

"Makah Clean Air-Healthy Homes"

Woodstove Change-Out Project Report

To:

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 10

Submitted By:

THE MAKAH TRIBE



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View of Neah Bay facing east down Bayview Avenue. This photo was taken during "mixed" air conditions.



View of Neah Bay housing during "stable" air conditions and temperature inversion where smoke is literally fumigating the Village.



Woodstove prior to change out.



Woodstove stack prior to change out.



Woodstove after change out.



Woodstove stack after change out.

Goals and Objectives

To use an old expression, if “one picture can tell a thousand stories”, then the above photos have truly achieved that purpose.

Based on field observations since the development of the Makah Air Quality Program in 2000 and the 2002 Makah Emissions Inventory, it has been the theory that forestry burning, other forms of open burning, and woodstove burning are the main causes of air pollution within the boundaries of the Makah Nation. Woodstove burning and the resultant smoke probably rank the highest. Based on revised emissions inventory estimates, it is calculated that out of an estimated 400-420 woodstoves in the

Makah Nation, that there are between 150-175 woodstoves that are not EPA certified. This is about 37% to 42% of the woodstoves in the Makah Nation. Pursuant to this, and as part of the strategic planning process of the Makah Air Quality Program, a high priority was placed on replacing non-EPA certified woodstoves with certified appliances as a mitigation effort.

During 2005 and 2006 the Makah Air Quality Program began doing research on woodstove changeouts and possible sources of funding. During the first and second quarters of the 2007-2008 grant funding period, the "Clean Air, Healthy Homes" Makah Woodstove Changeout project proposal was developed. Soon thereafter, a grant proposal was developed and application made to the "Innovations in Wood Stove Changeouts Study" competitive grant opportunity with the EPA. This was done in the fourth quarter of FY 2006. The end result of this effort was a partnership and collaboration between the Makah Tribe and the EPA in allocating a total of \$ 117,000 for Phase I project implementation. Tribal "in kind" contributions would total \$ 17,000 and the EPA contribution would total \$ 100,000.

Monies allocated for the project were not "stand alone" grant funds, but were added under an award amendment and funneled through the existing CAA 103 Grant, to be used during FY 2008 under a modified work plan changing Objective # 4 from an Education Objective (in FY 2007) to a Pollution Mitigation objective. Due to the complexity of the funding mechanism and designation as a demonstration project within a project, the award agreement amendment letter was not received until late December of 2007, leaving only three quarters (9 months) in which to implement and complete the project. This put the project on a "fast track" basis.

As a demonstration project within a project with it's own work-plan, the woodstove change-out project exhibited all elements of a stand alone project, including separate administration and management, staff training, outreach and education, indoor air quality monitoring, removal of old appliances and installation of new appliances, and evaluation mechanisms. This presented a challenge to a one staff program. However, the demonstration aspects of this project lent themselves to this challenge. **The overall goal if the project is to mitigate the human and environmental health effects of woodstove smoke pollution both in reference to the criteria air pollutants, of which PM 2.5 is the primary concern, as well as CO and also associated VOC's/Air Toxics such as benzene. This is both in reference to indoor air and ambient air, primarily in the village of Neah Bay.**

Objectives of the demonstration project included:

- 1. Maximize partnership and collaborative opportunities, both on the outside and within the Tribal organization, to leverage funds to bring in additional money for this phase and ongoing project phases.**
- 2. Maximize partnership and collaborative opportunities within the Tribal organization to effectively co-manage and implement the project, given limited Air Quality Program management capability.**
- 3. Maximize the number of woodstove changeouts. Forty changeouts was set as a goal.**
- 4. Maximize direct services provided to not only eligible tribal members, but to the tribal membership and the community as a whole in reference to addressing woodstove burning and resulting air pollution issues.**

In Phase I, tribal members that were 65 and over were eligible and targeted for woodstove changeouts with the only requirements being that they were 65 or over and did not own an EPA certified wood stoves. By Makah Tribal Council Resolution, all members that are 65 and over are designated as elders, and are automatically considered at risk where health and (fixed) income are concerned. Pursuant to this, health risk and income information and verification were not required for this group. Based on information provided by the Makah Housing Department and the Makah Senior Citizens Program, there were about 71 tribal members that are 65 and over. It was estimated that roughly half of those owned wood stoves, or around 35-40. Out of this it was estimated that about half of these were not EPA certified, or about 15-20. Based on this information, the Woodstove Changeout Committee perceived that there were more stoves available than eligible recipients. In order to keep the project on track, it was decided approximately half way through implementation of the actual changeouts, that eligibility requirements would be modified to include Tribal members that were 50 years old and over and who did not have EPA certified wood stoves. By Makah Tribal Council Resolution, all members that are between 50-64 are designated as senior citizens. However, for those between the ages of 50 to 64, application forms would include voluntary questions on income and health risk factors such as asthma, diabetes, and other high risk conditions that could be directly effected by woodstove smoke pollution. It must be emphasized that providing this information was completely voluntary, however those who decided not to provide this information would be put in a low priority status behind those that listed and verified their income and health risk status. By doing this, anyone who was 50 and over and who did not have an EPA certified wood stove could apply for and potentially receive a woodstove changeout.

