

US EPA ARCHIVE DOCUMENT

**Draft #4: Final Project Agreement**

**Georgia - Pacific Corporation  
Big Island, Virginia  
Project XL  
Final Project Agreement**

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## I. Introduction to the Agreement

### A. Project Summary

Georgia-Pacific Corporation ("G-P") owns and operates a non-sulfur, non-bleaching, semi-chemical pulp and paper mill in Big Island, Virginia ("Mill"). The Mill produces corrugated medium and liner board (the inside and outside components of cardboard) from hardwood pulp and secondary recycled fiber. The Mill is subject to the Pulp and Paper Mill Cluster Rule (a hazardous air pollution standard promulgated under the federal Clean Air Act), which is based on installation of Maximum Achievable Control Technology (MACT) on regulated emission sources. A second, so called MACT standard applicable to pulp and paper mills (MACT II) was proposed on April 15, 1998 to specifically address emissions from combustion sources associated with the recovery of pulping chemicals. At the mill pulping liquor is added to hardwood chips, and the mixture is passed through digesters to produce the pulp. Then the mill takes the spent pulping or black liquor, reduces it through evaporation, and flame combusts the resultant concentrated liquor in two "smelters," also called "recovery furnaces." The smelters recover the sodium carbonate in a molten smelt which is then dissolved in water to produce new pulping liquor.

Due to the age and physical condition of the existing smelters at the mill, to comply with MACT II Georgia-Pacific would have to substantially upgrade or rebuild these units and add additional emission control devices. Or they would need to replace the smelters with new recovery boilers which use conventional technology. Georgia-Pacific has investigated a third alternative for recovering pulping chemicals at its facility, using an innovative black liquor gasification system. Under this alternative, the concentrated black liquor would be pyrolyzed (breakdown of organic compounds) to liberate a combustible gas (primarily hydrogen), which in turn is burned as an energy source to drive the pyrolysis and to produce steam. Meanwhile, sodium carbonate pellets are recovered during this process for reuse in fresh pulping liquor.

G-P's proposed installation of a black liquor gasification system would be the first commercial application of this innovative gasification technology in the country. Deployment of the proposed gasification technology promises reduced consumption of fossil fuel, increased efficiency in energy conversion and chemical recovery, elimination of the smelt-water explosion hazard (inherent to the operation of recovery furnaces), reduced maintenance costs, and significantly lower environmental emissions of particulate, SO<sub>2</sub>, NO<sub>x</sub>, VOC, and greenhouse gases. If G-P experiences no problems in construction and testing of the gasification technology, G-P expects that its gasifier could be operational in time to meet the MACT II standards when they become effective. However, G-P is pursuing an XL Project for its Mill for the following reasons:

- 1) to be able to operate the existing smelters past the MACT II compliance date, if necessary, while the gasifier technology is brought on line,
- 2) to assure that if the gasifier technology fails, G-P would be allowed to operate its existing smelters, as necessary, past the MACT II compliance date while it constructs a conventional recovery furnace, and
- 3) to allow the steam generated by the new process to be utilized in another process at the mill.

**This project does not include modifications to production areas of the mill. This project is not intended to increase pulp or paper production. The capacity of the new units will be similar in capacity to the existing smelters.**

## **B. Purpose of the XL Program**

The U.S. Environmental Protection Agency (EPA), with the cooperation of State and local authorities, has initiated Project XL to work with interested companies or other potential Project Sponsors to develop innovative approaches to environmental protection. Project XL encourages potential sponsors to come forward with new approaches that can advance our nation's environmental goals more effectively and efficiently than current regulatory and policy tools or procedures. Project XL provides an opportunity for outside parties, including local community and environmental groups, to be involved in the project. This "Stakeholder" process allows all interested individuals or groups to have input, voice concerns, and help shape the final project. This process is described further in section III.C.

## **C. Purpose of this Final Project Agreement**

This Final Project Agreement, (" the Agreement") is a joint statement of the plans, intentions, and commitments of the U.S. Environmental Protection Agency ("EPA"), Virginia Department of Environmental Quality (VADEQ), Georgia-Pacific Corporation (G-P), and other Stakeholders, to carry out this demonstration Project approved for implementation at Georgia-Pacific Corporation's Big Island, VA Facility. This Project will be part of EPA's Project XL program to which promotes innovative approaches to environmental protection. This agreement does not create legal rights or obligations and is not an enforceable contract or a regulatory action such as a permit or a rule. The previous statement applies to both the substantive and the procedural provisions of this agreement. While the parties to the Agreement fully intend to follow these procedures, they are not legally obligated to do so under this agreement. Federal and State flexibility and enforceable commitments described in this Agreement will be implemented and become effective through a legal implementing mechanism such as a rule or permit. All parties to this Agreement will strive for a high level of cooperation, communication, and coordination to assure successful, effective, and efficient implementation of the Agreement and the Project.

## **D. List of the Parties that Will Sign the Agreement**

The Parties to this Final Project XL Agreement are the United States Environmental Protection Agency (EPA), Virginia Department of Environmental Quality, [National Forest Service], and Georgia-Pacific Corporation.

## **E. List of the Project Contacts**

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## **II. Detailed Description of the Project**

### **A. Description of the Facility**

The Georgia-Pacific Corporation owns and operates a non-sulfur, non-bleaching pulp and paper mill at Big Island, Virginia. The facility produces two products: corrugating medium, which is used by box plants to make the fluted inner layer of corrugated boxes and linerboard, which is used for the inside and outside layers of the boxes. Medium is made from semi-chemical (sodium carbonate/sodium hydroxide) hardwood pulp and secondary (recycled) fiber, and linerboard from fiber recycled from old corrugated containers, clippings and rejects from corrugated container manufacturing plants, and some mixed office waste paper. The production capacity of the semi-chemical pulp mill is about 860 tons per day and supplies only the medium machines. The Secondary Fiber (OCC) mill produces an average of 950 tons per day and supplies 100% of the furnish for the linerboard mill and about 20% of the furnish for the medium mill. The paper mills produce an average 870 tons per day of corrugating medium and 730 tons per day of linerboard. Corrugating medium is used to form the inner flute and linerboard to form the two flat outer surfaces of the board used to manufacture containers or cardboard boxes.

The mill is located in Bedford County, adjacent to the James River, which is the dividing line between Bedford and Amherst Counties. Big Island is approximately 20 miles northwest of Lynchburg, Virginia. The main operating area of the mill is located along, and just east of, U. S. Highway 501 in Bedford County. About 2 miles north of the mill, U.S. Highway 501 intersects with the Blue Ridge Parkway, which runs in a southwest to northeast direction. The James River borders the main operating area of the mill on the east. The mill owns additional land, and operates a landfill,



east of the river, in Amherst County, Virginia.

A principle environmental concern for this area is air quality due to the close proximity of a Federal Class I Wilderness area. The George Washington National Forest is located to the north and east of the James River; to the west is the Jefferson National Forest. The James River Face National Wilderness Area is about 3 miles to the northwest of the mill. The Forest Service is the designated Federal Land Manager for assuring that the air quality criteria for this designated Class I wilderness area are maintained.

To the west of the Mill lies the un-incorporated village of Big Island. The population of the village is approximately 400 and about 2,100 within a five-mile radius. Within a twenty-mile radius, which includes the city of Lynchburg, there is a population of approximately 111,500.

## **B. Description of the Project**

In order to meet the performance standard in the proposed MACT II regulations, Georgia-Pacific plans to install a PulseEnhanced™ Steam Reforming chemical recovery system in place of the existing smelter type recovery furnaces. The parties believe implementation of this system will allow the Big Island facility to reduce emissions well below the proposed MACT II emission standards, and will significantly lower emissions of other criteria pollutants compared to installation of conventional technology. Georgia-Pacific is seeking limited regulatory flexibility under federal and state air regulations to accommodate bringing this new technology on line. Additionally, Georgia-Pacific seeks the ability to utilize the steam generated from this unit in place of steam currently being generated from the high-cost natural gas fired boiler. This requested flexibility is detailed in Section IV.

The mill currently takes the spent liquor from the wood pulping operations, reduces its water content by evaporation by using a conventional multiple effect evaporation train, and combusts the resultant concentrated (about 60% solids) liquor in two smelters. Molten smelt is discharged from the smelters and dissolved in water to recover the sodium carbonate. This solution is used to make up the cooking liquor added to the hardwood chips going to the digesters (cooking vessels) to produce the pulp. To meet the standard proposed in the MACT II regulation the current smelters will require a substantial upgrade. The age and physical condition of the smelters themselves require they be rebuilt with additional emission control devices or replaced with a conventional technology recovery boiler. Georgia-Pacific has investigated, as a third alternative for chemical recovery, a liquor gasification system.

The parties believe that gasification of black liquor represents a new and better approach for the chemical recovery process and eliminates many of the deficiencies of the conventional recovery furnace and fluid bed combustion technologies. Gasification benefits to the paper industry generally are expected to include: increased efficiency in energy conversion and chemical recovery, elimination of the smelt-water explosion hazard, reduced maintenance costs, and significantly lower environmental emissions. The expected emissions to be reduced include: particulates (PM, PM<sub>10</sub>), Sulfur Dioxide (SO<sub>2</sub>), Total Reduced Sulfur (TRS), Nitrogen Oxides (NO<sub>x</sub>), Volatile Organic Carbon

(VOC), Carbon Monoxide (CO) and greenhouse gases, specifically Carbon Dioxide (CO<sub>2</sub>). These benefits are particularly attractive to pulp mills such as Georgia-Pacific's Big Island that use a semi-chemical non-sulfur processes that require auxiliary fossil fuel to sustain combustion of the black liquor. Actual benefits to the Big Island facility include significant reductions in SO<sub>2</sub>, NO<sub>x</sub>, VOC, CO, and particulates.

