle School
January 27, 1996

Dear PSC,

Thank you for showing us all about electricity and how to reduce it's use. I thought it was fun to learn all we did through a game.

-Shannon Lyon
Pinelake Middle School
January 27 1996

CONCLUSION:

The on-site version of *Balance of Power* reached a total audience of 21,331 between November 10, 1994 and January 31, 1996; in addition, the Physics on Wheels van offered exhibits and programs to an additional 30,000 students in the 1995-1996 school year. The program provided a groundbreaking new approach to informal science education, combining a dynamic demonstration with an intensely interactive game show. Between the on-site programming and the Physics on Wheels van programs, 51,331 students were impacted by the activities, exhibits and energy-conservation message of *Balance of Power*.

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