Activities/Tasks

1. Research resources and develop continuing funding strategy and grant proposals for this and future phases of the woodstove change out project.

- **Timeline**

The original timeline of twelve months was shortened to nine months due to funding implementation/mechanism challenges on the part of both the EPA and the Makah Tribe. Although the project was to have begun in October of 2007, the award letter was received in late December 2007, and project implementation was delayed until January of 2008.

- **Outputs**

Research was conducted into other funding sources, including HUD, USDA, and LIEHEAP.

- **Outcomes and Lessons Learned**

Both Makah Housing Department HUD funds and Social Services LIEHEAP funds had been used during 2007 to change out a total of 10 woodstoves in the community, so 2008 funds from these sources were not committed or available for assisting in Phase I of the woodstove change out project under EPA funding. The most promising funding was identified as USDA funding, including Rural Development Housing Service Section 533 Grants or “Housing Preservation Grants”, and Section 504 Grants or “Home Repair Loans and Grants”. Both the Housing Preservation Grants and the Home Repair Loans and Grants programs can be used to improve housing that will positively effect the health and safety of the occupants. Both programs are broad in scope, however the Housing Preservation Grants can be awarded directly to tribes to manage and implement under broader guidelines (such as this EPA grant), whereas Home Repair Loans and Grants can be awarded only to qualified individuals who must apply directly to the USDA for these assistance mechanisms, with loans going to those that are under the age of 62 and grants going to those that are 62 and over. Although tribes may assist in the application process for the loans and grants program, and even do some of the contracting (as do the Makah), the process is long and involved. Basically, instead of one loan or grant to manage, the result is a number of small grants and loans that need to be managed. Because of this feature, the “Home Repair Loans and Grants” program is much more cumbersome and does not lend itself very easily to a project such as a woodstove change out. This is especially true with a limited and already overburdened staff or a one person program. In addition, in order to be economically and operationally feasible or a contractor from 150-200 RT miles away to do, and to maximize the number of changeouts, stoves must be changed out in large blocks at a time, and not one or two at a time.

For purposes of this project, the Housing Preservation Grants program is much more suitable, and can be administered and managed coincidentally with a grant such as this EPA grant. The scoring process for these grant awards also favors tribes, with highest scores going to those applicants who can show need in the “very low income” categories. In addition, it does not appear that matching money must come from non-federal sources, but instead, grantees are encouraged to leverage funds, and the USDA awards the highest scores to those that can match or leverage 100% of the funded amount. In this case, it appears that the Makah Air Quality Program could have applied for a total of \$ 117,000 in additional funding from the USDA, effectively doubling the size of the grant and at least doubling the number of changeouts, if not more. However, this grant opportunity was not discovered until late March of 2008, with applications due by April. Due to internal tribal grant application requirements in addition to Makah Air Quality Program infrastructure and capacity limitations as regards staff, the window of opportunity to develop a grant application was short, and application was not made. As it was, staff spent up to 10% more time in doing direct project co-management than was anticipated in the work plan.

As part of “lessons learned” this information and strategy can be put to use by the Makah Tribe in the future and by other tribes as well.

2. Develop project partnerships and form “Clean Air, Healthy Homes” Woodstove Change-out Advisory Committee (Committee)

- **Timeline**

Once verbal notification of award/increase in funding was made in December of 2007, Makah Air Quality Program staff facilitated formation of the Committee during that same month. Committee meetings were then held as required with seven taking place altogether between January and September.