Georgia-Pacific has evaluated and plans to install the PulseEnhanced™ Steam Reforming chemical recovery system, developed by StoneChem, Inc. This technology converts the organics in the spent pulping liquor to a hydrogen-rich gas fuel, without combustion, leaving the chemicals (sodium carbonate) for reuse. The gas fuel can then be used as a low emission energy source for heating in the gasification unit and as an alternative boiler fuel, replacing non-renewable natural gas.

### C. Specific Project Elements

Please see section V.D. and the Appendix for an expanded schedule and milestone descriptions.

#### 1. Project Element 1: Final Project Agreement and DOE Partial Project Funding.

In order for Georgia-Pacific Corporation to move forward with this project, two items must be secured. Acceptance of the Final project agreement with all requested flexibility, and an executed contract with the Department of Energy for partial funding of the project. The cost of implementing this project as the first commercial scale, black liquor gasification unit, far exceeds the cost of putting in place conventional technology. As such, the DOE funding is crucial to the final decision to proceed. The involvement of the Department of Energy will have a direct bearing on construction and start-up schedule.

Just as crucial to implementation of the project is attaining the regulatory and steam use flexibility through implementation of the Final Project Agreement. As this is new technology, Georgia-Pacific may need additional time for start-up or in the worst case scenario, will require an extended time period for replacement of a failed gasifier with conventional technology. Additionally, the ability to utilize the steam from this unit in replacement of our highest cost steam (natural gas-fired), would lower our operational costs.

#### 2. Project Element 2: Regulatory Action

A Virginia State Air permit will be required for the construction and operation of the new facility. Georgia-Pacific will be working with the State and other agencies to develop this permit at the same time as the FPA is being drafted and reviewed. Additionally, Georgia-Pacific is requesting the flexibility to use steam generated from the new unit to replace steam generated by the natural gas boiler. This will require an amendment to an existing operating permit.

In conjunction with the FPA, a site-specific rule will be required on the federal level to allow the time flexibility requested in this document. A site-specific rule may also be required from the state, depending upon how the federal rule is written.

3. Project Element 3: Construction

The construction phase of the project will begin after the culmination of the above-mentioned agreements. Purchase of equipment cannot begin until DOE funding has been approved, and the cooperative agreement with the DOE has been executed.

4. Project Element 4: Commissioning

Due to the innovative nature of the technology and the fact that the equipment has never been operated on a commercial scale, time is allowed in this schedule to adjust parts of the process or equipment to make them work. During this time, operators, engineers and maintenance personnel learn to operate the equipment more efficiently. Adjustments are evaluated to determine progress and required additional changes. During the commissioning period each part of the chemical recovery system is checked to make sure it is complete, and is installed properly. Each part is then operated on its own to make sure it works. After individual parts are checked, the entire system is operated. Commissioning will culminate with the successful completion of the gasifier technology supplier's performance warranty demonstration. This demonstration is a series of trials to prove the technology and equipment are capable of performing to the contractual levels. This is required before release of final payment to the supplier.

5. Project Element 5: Start-up

For this innovative XL project, Start-up will occur at the end of the commissioning phase or three years following the execution of the Department of Energy Cooperative Funding Agreement for this project, whichever is earlier. This Start-up date will trigger the 180-day period for doing performance testing for the State construction permit and proving compliance with the MACT II standards. No later than 180 days after Start-up, or three years before March 2007, G-P will determine whether the project is successful or must be replaced with alternative technology. If the project is deemed a failure, a three-year project to install conventional recovery boiler technology will be started at this time.

6. Project Element 6: Kraft Liquor Trials

As a condition of receiving DOE funding, there also will be a trial on Kraft black liquor. This trial will be detailed at a later date; however, it is anticipated that the trial will take place after start-up and not last more than three weeks (500 operating hours). During the trial, the mill will process the Kraft liquor through one of the reformer vessels, while the other vessel remains out of service. The Kraft liquor feed to the reformer will be limited to allow the gas clean-up equipment to maintain adequate performance. Georgia-Pacific will maintain the emissions from the stack at or below the total levels stated in the construction permit for the reformer. This will

be accomplished by a combination of limiting the Kraft liquor processed as well as temporary modifications to the equipment or process. During the trial phase, it will be necessary to maintain separation of the process chemicals of the trial liquor and the mill liquor. To do that, the smelters will need to be operated during this time period to process the mill's black liquor. That means, the mill will be processing more liquor during this time period than is normal and the emissions will increase as well. The excess green liquor produced, as well as any sulfur containing green liquor from the H<sub>2</sub>S Absorber, will be returned to the facility that supplies the Kraft liquor. Flexibility required for this project element is described in section IV.A.

7. Project Element 7: Air Emissions Performance Testing

a. Background

The permit to construct and operate the new chemical recovery system at Big Island will include emission limits. The permit will set initial limits based on the estimated higher emission rate for each pollutant from either the conventional recovery boiler technology or from the steam reforming technology. The limits will satisfy the existing State and Federal requirements, as well as, the proposed requirements of MACT II.

b. Initial Performance Test(s) of emissions

Regardless of the technology option chosen, the construction permit will include pollutant specific emissions testing in order to verify the initial performance of the chemical recovery system. The scope of these tests will be determined from federal and state requirements. The federal requirements are from the proposed MACT II as published in the Federal Register on April 15, 1998 and specify testing for Total Hydrocarbons reported as carbon, using method 25A. The state requirements will be a function of DEQ's assessments of the reliability of data on which the initial permit limits are based. This reliability in turn is a function of the maturity of technology and department's familiarity with it. The initial tests will have to be performed not later than 180 days after the startup of the chemical recovery system, with start-up defined in Project Element 4 on page 10. The measurement location for these tests will be the exhaust stack. During the test, the process operation will be at rated capacity (i.e., target at least 80% of rated capacity). Process parameters will be measured during testing. It needs to be noted that this is a "one time" test to insure that the permitted emission unit is operating in compliance with the permit limits upon startup.

c. Emission-limit-reducing Performance Tests

**If the steam reformer technology option is constructed, it is expected that the actual emissions of most if not all, pollutants will be substantially lower than the emissions limits set by the initial permit that is based on the expected emissions for conventional recovery boiler technology. Therefore, in addition to the performance testing described above, the construction permit will describe a mechanism to reduce the permit emissions to a level representative of the actual emissions from the steam reformer. The emission-limit-reducing performance tests will be a series of tests to account for variations in system performance caused by factors such as the seasonal variations in raw materials, process degradation, and the learning curve of the operators. This series of tests will commence after the steam reformer system operation has been stabilized, tuned, and normalized, but not**

later than 1 year after system startup. It is anticipated that these tests, upon which revised permit levels of emissions will be established, will be completed within two years after startup. However, based on permitting experience of the VADEQ, these tests may take up to four years from start-up of the unit to completion of the performance testing due to unanticipated systems degradation. The stakeholder group recognizes the inherent difficulty in achieving optimal performance with an untried technology and believes that allowing Georgia-Pacific time to come to true operation standards will enable environmental regulatory authorities to set emissions limits in the most accurate fashion possible. Any requests for deviation from this time frame will be considered by DEQ. These tests will be specific for the criteria pollutants and HAPs as defined in the construction permit.

The results of this series of tests will be applied to reduce the allowable emission limits in the construction permit. The data from the tests will be analyzed and a safety factor will be applied. The construction permit emission-limit-reducing mechanism will not allow for increases in allowable emission rates. Any requests for such increases will be subject to the appropriate state permitting review. The permitted emissions limits will be reduced by an amendment to the construction permit.

- iv d. Air Emission Testing not covered by Virginia Permitting

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HAP characterization will be performed once during normal operation of the gasifier on mill liquor and once during the Kraft trial, using test methods acceptable to the EPA. Currently, Georgia-Pacific anticipates using the FTIR methodology. As the time approaches for the testing to occur, Georgia-Pacific and appropriate EPA representatives will reevaluate current technology and select the method best suited for the desired information. The selection will be based on method applicability, reliability, and economics.

- e. Compliance Monitoring:

Once the new emissions limits have been determined, and the construction permit modified, some type of compliance monitoring program will be established for the Gasification/Package Boiler system. MACT II regulations will address compliance monitoring requirements for known technology for those emissions regulated by the MACT (i.e. TGOHAPS). The actual emission source, the package boiler, may be subject to New Source Performance Standards (NSPS) and be regulated by 40 CFR Part 60. However, it may be that this new technology requires different or innovative methods for insuring compliance. The VADEQ has responsibility to insure that the new emission source is adequately monitored to maintain compliance. All compliance monitoring requirements will be incorporated into the mill's Title V permit.

8. Project Element 8: Time Flexibility

Should the commissioning phase (Project Element 4) extend past the MACT II compliance date, the mill will require regulatory flexibility in order to operate the smelters. The smelters must operate in order to keep the mill running.

#### 9. Project Element 9: Failure Contingency

Should the gasification technology fail, Georgia-Pacific Corporation will elect to install alternate technology (Recovery Boiler) in its place. The smelters will need to be operated during the recovery boiler construction period to maintain mill operation. Assuming MACT II has been made final, the smelters will be operating after the MACT II compliance deadline. It is anticipated that this will take three years from the time we decide to install conventional technology.

Georgia-Pacific Corporation will decide the success or failure of this project. The consensus of the XL Stakeholders is that the definition of and the decision to declare failure rests with Georgia-Pacific. MACT II is a performance-based regulation and it is not in the Federal or State regulatory domain to specifically identify how or what technology should be used to meet the emissions standards established in the rule. Nor can the stakeholders be expected to determine whether there has been sufficient G-P effort, manpower and assorted resources invested in a gasification project that simply fails to move toward successful installation, completion or operation.

