Secondary Outcome Measures: Toxicity [Time Frame: 3 months]–toxicity reported by type, frequency and severity. Worst toxicity grades per patient tabulated for selected adverse events and laboratory measurements. Toxicity (grade 3 or 4) monitored based on the Bayesian model (beta-binomial) by assuming a priori probability of toxicity following beta(1,1).

Eligibility: 18 Years and older; both genders are eligible.

Inclusion Criteria: 1. Patients must have a diagnosis of high-risk CLL/SLL and be previously treated with up to 3 lines of prior therapy. High-risk CLL and high-risk SLL is defined by the presence of a 17p deletion or 11q deletion or TP53 mutation. Any CLL and SLL patient who has a short remission duration of less than 3 years after prior first-line chemo-immunotherapy, such as the FCR regimen, also fulfills criteria of high-risk CLL/SLL, regardless of the presence or absence of cytogenetic abnormalities. 2. CLL and SLL patients with 17p deletion or TP53 mutation will not be required to have received any prior therapy, given the poor outcome of CLL/SLL patients to standard frontline chemo-immunotherapy, such patients will be eligible if they are untreated or if they have received up to 3 lines of prior therapy. 3. Patients must have an indication for treatment by 2008 IWCLL Criteria. 4. Patients age >18 years at the time of signing informed consent. Understand and voluntarily sign an informed consent. Be able to comply with study procedures and follow-up examinations. 5. ECOG/WHO performance status of 0-1. 6. Patients of childbearing potential must be willing to practice highly effective birth control (e.g., condoms, implants, injectables, combined oral contraceptives, some intrauterine devices [IUDs], sexual abstinence, or sterilized partner) during the study and for 30 days after the last dose of study drug. Women of childbearing potential include any female who has experienced menarche and who has not undergone successful surgical sterilization (hysterectomy, bilateral tubal ligation, or bilateral oophorectomy) or is not postmenopausal. Post menopause is defined as follows: Amenorrhea >/=12 consecutive months without another cause and a documented serum follicle stimulating hormone (FSH) level >35 mIU/mL; a male of childbearing potential is any male that has not been surgically sterilized. 7. Adequate renal and hepatic function as indicated by all of the following: Total bilirubin </=1.5×institutional Upper Limit of Normal (ULN) except for patients with bilirubin elevation due to Gilbert's disease who will be allowed to participate; an ALT </=2.5×ULN; and an estimated creatinine clearance (CrCl) of >30 mL/min, as calculated by the Cockroft-Gault equation unless disease related. 8. Free of prior malignancies for 3 years with exception of currently treated basal cell, squamous cell carcinoma of the skin, or carcinoma in situ of the cervix or breast. 9. A urine pregnancy test (within 7 days of Day 1) is required for women with childbearing potential

Exclusion Criteria: 1. Pregnant or breast-feeding females. 2. Treatment including chemotherapy, chemo-immunotherapy, monoclonal antibody therapy, radiotherapy, high-dose corticosteroid therapy (more than 60 mg Prednisone or equivalent daily), or immunotherapy within 21 days prior to enrollment or concurrent with this trial. 3. Investigational agent received within 30 days prior to the first dose of study drug or have previously taken Compound 1. If received any investigational agent prior to this time point, drug-related toxicities must have recovered to Grade 1 or less prior to first dose of study drug. 4. Systemic fungal, bacterial, viral, or other infection not controlled (defined as exhibiting ongoing signs/symptoms related to the infection and without improvement, despite appropriate antibiotics or other treatment). 5. Patients with uncontrolled Autoimmune Hemolytic Anemia (AIHA) or autoimmune thrombocytopenia (ITP). 6. Patients with severe hematopoietic insufficiency, as defined by an absolute neutrophil count of less than 500/micro-L and/or a platelet count of less than 30,000/micro-L at time of screening for this protocol. 7. Any other severe concurrent disease, or have a history of serious organ dysfunction or disease involving the heart, kidney, liver or other organ system that may place the patient at undue risk to undergo therapy with Compound 1 and rituximab. 8. Significant cardiovascular disease such as uncontrolled or symptomatic arrhythmias, congestive heart failure, or myocardial infarction within 6 months of screening, or any Class 3 or 4 cardiac disease as defined by the New York Heart Association Functional Classification. 9. Significant screening ECG abnormalities including left bundle branch block, 2nd degree AV block type II, 3rd degree block, bradycardia, and QTc >470 msec. 10. Any serious medical condition, laboratory abnormality, or psychiatric illness that places the subject at unacceptable risk if he/she were to participate in the study. 11. History of stroke or cerebral hemorrhage within 6 months. 12. Evidence of bleeding diathesis or coagulopathy. 13. Major surgical procedure, open biopsy, or significant traumatic injury within 28 days prior to Day 1, anticipation of need for major surgical procedure during the course of the study. 14. Minor surgical procedures, fine needle aspirations or core biopsies within 7 days prior to Day 1. Bone marrow aspiration and/or biopsy are allowed. 15. Serious, non-healing wound, ulcer, or bone fracture. 16. Treatment with Coumadin. Patients who recently received Coumadin must be off Coumadin for at least 7 days prior to start of the study. 17. Any chemotherapy (e.g., bendamustine, cyclophosphamide, pentostatin, or fludarabine), immunotherapy (e.g., alemtuzumab, or ofatumumab), bone marrow transplant, experimental therapy, or radiotherapy is prohibited during therapy on this study. 18. Use of medications known to prolong QTc interval or that may be associated with Torsades de Pointes (refer to Appendix F) are prohibited within 7 days of starting study drug and during study-drug treatment.

The examples and embodiments described herein are illustrative and various modifications or changes suggested to persons skilled in the art are to be included within this disclosure. As will be appreciated by those skilled in the art, the specific components listed in the above examples may be replaced with other functionally equivalent components, e.g., diluents, binders, lubricants, fillers, and the like.

What is claimed is:

1. A crystalline Form A of 1-((R)-3-(4-amino-3-(4-phenoxyphenyl)-1H-pyrazolo[3,4-d]pyrimidin-1-yl)piperidin-1-yl)prop-2-en-1-one that has an X-ray powder diffraction (XRPD) pattern comprising 2-Theta peaks at 5.7±0.1°, 18.9±0.1°, and 21.3±0.1°.

2. The crystalline form of claim **1**, wherein the X-ray powder diffraction (XRPD) pattern further comprises a 2-Theta peak at 16.1±0.1°.

3. The crystalline form of claim **1**, wherein the X-ray powder diffraction (XRPD) pattern further comprises a 2-Theta peak at 13.6±0.1°.

4. The crystalline form of claim **1**, wherein the X-ray powder diffraction (XRPD) pattern further comprises a 2-Theta peak at 21.6±0.1°.

5. The crystalline form of claim **1**, wherein the X-ray powder diffraction (XRPD) pattern further comprises 2-Theta peaks at 13.6±0.1°, 16.1±0.1°, and 21.6±0.1°.