- **Outputs**

The Committee was formed with following members:

- Jim Woods: Sustainable Resources Coordinator; Sustainable Resources Division; Fisheries Dept.
- Dana Sarff: Air Quality Specialist; Air Quality Program; Sustainable Resources Division, Fisheries Dept.
- Barbara Taylor: Energy Coordinator; Housing Dept.
- Maureen Sones: Senior Citizens Program Coordinator; Social Services Dept.
- Lyda Shaw: Coordinator; LIHEAP Program, Social Services Dept.
- June Williams: Senior citizen and community member.
- Kate Bruce: Oregon State University Summer Intern with ITEP/NAU. (Non-voting, Summer 2008)

Meeting agendas were developed and meetings were held on the following dates:

- January 10, 2008 Subject: Project Kickoff-Overview, develop bid documents, contractor invitation to bid, advertisement for bid, pre-bid meetings and contractor submittal process. Begin Phase I, Group A recipient application process 65+.
- March 12, 2008 Subject: Project Status: Contractor Q&A, submittals, bid openings on 3/21/08. Continue Phase I, Group A recipient application process 65+.
- April 3, 2008 Subject: Award Contract: Contract to Thurman's in Port Angeles, WA. Continue Phase I, Group A recipient application process 65+.
- May 13, 2008 Subject: Pre-Installation: Committee and Contractor meeting and scheduling. Continue Phase I, Group A recipient application process 65+.
- May 28, 2008 Subject: Project Status: Container arrival, fork lift repair and woodstove delivery. Applicant stove inspections, screening and Group A recipients-15 selected. Installations Group A last weeks of June.
- June 24, 2008 Subject: Determination: Determine Phase 1, Group B applicants- Seniors 50+ Begin Phase I, Group B recipient application process 50+.
- July 21, 2008 Subject: Applicant stove inspections, screening and Group B recipients. 25 Selected. Installations Group B first weeks if August.

- **Outcomes and Lessons Learned**

By forming internal “intra-tribal” partnerships the Makah Air Quality Program was able to maximize the existing tribal infrastructure to provide “in kind” match to develop the capacity to manage the implementation of the project. Without this cooperative effort it is doubtful this project could have been completed within the parameters set forth in the overall CAA 103 Work-plan and more specifically in the subordinate work-plan for the woodstove changeout project. It definitely would not have been possible to complete it on time and within the budget given the fast track nature of the project. In addition, the nature of the partnership lent itself to outreach and education efforts that reached deep into the community even before the project took on some visibility, so many people became aware of it soon after the funding was approved. Finally, the committee took the responsibility of making decisions on who would receive the stoves out of the hands of one or two people, and put it into the hands of several, making the decision making process more equitable and less likely to create conflict of interest issues.

3. Develop and deliver communications, outreach and education elements.

- **Timeline**

This activity cluster began in January and was ongoing throughout Phase I, coming to a close in September, 2008. Although these activities have been suspended until more funding is secured, we are continuing to accept applications from tribal members of all ages who feel that they may be eligible for a change out, solely based on the fact that they own a woodstove that may not be EPA certified, however all age, income and health information is still being requested. Performing inspections on these stoves would then give us a stove count to assist us in future funding efforts.

- **Outputs**

Printed flyers on the program were developed and posted. Outreach information on the program in digital format was also posted on the Makah Tribal Web Portal at MAKAHCAP.NET, including the basic flyer, more detailed information and application forms. This information was also made available at the Makah Housing Department, Senior Citizens Center, Health Department, Clinic, and at the offices of Air Quality and LIEHEAP. Information was also presented at the Makah Tribal Government Open House. Finally, brochures were adopted and developed from EPA materials on proper fire wood cutting and woodstove burning procedures.



Display at the Makah Tribal Government Open House at the Makah Community Hall. Intern Kathleen Bruce and a pleased wood stove change out recipient, Sam Parker, are happy to pose for the photo.



Close up of woodstove change out poster-board display.



Small 8 1/2" X 11" flyers were not catching the attention of the community, so we developed three 3' X 4' posters to advertise the program. We used Neah Bay School colors and hung these up at Washburn's General Store, the Senior Citizen's Center, and also at the Clinic.

- **Outcomes and Lessons Learned**

The direct outcome of these efforts was awareness by members of the community that there was a woodstove change out program in existence and available to qualified households and individuals. In addition, the nature of the outreach and education element attempted to emphasize the pollution reduction aspects of the change

out and the relationship of this to both indoor and outdoor, ambient air quality. More importantly, we wanted to emphasize the nature of the environmental and human health risks posed by old, non-EPA certified appliances that were emitting both indoor and ambient air pollution. One of the most important outcomes of this element was that the Makah Air Quality Program has started to become more visible in the community. This outcome can be expected in almost all situations where there are direct services to, and contact with the community, however this program has raised the overall visibility of the Makah Air Quality Program to a greater level than it has occupied in the past. Hence, we feel that pollution and air quality issues are generally gaining more attention than before.