In assessing the success/failure of the project G-P will consider the project's ability:

- (1) to achieve and maintain continuous compliance with environmental requirements,
- (2) to operate in a fashion that does not present unreasonable risks to human life, health, or property,
- (3) to support the mill's requirements for the recovery of process chemicals, and
- (4) to operate economically when considering relative energy, operating and maintenance costs.

No later than 6 months after Start-up, G-P will determine whether the project is successful or must be replaced with alternative technology. If the project is deemed a failure, a three-year project to install conventional recovery boiler technology will be started at this time.

### **III. How the Project Will Meet the XL Acceptance Criteria**

#### **A. Superior Environmental Performance**

##### 1. Environmental Performance without Project XL

Without Project XL conventional recovery technology would be installed with control equipment designed to operate with emissions at or below the MACT II limits as established by the construction permit. (see table below)

2. Environmental Performance if Project XL Is Implemented

Based on the limited data available from the gasifier pilot trials to date, emissions were estimated and compared to those estimated from a conventional recovery boiler with current Best Available Control Technology (BACT) type controls. A comparison of predicted emissions from the current technology (smelters), steam reformer (gasifier) technology, and a conventional recovery boiler are listed below:

**Table 1**

	Smelters		Recovery Boiler (w/o XL)		Gasifier System (with XL)	
	(tons/yr)	lbs/ton BLS*	(tons/yr)	lbs/ton BLS*	(tons/yr)	lbs/ton BLS*
<b>NOx</b>	168	4.90	90.4	2.48	19.3	0.53
<b>SO<sub>2</sub></b>	13	0.39	10.3	0.28	1.1	0.03
<b>CO</b>	7,592	221	146.1	4.00	11.7	0.32
<b>CO<sub>2</sub></b>	103,450	3,031.34	117,800	3,227.40	96,662	2,648.27
<b>VOC</b>	1,646	47.9	7.5	0.21	0.88	0.02
<b>Particulate</b>	440	12.8	14.8	0.41	1.88	0.05

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\* BLS – Black Liquor Solids. Table assumes 800 tons per day of pulp production, or 400,000 lbs per day of BLS

The emissions calculations are based on operating the pulp mill at 800 tons per day annual average. In 1999, the pulp mill ran at approximately 90% of this number. The gasifier emissions are best available predictions but not vendor guaranteed emissions. Since this will be the first, full-scale unit, it is not possible to predict precisely the level of emissions that will ultimately be achieved. The units used in this table are tons per year, which show the total annual emissions for each pollutant, and pounds per ton of black liquor solids (BLS) which describes the amount of pollutant emitted for each ton of black liquor that is consumed.

The column labeled “Smelters” shows calendar year 1999 emissions using existing technology factored up to 800 tons per day from the pulp mill. The column labeled “Recovery Boiler”, is the estimated maximum emissions if this Project XL is not approved or if the technology fails. The column labeled “Gasifier System” shows the estimated maximum

emissions using the new gasification technology. The emission of regulated hazardous air pollutants (HAP), which would be included in the more general term Volatile Organic Compounds (VOC), are the reason the existing smelters fall under the proposed MACT II regulations. The recovery boiler emissions for VOC's are expected to allow Georgia-Pacific to meet the new emission limitations in the proposed regulations. However, as is evident from the table, the gasification technology will further reduce all emissions, including the VOC's which include the regulated HAP compounds. The parties believe the available data demonstrates that the gasifier technology is more desirable than the conventional recovery boiler. It is anticipated that additional data on HAP emissions, collected after the gasifier is operational, will confirm the belief that the low VOC data correlates with low HAP emissions.

In addition to emissions specifically from the project, the effect on total mill emissions is another way of evaluating the benefit of the gasification project. This next table represents total emissions from the mill currently, and what they would be if the gasification project is successful. The first row shows actual data from 1999. The second row shows the total emissions if we offset steam from the natural gas boiler with steam from the gasifier. The ability to offset this more costly steam is one of the necessary flexibility items to make this project economically feasible. The final row shows what the emissions would be if the gasifier steam was used to offset steam from the coal and wood waste boilers.

**Table 2  
Annual Tons of Emissions**

	<b>Total Mill 1999</b>	<b>Total Mill w/Natural Gas Offset</b>	<b>Total Mill w/Coal &amp; Refuse Offset</b>
<b>PM</b>	432	41	39
<b>NOx</b>	898	759	639
<b>SO2</b>	1204	1192	1024
<b>CO</b>	7383	409	383
<b>VOC</b>	1954	359	352

While plant-wide emissions would be lower if Georgia-Pacific were to offset steam from the coal and wood waste boilers, this would result in a potential loss of \$700,000 per year in fuel savings. As stated previously, this annual cost savings is imperative to the project being economically viable for Georgia-Pacific. Without these savings the gasification project would be abandoned and a conventional recovery boiler would be constructed. This would mean that construction would follow a schedule dictated by the yet to be promulgated MACT II. However, the Gasification project would be constructed as soon as the State permit and DOE funding allow. Please see Section III.H for further discussion of the risks involved in project failure and not doing the project.

Additionally, there is potential environmental benefit in using the residue from the green liquor filtration system as an agricultural soil amendment. Initial analyses indicate a high calcium carbonate content. Once the system is operational, samples will be collected and analyzed to determine its potential use. This could divert an estimated 20 cubic yards per day from the landfill.



## **B. Anticipated Benefits, such as Cost Savings, Paperwork Reduction, and Operational Flexibility**

The installation of the first commercial steam reformer poses considerable financial risk and will not generate any significant cost savings compared to installation of a conventional recovery boiler. The “order of magnitude” estimates of investment capital for a steam reformer versus recovery boiler are \$36 million versus \$25 million. The comparison on estimated annual operating costs are \$2.1 million versus \$2.5 million. This \$400,000+ annual savings is a significant factor in choosing this technology over a recovery boiler. As part of its evaluation of proceeding with the steam reformer Georgia-Pacific has been discussing with the Department of Energy their willingness to provide some cost sharing to mitigate the risk of constructing a full scale demonstration unit. While they have expressed considerable support and willingness to participate, funding for a project can only be guaranteed for one year at a time. Additionally, the percentage of DOE participation is uncertain and their involvement might also require engaging in a competitive, “open solicitation” process for funds. Georgia-Pacific intends to continue its solicitation of DOE funds for this project and will request 50% funding. This percentage of funding is crucial to the final decision to move forward with this project. Commercial demonstration of the technology could result in future installations producing more substantial economic benefits through improved capital effectiveness. History has shown that first time installations incur much higher costs than subsequent installations. This demonstration should allow future installations to occur at lower capital costs.

Besides the environmental and energy benefits described above and in the section on innovation, the steam reformer would have a safety benefit over a recovery boiler. In the steam reformer the concentrated liquor is pyrolyzed by heat applied indirectly through the heater units liberating the gas, which is burned as part of the energy source for the heaters. The sodium carbonate pellets are drawn from the fluidized bed into a conventional dissolving tank. Other gasification and recovery technologies utilize flame combustion within a reactor vessel or an intermediate smelt phase. The steam reformer thus eliminates the potential for smelt water explosions, which are a major safety concern in the operation of recovery boilers.

## **C. Stakeholder Involvement and Support**

The XL process has included developing an ongoing dialogue with a mix of stakeholders from the local community, as well as interested state and federal organizations, such as the US Forest Service, National Park Service and the Department of Energy in addition to the Virginia DEQ and EPA. (see Appendix 3 for the complete list) G-P plans to maintain regular communication with all the current stakeholders as well as others that may express interest throughout the life of the project.

Prior to beginning the FPA development process, meetings were held with VaDEQ, Southern Environmental Law Center, the Sierra Club (VA Chapter), as well as several meetings in Bedford and Lynchburg, and a regularly scheduled community meeting. Information about the project was distributed to local newspapers, radio and TV stations.

Once the FPA negotiation process began, a series of nine stakeholder meetings were held. The first two meetings included tours of the Big Island facility and detailed briefing and discussions of the mill’s operations, manufacturing process, the proposed gasifier process and the anticipated air quality improvements associated with the proposed new equipment.

A collection of project documents has been established in the two local county libraries. These collections contain records of all stakeholder meetings, identification of the stakeholders, relevant materials and minutes. A mailing list, including all stakeholders, participants in the FPA development process and any members of the general public who have expressed interest in the project have received copies of all minutes and other materials from the meetings, including drafts of the FPA. EPA also is maintaining project documents on the Project XL web-site that is located at [www.epa.gov/Project XL](http://www.epa.gov/ProjectXL).

The stakeholder participants agreed to act as an advisory group and further agreed on a consensus method of decision-making. In the event of lack of consensus the group decided that a simple majority of the stakeholders would make a determination. The FPA will be signed by G-P, EPA and the VADEQ, will not be signatures to the document, but are encouraged to write separate letters of support of the FPA or to file letters of objection in the event they did not agree with the consensus.

#### **Future Stakeholder Involvement**

When US EPA provides a 30-day public period after negotiation of the FPA, stakeholders will have opportunity again to review and comment on the proposal and will be briefed by EPA on the Agency's response to the comments received from the public at large.

#### **After FPA Signed**

Further, as construction starts the stakeholders will be kept informed of progress through the quarterly newsletter mailed to the community and stakeholders and DOE update reports and EPA XL Project summaries placed in the project repositories in the local libraries and mailed to direct stakeholders. In addition, the annual Mill meeting held during the third week of February each year, will discuss the XL Project along with other topics of interest to the community. A second meeting also will be scheduled each year for the interested stakeholders that will focus in greater detail on the status of the project. All these reports and regular meetings will track progress and verify such progress with data summaries. See schedule for specific dates and details of future stakeholder updates and meetings.

### **D. Innovative Approach and Multi-Media Pollution Prevention in the Project**

Since about the mid 70s the pulp and paper industry around the world has been searching for ways to make its energy conversion systems more efficient and less capital intensive, while improving safety and environmental standards. One of the technologies that has been evaluated is gasification. Gasification can be defined as the conversion of low cost organic solids or liquids into clean burning gases for replacement of expensive fossil fuels. The pilot studies and conditions within the industry are converging to create a window of opportunity to commercialize this technology. Three situations creating this window are:

- 1) The scientific community and suppliers have brought the technologies to the point where a first large-scale demonstration is the next step;
- 2) The capital replacement cycle and pending MACT II requirements will result in the industry focusing on significant rebuilds or replacements of its powerhouse infrastructure;

- 3) The current world emphasis on global climate change may provide significant additional incentive to utilize this technology because of the reduced fossil fuel usage and subsequent reduction in greenhouse emissions.

Specifically for Big Island, the predicted total thermal efficiency of the steam reformer technology is slightly improved compared to that for conventional recovery boilers. The steam reformer does not require auxiliary fossil fuel to maintain a stable, liquor combustion, as is the case for a conventional recovery boiler. Reducing the mill's consumption of fossil fuels while maintaining the same level of production is a clear demonstration of pollution prevention and innovation.

## **E. Transferability of the Approach to Other Entities or Sectors**

Successful completion of this project will demonstrate this technology to be capable of providing the full chemical recovery capacity for a semi-chemical mill. The parties expect the project will demonstrate the reliability and operational flexibility of the technology and all of the associated equipment. Additionally, trials using other types of black liquor will run using this unit. Once the technology is demonstrated, the industry can apply this at other facilities to obtain better energy conversion, improved safety, and environmental performance. The Big Island semi-chemical mill is similar in characteristics to 12 other mills in the U. S. producing virgin medium for containers. Success and demonstration of this technology at Big Island would also contribute significantly to its implementation in a much larger number of Kraft mills. This technology also has applications for the conversion of non-wood liquors, sludges, and agricultural wastes to energy.

Additionally, the energy efficiency of this technology, once demonstrated, will produce steam as a byproduct of the chemical recovery process, which can offset steam generated with fossil fuel. In addition to producing steam, gasification technology has the added benefit of being able to generate onsite electricity as well, thereby offsetting the mill's demand for electricity purchased from the utility grid. By configuring the steam reformer to move steam through a combined cycle turbine, energy released in the chemical recovery process may be harnessed to generate clean electricity. The subsequent reduction in fossil fuel use will dramatically decrease production of greenhouse gases. Compared to average utility grid emissions, generating electricity from a gasification unit will result in lower emissions of conventional air pollutants. Displacing old, coal based utility boilers with a biomass based fuel, in this instance black liquor, will significantly lower emissions of CO<sub>2</sub>, a pervasive greenhouse gas (GHG) contributing to global climate change. When this technology can be successfully demonstrated with combined cycle technology and utilization of available biomass, current studies show that the energy savings could result in the Pulp and Paper Industry being a net exporter of electrical power instead of the industry importing 6 gigawatts. The studies also indicate that as an industry, successful development of gasification technology would result in the potential to decrease greenhouse gas emissions by 18 million metric tons per year. [source: The Forest Products Industry Gasification Combined Cycle Initiative, American Forest & Paper Association (AF&PA) Agenda 2020, July 1998 [www.agenda2020.org](http://www.agenda2020.org) ]

## **F. Feasibility of the Project**

The PulseEnhanced™ Steam-Reforming Gasification technology, developed with research funding from the U.S. Department of Energy, is currently at the point in its development to be instituted in a full-scale operation. Pilot scale studies have proven its capabilities and superior attributes over current

recovery technology. The following is a list of the Steam-Reforming Gasification pilot studies performed by the technology developers:

- Pilot plant in Zaragoza, Spain, processing 240 kg/day silica-laden straw pulping liquor.
- Pilot testing of silica-laden rice straw spent liquor from RAKTA mill in Alexandria, Egypt.
- 25-ton per day demonstration plant for spent liquor from bagasse and straw pulp, Erode, India, sponsored by the U.S. Agency for International Development.
- 50-ton per day demonstration at the Weyerhaeuser Company Kraft pulp mill in North Carolina.
- 12-ton per day test of sludge containing short fiber rejects and plastics at the Inland Container plant in California.

Additionally, the technology developer has a test facility in Baltimore, Maryland, where over 5,000 hours of testing have been conducted. Part of those hours consisted of two pilot trials on Georgia-Pacific Big Island spent pulping liquor.

The first pilot test for Georgia-Pacific occurred in January of 1998 and consisted of 86 continuous hours of operation on the 20-lb/day unit. The 86 hours included 73 hours of pre-conditioning for the unit and fluidized bed and 13 hours of actual test period to generate the required performance data. Results of this initial test conclusively demonstrated the feasibility of this technology for the Big Island liquor. The test achieved a 91.6% carbon conversion rate, generating a product gas with a higher heating value (HHV) of 254 Btu per dscf. The product gas yield was 7,564 Btu per pound of Black Liquor Solids (BLS).

The second pilot test, conducted in January of 1999, consisted of a total of four weeks of steam-reforming tests. Two tests were conducted over this time, including a low bed temperature (~1080 degrees F) and a higher temperature (~ 1124 degrees F). The tests processed a total of 5,094 pounds of BLS. The pilot plant operated well over the four-week period, with steady temperature profiles and no evidence of agglomeration, de-fluidization, channeling or heater fouling. The tests achieved carbon conversion rates of 81.3% and 99% for the low temperature and higher temperature runs, respectively. Product gas heating value ranged from 279 to 253 Btu per dscf and product gas yields were 5,081 Btu per pound BLS at the low temperature and 7,191 at the high temperature. Results of this trial confirm the results of the 1998 trial and the additional information will aid the engineers in finalizing the design for the full-scale plant proposed for the Big Island facility.

From a financial perspective, Georgia-Pacific is currently poised to make the necessary investments to proceed with implementation of steam-reforming technology at the Big Island facility, provided that no technology issues arise, we are successful in negotiating the FPA and State air permits and the DOE provides the anticipated funding. Georgia-Pacific realizes that annual DOE funding is not guaranteed, and is prepared to accept the remaining financial burden, should DOE funds not be available in subsequent years.

## **G. Monitoring, Reporting, Accountability, and Evaluation Methods**

Evaluation and monitoring of the gasifier units will be a major effort as the equipment is brought on-line. Information concerning performance testing and compliance emission monitoring can be found in section II.B.7 (page 10) of this agreement. Other reports, regarding steam-reforming

technology related to this project, that are produced for the Department of Energy will also be made available to the stakeholder group and the public.

A topic of concern that is not an “emission compliance” issue, is the potential reduction in greenhouse gasses. Greenhouse gasses have been implicated in causing global warming. The compounds most commonly associated with greenhouse gasses are: carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous oxide (N<sub>2</sub>O), Sulfur hexafluoride (SF<sub>6</sub>), perfluorocarbons, and hydrofluorocarbons. Of these, carbon dioxide is the gas most likely to be affected by the gasification process. Although the application of gasification technology at the Big Island mill is not expected to have a dramatic effect on greenhouse gas emissions, some moderate reductions are anticipated. More importantly, the application of this technology to the industry as a whole, including the gasification of all bio-mass and implementation of combined cycle technology, is expected to yield very large reductions in greenhouse gasses. This is discussed in more detail in Section III.E.

The reductions in carbon dioxide we anticipate from this project at Big Island will be a result of not burning auxiliary fuel to sustain black liquor combustion and because the project offsets approximately 50,000 lbs per hour of steam currently generated by another boiler. In order to document the future reduction of CO<sub>2</sub> and the increase efficiency of energy conversion, Georgia-Pacific must establish a baseline for current emissions and reporting mechanism for future emissions. An estimation of the reduced CO<sub>2</sub> emissions from not burning auxiliary fuel will be documented. CO<sub>2</sub> data will be collected during normal operation of the Gasifier. This can then be compared to baseline CO<sub>2</sub> data from the smelters. Increases in thermal efficiency can be ascertained by measuring the increase in steam output per unit fuel input in the chemical recovery process.

Compliance Monitoring: Once the new emissions limits have been determined, and the construction permit modified, some type of compliance monitoring program will be established for the Gasification/Package Boiler system. MACT II regulations will address compliance monitoring requirements for known technology for those emissions regulated by the MACT (i.e. TGOHAPS). The actual emission source, the package boiler, may be subject to New Source Performance Standards (NSPS) and be regulated by 40 CFR Part 60. However, it may be that this new technology requires different or innovative methods for insuring compliance. The VADEQ has responsibility to insure that the new emission source is adequately monitored to maintain compliance. All compliance monitoring requirements will be incorporated into the mill’s Title V permit.

## **H. Avoidance of Shifting the Risk Burden to Other Areas or Media**

The emission reductions anticipated from this innovative process are believed to be true pollution reductions and not merely moving it to another media. As indicated in the comparative emissions data above, the greatest reductions are in NO<sub>x</sub>, SO<sub>2</sub>, VOCs, and Particulates. The reduced NO<sub>x</sub> is a function of NO<sub>x</sub> control technology in the Gas Boiler. VOCs are converted to energy and the particulates are captured and added to the bed solids as additional sodium carbonate. Some of the sulfur compounds could be purged to the mill wastewater treatment system for assimilation. No significant impact to water quality is anticipated.