Posting on the makahcap.net web portal and using small 8 1/2" X 11" flyers posted at the usual locations were not nearly as effective as putting up poster sized campaign presentation boards (3'X4'). In addition, the Neah Bay "Red Devil" school colors of black and red were used generously on these posters in attracting attention to the woodstove change out program. The Makah community is very supportive of sports programs at the local school, and using the school colors drew immediate attention to the program from community members of all ages. This was the single most important outreach and education tool that we developed. From there it was word of mouth.

Finally, one of the elements that we had planned on implementing but did not was a pre-installation Woodstove Change-out Seminar and Workshop for all of those who were to receive the new appliances. This event would have highlighted air pollution issues, proper wood cutting, preparation, and wood stove operating procedures as well as stove maintenance and cleaning. It was the intent to make attendance of the event a requirement for receiving a new appliance. However, to do this would have meant that we would have had to wait until all of the household inspections were completed, applicants screened, and approved for a change out before we could have scheduled and staged such an event. It was decided by the Committee that this would have delayed completion of the project by several weeks if not more. Given the "fast track" nature of the project, the Committee decided that this was not feasible in the amount of time that we had. This, in our estimation, was an important element in the program. Between the end of Phase I in September and the writing of this report, we are starting to receive inquiries from recipients on maintenance and cleaning procedures, as well as some complaints about possible build up of creosote in the chimneys. We are currently consulting with the change-out contractor on coming out and doing a "remedial" seminar and workshop that will cover these same issues and points.

4. Develop proposal and bidding guidelines, scope of work, specifications, bid documents, "advertisement for bid" from qualified contractors, sub-contractors, and suppliers, implement bidding process, develop contract documents for award and signature, and award contract.

- **Timeline**

This activity cluster was carried out during the months of January, February, March and April with the formal public bid opening taking place on March 21, and award and contract signature completed by April 24, 2008.

- **Outputs**

Outputs included the following:

- Review of Federal GAO/EPA Policies and Procedures as relates to the bidding process.
- Review of Makah Tribal Policies and Procedures as relates to the bidding process for "Major Subcontracts" (\$ 5,000 and over).
- Pursuant to all policies and procedures, development of the following documents:
 - * Makah Woodstove Change-out Program Bid Documents Phase I
 - * Invitation to Bid
 - * Bid Opening Checklist
 - * Bid Comparison Sheet
 - * Notice of Award
 - * Construction Contract
 - * Notice to Proceed

- **Outcomes and Lessons Learned**

This element insured that both federal and tribal project proposal and bid guidelines were followed, implemented and adhered to.

Additionally, the Air Quality Program, project partners and the Committee were concerned that contractors and suppliers provided bids that enabled decisions to be made based on “apples to apples” proposal comparisons and in a transparent bidding environment. No “smoke and mirrors” allowed. This meant that it was up to the tribe to develop a standard bid format, so that the contractors/suppliers were not each submitting their own format, which would make comparisons difficult. This would insure that the tribe was driving the process and not the bidders by assuring that the outcome would clearly specify what items and how many of each were to be included in the bid for each installation. An installed price for each item was to be included in the bid (“itemized bid”), instead of a lump sum price for each stove installation or for all of the installations together.

The Committee decided that the bids should include the cost of purchasing, removing/recycling, and installing a total of 40 stoves. This number was based on the allowable budget for the contracting work (+/- \$ 92, 000) at an allowable cost of \$ 2,300 per stove, which was arrived at by researching other change-out programs and talking to different people in the industry who helped us to determine what a “good value” price would be for an individual woodstove change-out. However, it was emphasized in the “advertisement for bid” and in our discussions with bidders that our goal was to install a minimum of forty stoves and that we were interested in installing as many stoves as we could, given our budget. Although the contractors/suppliers did request information on our total budget, this information was not shared with any potential bidders. Bid forms were then designed that would separate the cost of purchasing the stoves and the cost of removing/recycling the existing stoves from the cost of the hearths, the installation hardware, and the labor to do the installations. This would allow contractors/suppliers to bid on providing the stoves separately from the cost of removing/recycling the existing stoves and then doing the installations. Since each contractor and/or supplier had manufacturer specific distribution agreements in place for this geographic area, stoves that were bid on were different makes however comparable models were selected in terms of size and specifications. This meant that there would be some variability in the cost of the stoves from the start, however at the same time it allowed an environment where competitive pricing worked to the advantage of the tribe, instead of a situation where the distributor or manufacturer of a single make and model dominated the project.