An area of concern is the potential risk of failure of the gasification technology and the subsequent construction of a recovery boiler. During this construction period the smelters would be operated to maintain production at the mill. This time period could very possibly run past the MACT II compliance date. There then is a risk that total emissions over the project period would exceed

emissions if the project were not pursued and conventional technology was put into place by the compliance date. The following table shows emissions in total tons for a set period of time during the project under differing scenarios as described.

**Table 3**  
**Comparison of Emissions in Tons**  
**Jan. 1, 2001 to Mar. 31, 2006**

	<b>Gasification Successful With XL</b>	<b>Failure of Gasification Replace with a Recovery Boiler</b>	<b>MACT II Final Dec. 2000 Recovery Boiler Without Project XL</b>	<b>MACT II Final May 2002 Recovery Boiler Without Project XL</b>
<b>NOx</b>	346	739	635	717
<b>SO2</b>	27	61	60	62
<b>CO</b>	12474	32625	18157	27578
<b>CO2</b>	509569	493513	554570	514079
<b>VOC</b>	2700	7077	3876	5955
<b>PM</b>	724	1884	1065	1599

The first column of emissions data are the total emissions estimated if the project goes as planned. The second column reflects estimated emissions should the project fail and a recovery boiler needs to be built, during which time the smelters would continue to operate. The third column is an estimate of the emissions if gasification technology is not pursued and the MACT II promulgation date is December 2000. The fourth column of data shows total emissions if we do not pursue gasification technology and the MACT II promulgation date is May 2002. The conclusions which can be drawn from this data are as follows: 1) a successful gasification technology implementation has much lower tons of emissions than the other scenarios; 2) the worst case additional pollutant burden would be the difference between column 2 (failed project) and column 3 (earliest MACT II date w/o Project XL); and 3) the best case additional pollutant burden would be the difference between column 2 and column 4 (latest MACT II date w/o Project XL).

Additionally, if you compare the annual emissions of the gasifier to a recovery boiler, the difference is 21,372 additional tons emitted from the recovery boiler. Taking out the CO<sub>2</sub> emissions, the recovery boiler will still emit an additional 234 tons every year. In summary, the parties agree that the potential additional pollutant burden in pursuing this project do not out-weigh the potential benefits.

Another area of concern is that of Environmental Justice (EJ). The two criteria reviewed to determine if the project area is an EJ area are, 1) Does the minority population in the area of concern exceed the State average for minority population?, and 2) Does the income level in the area of concern exceed the state average for poverty?. The average minority population in Virginia is 27.09%, compared to a project area average minority of 18.9%. The average percentage of population living at or below the poverty level in Virginia is 12.25%, compared to a project area poverty average of 5.0%. Both are well below state averages, therefore, this is not considered an Environmental Justice community.

## **IV. Description of the Requested Flexibility and Implementing Mechanisms**

### **A. Background**

There are no current full-scale commercial applications of the black liquor Steam-Reforming gasification technology of the type proposed by Georgia-Pacific. Thus, there are risks in attempting to construct and operate Georgia-Pacific's gasifier. Georgia-Pacific has identified two principal risks. The first risk is that, once constructed, the unit may require an extended period of unforeseen problem resolution and operational "debugging." During this commissioning period, black liquor must continue to be processed in the existing smelters to accommodate Georgia-Pacific's ongoing production demands. The parties recognize that the existing smelters cannot meet the standard of performance expected to be promulgated under MACT II, and that the gasifier "debugging" period may extend beyond the applicable MACT II promulgated compliance date for existing sources. The second risk is that the technology will simply not work and never attain "start-up" (as defined in item 13 in the schedule), either in full scale or for some reason related to Georgia-Pacific's Big Island operations. In either case, Georgia-Pacific would need to construct a standard chemical recovery boiler to comply with MACT II. In this situation also, Georgia-Pacific will need to continue to operate the existing smelters, possibly past the MACT II compliance date for existing sources while the standard recovery boiler is constructed. Should either of these two situations occur, as part of this XL Project, Georgia-Pacific has requested the flexibility to operate the existing smelters past the MACT II compliance date for existing sources (once established).

Georgia-Pacific also has requested modification of certain steam utilization restrictions that were imposed in a construction permit issued by the Virginia Department of Environmental Quality (VADEQ). The restrictions stem from new source review regulations issued by EPA under the CAA which are implemented by VADEQ. The modification is requested to account for the new steam production expected from combustion of the gasifier product gas.

## B. Flexibility - Federal

To accommodate the requested flexibilities and implement this XL project, the EPA expects to propose an amendment to the promulgated MACT II performance standard, or propose language within a MACT II reproposal, to establish a later, site-specific compliance date for the existing smelters at the Georgia-Pacific Big Island plant. Additionally, VADEQ expects to modify the steam utilization requirements in the existing Virginia permit, issue to Georgia-Pacific a permit to construct the Steam-Reforming gasifier (or conventional recovery boiler, if necessary), and incorporate specific emission limits for the gasifier in Georgia-Pacific's CAA Title V permit for the Big Island facility.

### 1. Compliance Date Flexibility

EPA expects that its decision whether to extend the MACT II compliance date will depend on the occurrence of certain events and completion of certain actions by Georgia-Pacific. Although EPA expects that the exact regulatory language for any site specific MACT II compliance date extension will be established in an amendment to or reproposal of the MACT II rule, the Agency does expect that such language would include requirements for qualifying for an extension, a description of the extension being granted, and procedures G-P must follow to establish an extension. These expected requirements are described in greater detail below.

i. As part of this XL Project, Georgia-Pacific will undertake the installation and operation of a prototype, black-liquor Steam-Reforming Gasifier. The parties to this FPA understand that EPA expects to provide a later compliance date for the MACT II if, and only if, one or more of the following events takes place (notification of which Georgia Pacific will timely give to the other stakeholders as provided in this FPA):

a. Georgia-Pacific (1) experiences a delay beyond its control during the construction and/or startup (as defined in items 12 and 13 of the Schedule) of the new gasifier, (2) determines that the delay is likely to prevent the gasifier from "achieving startup" by the promulgated MACT II compliance date for existing sources (applicable to the existing smelters), and (3) expects that ultimately it will be able to complete construction, commissioning and startup of the new gasifier within a defined period of time, after which it expects that the gasifier will comply with the MACT II requirements for new sources and that it will decommission the existing smelters; or

b. Georgia-Pacific determines at some point during the construction, commissioning and/or startup of the new gasifier that (1) the unit will not work as it expects (e.g., discovery of a fatal flaw, or persistent or intractable operational problems [*G-P, please include the criteria or standards you expect to use in making this decision*]), (2) construction must begin on a conventional chemical recovery system to comply with the MACT II standard(s), and (3) installation/operation of the conventional system cannot be completed by the MACT II compliance date for existing sources (applicable to the existing smelters).

ii. If and when Georgia-Pacific qualifies for an extension to the MACT II compliance date, the new compliance date will be determined as follows:

a. If Georgia-Pacific determines that the new gasifier will not be able to achieve startup by the MACT II compliance date for existing sources (applicable to the existing smelters), due to the circumstances described in paragraph i.a. above and so notifies EPA, EPA expects that it will



grant Georgia-Pacific an extended MACT II compliance date until which time Georgia-Pacific would be permitted to operate the existing smelters. The extended compliance date would be based on a period consistent with the amount of delay experienced in construction of the gasifier, or the time needed to effect modifications to the gasifier that will lead to startup. EPA does not expect to extend the compliance date beyond 03/31/07 (presuming the promulgated MACT II compliance date precedes 03/31/07); or

b. If Georgia-Pacific determines that the gasifier project has failed under paragraph i.b. above and so notifies EPA, EPA expects that it will grant Georgia-Pacific an extension to the MACT II compliance date of three years from the date of such notification so that Georgia Pacific would be permitted to operate the existing smelters while a new conventional chemical recovery system is installed. EPA does not expect to extend the compliance date beyond 3/31/07.\*

As part of the site-specific regulatory language to be included in the MACT II rule, EPA expects to propose information/reporting requirements and procedures for Georgia-Pacific to follow to appropriate a compliance extension. EPA intends information/reporting requirements to define the notice Georgia-Pacific must submit to support the need for a compliance extension and any follow-up or progress reports necessary after initial notification. Such support may include: evidence of good faith attempts to make the gasifier technology work, description of delays experienced or operational problems, and details of the plan to continue to pursue proper operation of the gasifier or details of the reasons for declaring failure of the project. EPA's proposed procedures will govern timing of notifications and compliance extension approvals.

## 2. Kraft Liquor Trials

In addition to the regulatory flexibility contemplated above, the parties recognize that Georgia Pacific, as a condition of receiving DOE funding, intends to conduct a trial of the suitability of the gasifier for use with black liquor generated in Kraft pulp and paper mills (i.e. different from the type of black liquor used in semi-chemical pulp and paper mills such as the Big Island facility). While the precise timing of the trial will be detailed at a later date, the parties anticipate that the trial will not last more than three weeks (500 operating hours) in total (see schedule). During the Kraft liquor trial phase, it will be necessary to operate the existing smelters to process the mill's black liquor. EPA expects that the site-specific section of the MACT II will also permit operation of the smelters during this period.

## C. Flexibility - State

Georgia-Pacific also has requested modification of certain steam utilization restrictions that were imposed in a construction permit issued by VADEQ. The modification is requested to account for the new steam production expected from combustion of the gasifier product gas. G-P and VADEQ intend to effectuate the necessary permit modifications to accomplish this change. Specifically, the gasifier-generated steam will be used to offset steam generated by a higher cost natural gas. The associated cost savings is critical in G-P's financial evaluation determining if it can proceed with the project.

Currently, the operating permit for the Linerboard/OCC complex and the No.6 Power Boiler restricts the source of steam to operate the linerboard and OCC equipment. This requested flexibility will modify this permit to allow steam generated by the gasifier and associated steam-generating equipment to supply steam in place of some amount of steam from the No. 6 boiler.