The first issue that we ran into in our discussions with potential bidders was that they felt that they could not submit an accurate bid unless the houses and the stoves that were to be replaced were individually inspected prior to the bid. To have each bidder conduct pre-bid inspections at each location was not practical, especially since the application process for potential recipients was occurring simultaneously to the bidding process, and we did not know who the recipients would be yet. To overcome this issue it was decided that each bidder would give, in addition to the price for providing 40 stoves and a price for removal/recycling the same, a price for 40 new hearths, a price for a standard one-story installation X 40 (low installation price) and an “alternate add” price for a non-standard two-story installation X 40 (high installation price), given that there would be no modifications or repairs to the structure, and that there was already a vent through the roof for the chimney assembly. Bid forms included itemized supplies and materials for both the low and high price scenarios. Bidding in this manner did not take into consideration any reusable hearths or piping material, which could be credited to the project and potentially increase the total number of change-outs. Any structural modifications, maintenance or repair work were excluded from the bid, and homeowners who had structures that needed this type of work completed would have to complete the work at their own expense prior to the change-outs. As it turned out, there were no homes that required any structural work.

Finally, the tribe was to furnish storage space for the stoves, which were to be “drop shipped/delivered”, access to an operable fork lift throughout the project period, and a small staging area for daily operations.

The outcome of the bid process is summarized in the spreadsheet below.

Makah Clean Air, Healthy Homes Initiative

Woodstove Changeout Project-Phase I

Bid Summary and Comparison Sheet

Item	Seiku Chimney	Thurman's	Everwarm	
Stove Specified	Quadra-Fire 3100 Millenium	Kuma Classic	Lopi Endeavor	Lopi Republic
40 Stoves Only	\$ 54,600	\$ 54,000	\$ 61,800	\$ 50,480
40 Stoves Standard Installation.	\$ 91,658	\$ 97,396	\$ 102,216	\$ 90,896
Add Per Stove for Non-Standard Installation.	\$ 651	\$ 581	\$ 649	\$ 649
40 Stoves Range of Cost.				
Low	\$ 91,658	\$ 97,396	\$ 102,216	\$ 90,897
High	\$ 117,698	\$ 120,636	\$ 128,176	\$ 116,856
	Notes: One man crew. Does not include L&I \$ 120 for standard install. \$ 180 for non-standard install Includes recycling by Tribe	Notes: Two man crew. Includes L&I \$ 300 for standard install \$ 450 for non-standard install Includes recycling by Contractor	Notes: Two man crew. Includes L&I \$ 200 for standard install \$ 350 for non-standard install Includes recycling by Contractor	



Apparent low bidder. One man crew, no L&I, and recycling by Tribe not accepted by Committee
 Next apparent low bidder if we select the Lopi Republic stove. Lopi Republic stove not accepted by Committee.
 Kuma Classic Stove preferred over Lopi Republic by Committee. Thurman's selected as Contactor by Committee.

Note: Makah Woodstove Change-out Committee decision was to go with the Kuma Classic and Thurman's as the Contractor/Supplier.

The Committee decided to select Thurman's as the contractor, who was perceivably providing a more attractive stove with a larger "burn box" that was "easier" to operate. However, this decision was based on advertising and sales brochures, and due to the time constraints, bidders were not afforded the opportunity to bring their stove in front of the Committee for a demonstration. It is recommended that given the time, subcontractors/suppliers be afforded this opportunity.

5. Develop, distribute, collect, review, and process applications for woodstove change-outs from potential recipients. Conduct inspections of existing woodstove sites to determine basic eligibility. Selection of recipients. Notify recipients of award in letter format and have agreement documents signed and returned.

- **Timeline**

This activity cluster was carried out during the entirety of Phase I of the project and is still in progress in preparation for applications for funding of Phase II. However, Notice of Award Letters and Agreements are being withheld pending funding for Phase II.

- **Outputs**

- Application documents
- Notice of Award Letter and Agreement documents

- **Outcomes and Lessons Learned**

- Sixty-nine (69) applications to date
 - * (22) ages 65 and over
 - * (31) ages 50-64
 - * (16) ages 49 and under
- Sixty-two (62) eligible applicants to date
 - * (20) ages 65 and over with (2) denied
 - * (26) ages 50-64 with (5) denied.
 - * (16) ages 49 and under with (0) denied.

6. Develop logistics, staging, woodstove delivery, remove and recycle old woodstoves, and install new appliances.

- **Timeline**

The selection of the staging/operation area, purchase, transport, and placement of a 40' used storage container, and maintenance and repair to the dedicated small Tribal forklift was completed by the end of May. The woodstoves were also delivered at this time. The removal of old appliances and installation occurred from late June thru the middle of August, in about a seven to eight week time period. This was done in three separate visits by the contractor, who remained on site for about a 5 day period each time for a total of about 15 days. Average rate of the change-out was about 15 stoves each visit or about 3 per day with a two man crew.

- **Outputs**

- Out of sixty-nine (69) applicants to date
 - * (17) ages 65 and over received change-outs with (3) on waiting list and (2) denied
 - * (22) ages 50-64 received change-outs with (4) on waiting list and (5) denied.
 - * (6) ages 49 and under received change-outs with (10) on waiting list and (0) denied.
- A total of 44 stoves and 1 fireplace insert were installed.
- At total of 10 EPA certified woodstoves belonging to applicants that were not eligible for a change- out were serviced and brought back into compliance with certification specifications, although no tests were conducted on these stoves.

- **Outcomes and Lessons Learned**

The initial work plan estimated that there would be around 71 potential recipients. Out of 69 applicants to date, a total of 62 were eligible for the change-out. With 45 installations, this was a rate of about 73%, which was higher than anticipated.

Not all applicants in the 50 and over age groups that were targeted and were eligible received the change-outs. There were 7 in this group. Six installations went to those that were in their late 40's. The reason for this was that these 7 applications came in near or after the scheduled completion date of work by the contractor, which was in mid-August. These 7 applicants will be prioritized during Phase II of the change-out program, as will others in the 50 and over category that submit applications and are deemed eligible.

In addition, the Tribe, the Committee and the recipients were very pleased with the smoothness, speed and the efficiency displayed by the contractor in conducting Phase I of this change-out. Finally, the installers were courteous and friendly and were well received by the recipients, and there were no complaints registered by anyone against the installers.

Pre-application and basic eligibility determination based only on the fact that applicant does not have an EPA certified wood stove appliance. This could be done very simply and would provide demographics and statistics which would establish a "need" that could be used in applying for funding for future change-out program phases.

7. Develop Summary Report on Makah "Clean Air, Healthy Homes" Woodstove Change-out Program Phase I.

- **Timeline**

Completed in October, November, and December of 2008.

- **Outputs**

Standard report document outlining objectives, timeline, outputs, and outcomes as relates to original agreement, work plan, and budget. Includes graphic support documentation as required. This is to be a stand alone document and included in the EPA CAA 103 Final Performance Report for FY 2007-2008.

- **Outcomes and Lessons Learned**

Provides EPA Region 10 and the Makah Tribe with documentation of successes, failures, and lessons learned during this effort. Report and supporting documents can be shared with other tribes for their knowledge and use in facilitating and implementing their own woodstove change-out program or project.

8. Develop PowerPoint presentation on Makah "Clean Air, Healthy Homes" Woodstove Change-out Program Phase I.

- **Timeline**

Completed in December of 2008.

- **Outputs**

Summary presentation of the report document outlining objectives, timeline, outputs, outcomes, general summary and lessons learned.

- **Outcomes and Lessons Learned**

Provides EPA Region 10 and the Makah Tribe with an outreach and education tool with which to share information to assist other tribes, jurisdictions and organizations in strategizing, planning, and implementing woodstove change-out programs and projects.

Summary

Outcomes

Mitigation and reduction of air pollution is directly related to the number of changeouts that are achieved.

One way to do this was to look at maximizing and leveraging EPA funds to bring in as much additional money as possible for ongoing phases of the project. This was included as one of the objectives of the work plan.

While this makes sense, in hindsight, conditions existed which would prove to make this a strategically difficult thing to do. To begin with, there were no project partnerships or a committee in place prior to the EPA grant application, and although there was a project plan outline that had been developed prior to the EPA proposal, application, and award from the EPA, the strategic funding element of the plan had not been sufficiently researched and thought through. It soon became evident that timing of complimentary grant funding cycles was going to be problematic. Grants that could have been used for this should have been applied for simultaneously along with application to the EPA, or shortly after it the grant funding was awarded. Also, funding mechanism issues resulted in an unintended delay in making the award to the Tribe, and as a result the project was put on a “fast track” timeline in order to complete it by the end of October, 2008. The combination of these two conditions, in addition to the fact the Makah Air Quality Program is a one staff program, made this objective very difficult to implement. Finally, former tribal departmental and program expenditures would also prove to be an issue. Both Makah Housing Department HUD funds and Social Services LIEHEAP funds had been used during 2007 to change out a total of 10 woodstoves in the community, so 2008 funds from these sources were not committed or available for assisting in Phase I of the woodstove change out project under EPA funding.