## B. Legal Implementing Mechanisms

The Commonwealth of Virginia intends to propose and issue a permit to construct and operate a chemical recovery system for the Georgia-Pacific mill located in Big Island, Virginia. This permit will be issued under the authority of 9 VAC 5-80-10 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution of the Commonwealth of Virginia.

## V. Discussion of Intentions and Commitments for Implementing the Project

### A. [The Project Sponsor's name] Intentions and Commitments

### B. EPA's, [State]'s, and [local agency]'s Intentions and Commitments

*Suggested language, depending on the nature of the flexibility:*

"1. EPA intends to propose and issue (subject to applicable procedures and review of public comments) a site-specific rule, amending 40 CFR Part \_\_\_ [*relevant citation*], and/or to propose and issue (also subject to applicable procedures and review of public comments) a permit or a permit modification under 40 CFR [*new citation*] that applies specifically to the [*Project Sponsor's*] facility. The [*site-specific rule or permit*] will also provide for withdrawal or termination and a postProject compliance period consistent with Section \_\_\_ of this Agreement, and will address the transfer procedures included in Section \_\_. The standards and reporting requirements set forth in Section \_\_\_ [and Attachments of this Agreement] will be implemented in the [*sitespecific rule and/or associated permit and/or other local rule, permit, etc.*]

"2. The State of [*name*] intends to propose and issue (subject to applicable procedures and review of public comments) a [*rule, permit, order, etc.*] under [*cite relevant state authority*]." [*Describe the specifics of what goes into the state legal mechanism*].

3. [*Describe local authority actions, if needed.*]

### C. Project XL Performance Targets

See schedule below and Appendix.

### D. Proposed Schedule and Milestones

#### Proposed Schedule and Milestones

		<u>Start</u>	<u>Completion</u>
1. DOE Solicitation and Contract	01/04/00		06/15/00
2. Project XL FPA	12/18/99		
3. DEQ Construction Permit	01/21/00		06/01/00
4. Project XL Federal Register/ Public Comment	04/15/00	07/30/00	
5. Detailed Engineering	05/01/00		12/30/00
6. Procurement of Major Equipment	08/01/00		12/30/00
7. Purchase Remaining Equip. and Mat.	08/01/00		02/28/01
8. Select Construction Contractors	03/01/01		02/28/02

9. Project XL Stakeholder Update		01/30/01
10. Construction/ Equipment Installation	09/01/01	08/30/02
11. Project XL Stakeholder Update		01/30/02
12. Commissioning/Modifications/Training	08/01/02	09/01/03
13. Start-up		09/01/03
14. Project XL Stakeholder Update		01/30/03
15. Emission Performance Testing		02/15/04
16. Kraft Liquor Trial	09/01/03	05/01/04
17. Modify State Air Permit	02/28/04	05/30/05
18. Project XL Stakeholder Update		01/30/04
19. DOE Demonstration and Final Report	02/01/03	05/30/05
20. Decommission Existing Smelters	03/01/04	08/30/04
21. Final EPA Project XL Stakeholder Update		09/30/04

Note: No later than 6 months after Start-up, G-P will determine whether the project is successful or must be replaced with alternative technology. If the project is deemed a failure, a three-year project to install conventional recovery boiler technology will be started at this time. Please Appendix 3 for a detailed description of each milestone.

**E. Project Tracking, Reporting and Evaluation**

*For guidance on this section, please refer to Appendix A and B of this Guide*

**F. Periodic Review by the Parties to the Agreement***Suggested language:* “ The Parties will hold periodic performance review conferences to assess their progress in implementing this Project. Unless they agree otherwise, the date for those conferences will be concurrent with annual Stakeholder Meetings. No later than thirty (30) days following a periodic performance review conference, [the Project Sponsor] will provide a summary of the minutes of that conference to all Direct Stakeholders. Any additional comments of participating Stakeholders will be reported to EPA.”

**G. Duration**

“This Agreement will remain in effect for [X] years, unless the Project ends at an earlier date, as provided under Section \_\_ (Amendments or Modifications), Section \_\_ (Withdrawal or Termination), or Section \_\_ (Transfer of Project Benefits and Responsibilities). The implementing mechanism(s) will contain “sunset” provisions ending authorization for this Project [X] years after the effective date of the [implementing mechanism(s)]. They will also address withdrawal or termination conditions and procedures (as described in Section \_\_). This Project will not extend past the agreed upon date, and [the Project Sponsor] will comply with all applicable requirements following this date (as described in Section \_\_), unless all parties agree to an amendment to the Project term (as provided in Section \_\_).”

**VI. Legal Basis for the Project**

**A. Authority to Enter Into the Agreement**

*Suggested language:* “By signing this Agreement, EPA, the State of ...[*name*], [local government], and ... [*the Project Sponsor’s name*] acknowledge and agree that they have the respective authorities, discretion, and resources to enter into this Agreement and to implement all applicable provisions of this Project, as described in this Agreement.”

#### **B. Legal Effect of the Agreement**

*Suggested Language:* “This Agreement states the intentions of the Parties with respect to [*the Project Sponsor’s name*]’s XL Project. The Parties have stated their intentions seriously and in good faith, and expect to carry out their stated intentions.”

“This Agreement in itself does not create or modify legal rights or obligations, is not a contract or a regulatory action, such as a permit or a rule, and is not legally binding or enforceable against any Party. Rather, it expresses the plans and intentions of the Parties without making those plans and intentions binding requirements. This applies to the provisions of this Agreement that concern procedural as well as substantive matters. Thus, for example, the Agreement establishes procedures that the parties intend to follow with respect to dispute resolution and termination (see Sections \_\_\_ and \_\_\_). However, while the parties fully intend to adhere to these procedures, they are not legally obligated to do so.”

“EPA intends to propose for public comment the [*insert name of legal mechanism, e.g. rule, permit modification, etc.*] needed to implement this Project. Any rules, permit modifications or legal mechanisms that implement this Project will be effective and enforceable as provided under applicable law.”

“This Agreement is not a “final agency action” by EPA, because it does not create or modify legal rights or obligations and is not legally enforceable. This Agreement itself is not subject to judicial review or enforcement. Nothing any Party does or does not do that deviates from a provision of this Agreement, or that is alleged to deviate from a provision of this Agreement, can serve as the sole basis for any claim for damages, compensation or other relief against any Party.”

#### **C. Other Laws or Regulations That May Apply**

*Suggested Language:* “Except as provided in the legal implementing mechanisms for this Project, the parties do not intend that this Final Project Agreement will modify any other existing or future laws or regulations.”

#### **D. Retention of Rights to Other Legal Remedies**

*Suggested language:* “Except as expressly provided in the legal implementing mechanisms described in Section \_\_\_, nothing in this Agreement affects or limits [*the Project Sponsor’s*], EPA’s, the State’s, or any other signatory’s legal rights. These rights include legal, equitable, civil, criminal or administrative claims or other relief regarding the enforcement of present or future applicable federal and state laws, rules, regulations or permits with respect to the facility.”

Although [*the Project Sponsor*] does not intend to challenge agency actions implementing the Project (including any rule amendments or adoptions, permit actions, or other action) that are consistent with this Agreement, [*the Project Sponsor*] reserves any right it may have to appeal or otherwise challenge any EPA, [*State*] [*or local authority*] action to implement the Project. With regard to the legal implementing mechanisms, nothing in this Agreement is intended to limit [*the Project Sponsor’s*] right of to administrative or judicial appeal or review of those legal mechanisms, in accordance with the applicable procedures for such review.”

### **vii. Unavoidable Delay During Project Implementation**

*It is a good idea to anticipate that things may not always go as planned and write an agreement that can adapt to these situations.*

*Suggested language:* “Unavoidable delay” (for purposes of this Agreement) means any event beyond the control of any Party that causes delays or prevents the implementation of the Project described in this Agreement, despite the Parties’ best efforts to put their intentions into effect. An unavoidable delay can be caused by, for example, a fire or acts of war.”

“When any event occurs that may delay or prevent the implementation of this Project, whether or not it is avoidable, the Party to this Agreement who knows about it will immediately provide notice to the remaining Parties. Within ten (10) days after that initial notice, the Party should confirm the event in writing. The confirming notice should include: 1) the reason for the delay; 2) the anticipated duration; 3) all actions taken to prevent or minimize the delay; and 4) why the delay was considered unavoidable, accompanied by appropriate documentation.”

“If the Parties, agree that the delay is unavoidable, relevant parts of the Project schedule (see Section \_\_\_) will be extended to cover the time period lost due to the delay. If they agree, they will also document their agreement in a written amendment to this Agreement. If the Parties don’t agree, then they will follow the provisions for Dispute Resolution outlined below.”

“This section applies only to provisions of this Agreement that are not implemented by legal implementing mechanisms. Legal mechanisms, such as permit provisions or rules, will be subject to modification or enforcement as provided under applicable law.”

## VIII. Amendments or Modifications to the Agreement

*Suggested language:* “This Project is an experiment designed to test new approaches to environmental protection and there is a degree of uncertainty regarding the environmental benefits and costs associated with activities to be undertaken in this Project. Therefore, it may be appropriate to amend this Agreement at some point during its duration.”

“This Final Project Agreement may be amended by mutual agreement of all parties at any time during the duration of the Project. The parties recognize that amendments to this Agreement may also necessitate modification of legal implementation mechanisms (*such as a rule or permit*) or may require development of new implementation mechanisms. If the Agreement is amended, EPA and [*the Project Sponsor*] expect to work together with other regulatory bodies and stakeholders to identify and pursue any necessary modifications or additions to the implementation mechanisms in accordance with applicable procedures. If the parties agree to make a substantial amendment to this Agreement, the general public will receive notice of the amendment and be given an opportunity to participate in the process, as appropriate.”