The most promising funding was identified as USDA funding, including Rural Development Housing Service Section 533 Grants or “Housing Preservation Grants”, and Section 504 Grants or “Home Repair Loans and Grants”, however, the Section 504 program is cumbersome and does not lend itself very easily to a “scale of volume” such as a woodstove change out project, where, in order to reduce costs, it is imperative that as many stoves get replaced as possible in the shortest amount of time. For purposes of this project, the Housing Preservation Grants program is much more suitable, and can be administered and managed coincidentally with a grant such as this EPA grant. However, this grant opportunity was not discovered until late March of 2008, with applications due by April. Due to internal tribal grant application requirements the window of opportunity to develop a grant application was too short, and application was not made.

In the end, the combination of these factors was overwhelming in conspiring to make this an impossible objective to realize. Although it is doubtful that the stars would “align” to create this exact set of conditions again, this is a testimonial to the benefit of forming strategic partnerships and committees and in doing strategy planning for these projects in advance.

On a more limited scale, and in the case of this project, the selection of the contractor and the manner in which the project was bid was probably the most important element in maximizing the number of change-outs. Because the Tribe controlled the bid format that required an “apples to apples”, completely “itemized bid”, there was transparency in the process. Invoices were also itemized for project cost analysis and control. As the change-out proceeded, each installation and each item was broken out on the invoices, which could then be compared to the prices that were included and itemized in the original bid. Because many of the existing hearths and some of the existing piping and chimney material could be re-used, the cost of each installation was, on average, substantially less than the bid price. This could have only been determined through a bidding and invoice process that itemized everything.

In anticipation of possibly installing more than the 40 stoves that were included in the original bid, the contractor purchased an additional 5 stoves and held them in inventory, for a total of 45 stoves. This was not done at the Tribe’s request, but was a proactive decision made by the contractor. Once the initial 40 stoves were installed and invoices were totaled based on “itemized” prices included in the bid, it was determined that with the money remaining in the contract, the contractor could provide two additional woodstoves and do the installation for all five remaining stoves. The Tribe only had to purchase the remaining 3 wood stoves. Funding for this was identified and secured from residual monies left over in the CAA 103 Grant aside from the \$ 100,000 awarded by the EPA specifically for Phase I of this project. In addition, the contractor could provide maintenance and repairs on some stoves that did not qualify for a change-out, but were not operating properly. Total cost was \$ 91,621, which was the contracted amount, plus \$ 4,050, which was the cost for 3 additional woodstoves as per the original bid price of \$ 1,350 each. This brought the total hard costs for the change-out to \$ 95, 675.

As a result, a total of 45 stoves were installed at a cost of \$ 2,104 per stove. With about \$ 1,000 left over, an additional 10 EPA certified woodstoves that did not qualify for a change-out were serviced at an average cost of about \$ 100 each in order to bring them back into compliance with the certification. This was all accomplished without one change order.

The Committee felt that because of the way the bidding was conducted, that maximum value in terms of the number of changeouts was achieved in Phase I of this project.

Although air quality testing for concentrations of indoor air pollutants was not a part of the project work plan or budget, we did try to introduce testing into the project using a FLUKE Particle Meter in each home in “before” and “after” environments. It was discovered however that the instrument’s calibration was questionable. Due to this and time constraints, this element was abandoned. However, we can extrapolate from data generated from the “Great American Woodstove Changeout Project” in Libby Montana, that average levels of PM_{2.5} within homes prior to the changeout were around 53 ug/m³ and after the change out were around 15 ug/m³, which is around a 70% reduction in indoor PM_{2.5}.

Lessons Learned and Recommendations

1. Form a Project Strategy Committee before applying for funding, not after application or receiving “anchor” grant award.
 - Made up of all organizational departments/ programs and who have a vested interest
 - Include members from the community you are serving.
 - Committee can change its mission and members to accommodate strategic planning, implementation, or advisory roles, depending on the need.
 - Can help with strategic funding plan, leveraging and grant writing.
 - Accommodates multi-lateral thinking and decision making. Strong point in small communities.

2. Form partnerships and teams and maximize your match
 - Define roles early on and share responsibilities
 - Project Management role can be shared effectively by two team members (Project Co-Managers). It worked for us!!!