“In determining whether to amend the Agreement, the parties will evaluate whether the proposed amendment meets Project XL acceptance criteria and any other relevant considerations agreed on by the parties. All parties to the Agreement will meet within ninety (90) days following submission of any amendment proposal (or within a shorter or longer period if all parties agree) to discuss evaluation of the proposed amendment. If all parties support the proposed amendment, the parties will (after appropriate stakeholder involvement) amend the Agreement.”

## IX. Transfer of Project Benefits and Responsibilities to a New Owner

*If applicable, this section describes what would happen if the facility were sold or new owners or operators took over.*

*Suggested language:* “The parties expect that the implementing mechanisms will allow for a transfer of [*the Project Sponsor’s*] benefits and responsibilities under the Project to any future owner or operator upon request of [*the Project Sponsor*] and the new owner or operator, provided that the following conditions are met:

- A. [The Project Sponsor] will provide written notice of any such proposed transfer to the EPA, [State,] [and local authority] at least ninety (90) days before the effective date of the transfer. The notice is expected to include identification of the proposed new owner or operator, a description of its financial and technical capability to assume the obligations associated with the Project, and a statement of the new owner or operator's intention to take over the responsibilities in the XL Project of the existing owner or operator.
- B. Within forty-five (45) days of receipt of the written notice, the parties expect that EPA, [State,] [and local authority], in consultation with [stakeholder(s)], will determine whether: 1) the new owner or operator has demonstrated adequate capability to meet EPA's requirements for carrying out the XL Project; 2) is willing to take over the responsibilities in the XL Project of the existing owner or operator; and 3) is otherwise an appropriate Project XL partner. Other relevant factors, including the new owner or operator's record of compliance with Federal, State and local environmental requirements, may be considered as well.

It will be necessary to modify the Agreement to reflect the new owner and it may also be necessary for EPA, [the State] [, and the local authority] to amend appropriate rules, permits, or other implementing mechanisms (subject to applicable public notice and comment) to transfer the legal rights and obligations of [the Project Sponsor] under this Project to the proposed new owner or operator."

## X. Process for Resolving Disputes

*Suggested language:* "Any dispute which arises under or with respect to this Agreement will be subject to informal negotiations between the parties to the Agreement. The period of informal negotiations will not exceed twenty (20) calendar days from the time the dispute is first documented, unless that period is extended by a written agreement of the parties to the dispute. The dispute will be considered documented when one party sends a written Notice of Dispute to the other parties.

If the parties cannot resolve a dispute through informal negotiations, the parties may invoke non-binding mediation by describing the dispute with a proposal for resolution in a letter to the Regional Administrator for EPA Region [#]. The Regional Administrator will serve as the non-binding mediator and may request an informal mediation meeting to attempt to resolve the dispute. He or she will then issue a written opinion that will be non-binding and does not constitute a final EPA action. If this effort is not successful, the parties still have the option to terminate or withdraw from the Agreement, as set forth in Section \_\_\_ below."

## XI. Withdrawal From or Termination of the Agreement

### A. Expectations

*Suggested language:* "Although this Agreement is not legally binding and any party may withdraw from the Agreement at any time, it is the desire of the parties that it should remain in effect through the expected duration of [X# of] years, and be implemented as fully as possible unless one of the conditions below occurs:

1. Failure by any party to (a) comply with the provisions of the enforceable implementing mechanisms for this Project, or (b) act in accordance with the provisions of this Agreement. The assessment of the failure will take its nature and duration into account.
2. Failure of any party to disclose material facts during development of the Agreement.

3. Failure of the Project to provide superior environmental performance consistent with the provisions of this Agreement.
4. Enactment or promulgation of any environmental, health or safety law or regulation after execution of the Agreement, which renders the Project legally, technically or economically impracticable.
5. Decision by an agency to reject the transfer of the Project to a new owner or operator of the facility.

In addition, EPA, [the State], [and the local authority] do not intend to withdraw from the Agreement if [the Project Sponsor's name] does not act in accordance with this Agreement or its implementation mechanisms, unless the actions constitute a substantial failure to act consistently with intentions expressed in this Agreement and its implementing mechanisms. The decision to withdraw will, of course, take the failure's nature and duration into account.

[The Project Sponsor] will be given notice and a reasonable opportunity to remedy any "substantial failure" before EPA's withdrawal. If there is a disagreement between the parties over whether a "substantial failure" exists, the parties will use the dispute resolution mechanism identified in section \_\_\_ of this Agreement. EPA, the State of ...[name], and ...[any other signatory?] retain their discretion to use existing enforcement authorities, including withdrawal or termination of this Project, as appropriate. [The Project Sponsor] retains any existing rights or abilities to defend itself against any enforcement actions, in accordance with applicable procedures."

#### **B. Procedures**

*Suggested language:* "The parties agree that the following procedures will be used to withdraw from or terminate the Project before expiration of the Project term. They also agree that the implementing mechanism(s) will provide for withdrawal or termination consistent with these procedures.

1. Any party that wants to terminate or withdraw from the Project is expected to provide written notice to the other parties at least sixty (60) days before the withdrawal or termination.
2. If requested by any party during the sixty (60) day period noted above, the dispute resolution proceedings described in this Agreement may be initiated to resolve any dispute relating to the intended withdrawal or termination. If, following any dispute resolution or informal discussion, a party still desires to withdraw or terminate, that party will provide written notice of final withdrawal or termination to the other parties.

If any agency withdraws or terminates its participation in the Agreement, the remaining agencies will consult with [the Project Sponsor] to determine whether the Agreement should be continued in a modified form, consistent with applicable federal or State law, or whether it should be terminated.

3. The procedures described in this Section apply only to the decision to withdraw or terminate participation in this Agreement. Procedures to be used in modifying or rescinding any legal implementing mechanisms will be governed by the terms of those legal mechanisms and applicable law. It may be necessary to invoke the implementing mechanism's provisions that end authorization for the Project (called "sunset provisions") in the event of withdrawal or termination."

## **XII. Compliance After the Project is Over**

*Final Project Agreements and most implementing mechanisms are negotiated for a finite period of time. After that time, the Project Sponsor needs to go back to complying with the requirements that would have been in effect without the flexibility provided through Project XL, unless the Project was successful and the Agreement and its implementing mechanisms are amended to extend the Project's term. If the*

*results of the experiment are clearly successful, then this can be easily assessed. If the results and transferability opportunities are not obvious, EPA will conduct an evaluation.*

*If the requirements for returning to traditional regulations are clear, then the process outlined below may be followed. If the requirements are not clear, you may need to include provisions for an evaluation of the Project and an implementation schedule for returning to traditional regulations, as described in the Andersen Windows Project (see [www.epa.gov/ProjectXL](http://www.epa.gov/ProjectXL)).*

*Suggested language: “The parties intend that there be an orderly return to compliance upon completion, withdrawal from, or termination of the Project, as follows:*

**A. Orderly Return to Compliance with Otherwise Applicable Regulations, if the Project Term is Completed**

*EPA will conduct an evaluation of the project before a decision is made that the project has been completed.*

*“If, after an evaluation, the Project is terminated because the term has ended, [the Project Sponsor] will return to compliance with all applicable requirements by the end of the Project term, unless the Project is amended or modified in accordance with Section \_\_\_ of this Agreement (Amendments or Modifications). [The Project Sponsor] is expected to anticipate and plan for all activities to return to compliance sufficiently in advance of the end of the Project term. [The Project Sponsor] may request a meeting with EPA, [State], and [local authority] to discuss the timing and nature of any actions that [the Project Sponsor] will be required to take. The parties should meet within thirty days of receipt of [the Project Sponsor’s] written request for such a discussion. At and following such a meeting, the parties should discuss in reasonable, good faith, which of the requirements deferred under this Project will apply after termination of the Project.”*

**B. Orderly Return to Compliance with Otherwise Applicable Regulations in the Event of Early Withdrawal or Termination**

*“In the event of a withdrawal or termination not based on the end of the Project term and where the [Project Sponsor] has made efforts in good faith, the parties to the Agreement will determine an interim compliance period to provide sufficient time for [the Project Sponsor] to return to compliance with any regulations deferred under the Project. The interim compliance period will extend from the date on which EPA, [State], [local authority] or [the Project Sponsor] provides written notice of final withdrawal or termination of the Project, in accordance with Section \_\_\_ of this Project Agreement. By the end of the interim compliance period, [the Project Sponsor] will comply with the applicable deferred standards set forth in 40 CFR Part [X] and [State laws/regulations]. During the interim compliance period, EPA [State, and/or local authority] may issue an order, permit, or other legally enforceable mechanism establishing a schedule for [the Project Sponsor] to return to compliance with otherwise applicable regulations as soon as practicable. This schedule cannot extend beyond [ X # of] months from the date of withdrawal or termination. [The Project Sponsor] intends to be in compliance with all applicable Federal, State, and local requirements as soon as is practicable, as will be set forth in the new schedule.”*

*If good-faith efforts have not been made, EPA will enforce the Project’s legal implementing mechanisms.*

### **XIII. Signatories and Effective Date**



## Appendix 1: Glossary of Terms

BACT – Best available Control Technology

Black Liquor - Spent pulping liquor; Pulping chemicals with organics cooked out of wood chips

Black Liquor Solids (BLS)- Used cooking liquor after the water has been evaporated

Commissioning – The period of time between construction and Start-up

Construction Permit – VADEQ Air permit allowing construction of a facility and outlining compliance limits

Containerboard – material used to make containerboard boxes (cardboard)

Cooking Liquor – The chemicals used to cook (pulp) wood chips. In the case of Big Island these chemicals are sodium carbonate and sodium hydroxide.

Corrugated Medium – Paper used to make the fluted inner layer of containerboard (cardboard)

Criteria Pollutants –

DOE – Department of Energy

EPA – Environmental Protection Agency

Furnish – The raw materials (fiber, pulp) used to make paper

FPA – Final Project Agreement

Gasification - Converting organics into a combustible gas through heat input

Green Liquor - Pulping chemicals after removal of the organics and inert material

HAPs – Hazardous Air Pollutants

Linerboard – Paper used to make the inner and outer layer of containerboard

MACT - Maximum Achievable Control Technology - Federal Air Regulations

MACT II – Proposed federal regulations addressing HAPs from Pulp and Paper Mill Chemical Recovery systems

Medium Machine – Paper machine that makes corrugating medium

NO<sub>x</sub> – Nitrogen oxides

Old Corrugated Container (OCC) – Post-consumer waste containerboard

Particulates (PM) – Particulate matter

PSD – Prevention of Significant Deterioration

Secondary Fiber – Pulp made from post-consumer waste paper

Smelter – A technology used to combust the organics from pulp cooking liquor

SO<sub>2</sub> – Sulfur dioxide

Start-up – The day Commissioning ends. This also triggers the 180 day performance testing period

Steam-Reforming Gasification - Using indirect heat and steam to drive the gasification process

Total Reduced Sulfur (TRS) – Emissions of sulfur in a chemically reduced state (ie: Hydrogen sulfide, Methyl mercaptan, etc.)

VADEQ – Virginia Department of Environmental Quality

VOCs – Volatile Organic Compounds

XL – eXcellence in Leadership

## Appendix 2: Schedule and Milestones

### Proposed Schedule and Milestones

	<u>Start</u>	<u>Completion</u>
1. DOE Solicitation and Contract	01/04/00	06/15/00
2. Project XL FPA	12/18/99	
3. DEQ Construction Permit	01/21/00	06/01/00
4. Project XL Federal Register/ Public Comment	04/15/00	07/30/00
5. Detailed Engineering	05/01/00	12/30/00
6. Procurement of Major Equipment	08/01/00	12/30/00
7. Purchase Remaining Equip. and Mat.	08/01/00	02/28/01
8. Select Construction Contractors	03/01/01	02/28/02
9. Project XL Stakeholder Update		01/30/01
10. Construction/ Equipment Installation	09/01/01	08/30/02
11. Project XL Stakeholder Update		01/30/02
12. Commissioning/Modifications/Training	08/01/02	09/01/03
13. Start-up		09/01/03
14. Project XL Stakeholder Update		01/30/03
15. Emission Performance Testing		02/15/04
16. Kraft Liquor Trial	09/01/03	05/01/04
17. Modify State Air Permit	02/28/04	05/30/05
18. Project XL Stakeholder Update		01/30/04
19. DOE Demonstration and Final Report	02/01/03	05/30/05
20. Decommission Existing Smelters	03/01/04	08/30/04
21. Final EPA Project XL Stakeholder Update		09/30/04

Note: No later than 6 months after Start-up, G-P will determine whether the project is successful or must be replaced with alternative technology. If the project is deemed a failure, a three-year project to install conventional recovery boiler technology will be started at this time.

## Appendix 2

### Description of the Schedule Activities

1. DOE Solicitation and Cooperative Agreement: G-P prepares a proposal responding to DOE's solicitation for projects to develop and demonstrate Black Liquor/Biomass Gasification in the Forest Products Industry (DE-PS26-00NT40772). G-P's proposal will include; a project description, cost-benefit, how it will be built, how it will be tested, and how the technology will be commercialized in the future. If DOE selects the project for funding, a NEPA review will be conducted. This is a process where the funding agency conducts an analysis of the potential environmental and public consequences that could result from the project.

G-P expects to complete the proposal and submit it to DOE by 2/29/00. DOE anticipates that selections of the winning proposals will be announced the first week in April and that cooperative agreements will be negotiated and awarded within the following 90 days, although the length of time required to finalize an agreement depends on the complexity of the negotiation process.

Following the selection announcement, DOE will initiate the NEPA review and begin negotiation of the agreement. During the negotiation period, DOE can authorize an organization to perform agreed-on work prior to completing actual award of an agreement, and DOE would subsequently reimburse the organization for these allowable costs, up to the amount of DOE's cost-share, after the agreement is awarded. However, until the NEPA review is completed, DOE cannot authorize use of funds for construction or other activities that would have an adverse environmental impact or limit DOE's choice of reasonable alternatives.

DOE's anticipated schedule for completing awards within 90 days following selection (i.e., before the end of June 2000) will not affect G-P's critical date of 8/1/00 for starting procurement of major equipment. An award can be made prior to completing the NEPA review. The length of time that DOE will require for completing the NEPA review, however, is uncertain and can vary considerably depending on the complexity and controversy of the activity being reviewed. While the Project XL stakeholder process conducted by G-P and the Federal Register/public comment step used by EPA as part of the FPA process, should aid and be a positive influence on DOE's NEPA review, a review time extending more than about 4 months from the target date for selection of winning proposals will have a critical impact on schedules for installing the black liquor gasification technology.

2. Project XL FPA: The Project XL FPA completion date is not critical unless it extends beyond the NEPA review. It is hoped that negotiations on the FPA will be completed and published in the Federal Register for comment before that time so that it will have a positive influence on the NEPA review.

3. DEQ Construction Permit: The permit schedule does not become critical until it extends beyond the contract date.
4. Project XL Federal Register/Public Comment: The final FPA will be published in the Federal Register, with EPA comment as appropriate. We would hope that these dates are not critical, as we do not expect many negative comments due to the nature of the XL process.
5. Detailed Engineering: The actual design of the project is done during this phase. This includes specifying the equipment required, designing the foundations, piping, electrical, building steel and instrumentation required. The start of detailed engineering is a critical date. We should be able to meet this date if 'pre-contract costs' are approved.
6. Procurement of Major Equipment: During this activity, the major pieces of process equipment are purchased. This must occur early due the length of time required to design many components and to custom build them. The start of procurement is critical. Before this starts, items 1, 2, & 3 must be completed. This drives the rest of the project schedule. If this is delayed, it may be possible to compress the schedule by paying a premium for expedited delivery of critical portions of the equipment.
7. Purchase Remaining Equipment and Material: During this activity all of the generic equipment such as pumps and motors are purchased. Also, piping, electrical and instrument materials are ordered. This is not a time critical activity.
8. Select Construction Contractors: During this phase, the engineering information from 6 and 7 is used to obtain bids and select a construction contractor. From this point forward, the contractor helps to determine the best ways to build the project. This is not a time critical activity.
9. Project XL Stakeholder Update: Stakeholders are briefed on project progress.
10. Construction/ Equipment Installation: The period when the project is under construction.
11. Project XL Stakeholder Update: Second XL Stakeholder briefing.
- 11.**
12. Commissioning/Modification/Training: Due to the innovative nature of the technology and the fact that the equipment has never been operated on a commercial scale, time is allowed in this schedule to adjust parts of the process or equipment to make them work. During this time, operators, engineers and maintenance personnel learn to operate the equipment more efficiently. Adjustments are evaluated to determine progress and required additional changes. During the commissioning period each part of the chemical recovery system is checked to make sure it is complete, and is installed properly. Each part is then operated on its own to make sure it works. After individual parts are checked, the entire system is operated. Commissioning will culminate with the successful completion of the gasifier technology supplier's performance warranty demonstration. This demonstration is a series of trials to prove the technology and equipment are capable of performing to the contractual levels. This is required before release of final payment to the supplier.
13. Start-Up: For this innovative XL project, Start-up will occur at the end of the commissioning phase or three years following the execution of the Department of Energy Cooperative Funding Agreement for this project, whichever is earlier. This Start-up date will trigger the 180-day period for doing performance testing for the State construction permit and proving compliance with the MACT II standards. No later than 180 days after Start-up, G-P will determine whether the project is successful or must be replaced with alternative technology. If the project is deemed a failure, a three-year project to install conventional recovery boiler technology will be started at this time.
14. Project XL Stakeholder Update: Third Stakeholder briefing.

15. Air Emission Performance Testing: The environmental testing required by the EPA and the VADEQ permit will be complete by this time. Mill “start-up” triggers obligation for VADEQ compliance testing period. These requirements are triggered by a “start-up” date.
15. 16. Kraft Liquor Trial: After the plant is running well on Big Island black liquor, we will try to run it on liquor from a Kraft mill. This is required to determine how this technology can be applied to other facilities. This is part of the commercialization plan with DOE to make the technology benefits available to more users. Please see section II.B.5 for more information regarding the Kraft black liquor trials.
17. Modify State Air Permit: Based on the results of Emission-Limit Reducing Testing performed over a period of time, the permit limits will be adjusted, reflecting new limits for the gasifier.
18. Project XL Stakeholder Update: Fourth Stakeholder briefing.
19. DOE Demonstration and Final Report: During this period, the process will be operated normally as it will in the future. The equipment and process will be monitored to determine if there is any long-term problem that needs to be addressed. Examples of items to be checked include the corrosion and wear rates of the equipment. Is the process reliable and stable? Are there any maintenance or operations problems?
20. Decommission Existing Smelters: After the process is proven and reliable, the smelters will be physically isolated from the process and removed.
21. Final EPA Project XL Stakeholder Update: The final report to DOE detailing all the events of the project along with documentation of the benefits predicted and achieved as well as problems and flaws will be prepared and provided to all participants.

## Appendix 3: Stakeholders and Interested Parties

### Stakeholder Group

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