3. Develop a pre-application strategy and approach.
 - Should contain all information needed for regular application,
 - On income and health/medical information (signed by doctor), make voluntary, but if does not provide, will go to a low priority status. Verifiable information is prioritized.
 - Can simply change status from pre-application to application once funding is awarded.
 - Can pre-inspect applicant homes and existing woodstove installations to determine eligibility. Is the existing appliance it EPA certified or not?
 - Can use this information and demographics to establish “need” in funding applications.

4. Outreach and education element.
 - In small communities , especially where telecommunications options are limited, go beyond small flyers and use large bold advertising and poster size signage and even large sidewalk folding signs.
 - Use colors in the advertising that will get attention, such as local school colors.
 - Generate “word of mouth” advertising.
 - Hold a woodstove change-out seminar and workshop before the change-out, and consider making it part of the agreement with the recipients that attendance is mandatory (logistically, a pre-application process would make this feasible and would facilitate this).
 - See under removal/recycling above for additional elements.

5. Create a short list of qualified contractors
 - Develop and advertise a “request for qualifications” from contractors.
 - Eliminates a general “advertisement for bid” environment for under-qualified or unqualified contractors.
 - Work with qualified contractors from the very beginning, while still forming funding strategy.
 - Contractors can help with cost estimates to assist in formulating budgets for funding applications.
 - Can help you determine early on which contractors will provide the highest level of service.

6. Create your own bid documents and itemized” bid forms.

- Allows transparent “apples to apples” bid environment. No “smoke and mirrors”.
- Exclusions are clearly spelled out so there are no misunderstandings
- Can’t hide money so won’t leave money “on the table”.
- In the end, this will help to maximize services and number of change-outs.

7. Selection of contractor.

- After bids are submitted and opened, require contractors to bring their woodstoves to the committee for presentation and demonstration before selecting contractor. Invite qualified applicants to attend.
- Can observe first hand how contractors work with committee and community members.
- Selections should be based not just on “low qualified” bidder, but on “comfort levels” of committee members and applicants, service level and product.

8. Removal/recycling and installation of new appliance.

- Disable old stoves immediately upon removal, especially if you must store outside before transporting. Can do by removing doors and storing in another location.
- Installer to show them how to operate the stove and also maintenance and cleaning.
- Make sure that you educate the recipients about “first burn” issues, and recommend that they stay out of the woodstove room or even vacate the home for the first day to avoid inhaling “off gases” produced.

9. Outreach and education element.

- In small communities , especially where telecommunications options are limited, go beyond small flyers and use large bold advertising and poster size signage and even large sidewalk folding signs.
- Use colors in the advertising that will get attention, such as local school colors.
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- See under removal/recycling above for additional elements.

10. Given opportunities and constraints presented by your specific circumstances, don’t be overly ambitious and set expectations too high.

Supplemental Budget Expenses: EPA CAA 103 Grant						
Makah Clean Air, Healthy Homes Project						
October 1, 2007-September 30, 2008						
Item	Quantity	Unit	Unit Cost	Makah	EPA	Total
Personnel ("in kind")						
Housing Repair and Energy Program Coordinator	390	hrs	13.00	5,070.00		5,070.00
0.19 full time equivalency				-		
Senior Citizen's Program Coordinator	153	hrs	17.00	2,601.00		2,601.00
0.07 full time equivalency				-		
NAU/ITEP Intern	200	hrs	12.00	2,400.00		2,400.00
0.10 full time equivalency (no fringe included)						-
						-
Fringe Benefits ("in kind")	33%	percent	7,671.00	2,531.43		2,531.43
						-
Other						-
Storage Unit						-
<i>Purchase</i>						
10' X 40' container (stove storage/staging)	1	lump sum			1,750.00	1,750.00
<i>Transportation and Delivery</i>						-
10' X 40' container (stove storage/staging)	1	lump sum			750.00	750.00
Fork Lift Repair						
Replace battery, repair ignition, misc. elect parts and tune up	1	lump sum			1,771.37	1,771.37
Supplies						-
Field						
prest logs, fork lift keys, padlock for container, misc.parts	1	lump sum			68.60	68.60
Advertisement for bid and education/outreach						
ad in paper and misc. presentation materials	1	lump sum			289.10	289.10
Additional three (3) wood stoves						
cost of appliances only as per bid price of \$ 1,350 each	1	lump sum			4,050	4,050
						-
Contractual						-
Wood Stove Change-Out Contractor					91,621.00	91,621.00
						-
Sub-Total				12,602.43	100,300.07	112,902.50
Indirect Costs					3,050.00	3,050.00
Indirect costs @ 35.14% of \$ 8,679.07						
Total				12,602.43	103,350.07	115,952.50

Appendix

See digital file.